VALUATION: DIVIDENDS, BOOK VALUES, AND EARNINGS

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1. Overview

Dividends, book values, and earnings are the three widely used financial metrics. Their popularity naturally leads to the question: how does one convert forecasts of these metrics into an estimate of equity value? This spreadsheet presents three transformations of the dividend discount model (DDM) – the dividend growth model, the book value growth model, and the earnings growth model. These transformations connect equity value to a valuation anchor and a second component attributable to growth in the valuation anchor. These anchors connect with popular relative valuation metrics as summarized in the table below.

Transformation of DDM	Anchor: Starting point in valuation	Relative valuation metric
Dividend growth model	Forthcoming dividend/cost of equity	Price to forthcoming dividend ratio
Book value growth model	Current book value	Price to book ratio
Earnings growth model	Forthcoming earnings/cost of equity	Price to forthcoming earnings ratio

These transformations are also known by the following names.

Transformation of DDM	Popular names
Dividend growth model	--
Book value growth model	Residual income valuation model (RIV, RIM) A variation is called the economic value added model (EVA™)
Earnings growth model	Abnormal earnings growth model (AEG)

Of the relative valuation metrics, price to forthcoming earnings ratio gets the most attention.

All transformations use the same inputs: (i) current book value (ii) earnings forecasts for the explicit forecast horizon of two years, (iii) dividend payout ratio, (iv) perpetual growth rate, and (v) cost of equity. Inputs (ii) and (iii) can be based on analyst forecasts. Therefore, these transformations provide a quick way to connect equity value to analyst forecasts.

There are two subsidiary spreadsheets with the following variations:

- The first supplement has a four-year horizon instead of the two-year horizon. The longer horizon allows more flexibility in varying the pre-horizon growth rates. Therefore, it is suitable for firms that will take longer to reach the post-horizon growth rate because.
- The second supplement transforms DCF rather than DDM. It discounts wealth creation (enterprise cash flows) rather than wealth distribution (dividends) and replaces the triplet {book value, earnings, dividends} with {net enterprise assets, enterprise profit after taxes, enterprise cash flows} which are their unlevered counterparts. The DCF model eliminates the need to forecast financial activities by assuming that they have zero NPV.

2. The spreadsheet implementation of the three transformations

2.1. Notation

d_t: dividends for the period t-1 to t paid out at time t
e_t: earnings for the period t-1 to t
b_t: book value after dividends have been paid out at time t
r_e: cost of equity
g: perpetual growth rate in residual earnings
ROE_t: return on equity for the period t-1 to t $[e_t/b_{t-1}]$

2.2. Dividend discount model (DDM)

The spreadsheet starts with DDM.

$$P_0 = \underbrace{0}_{\text{No anchor}} + \underbrace{\frac{d_1}{(1+r_e)} + \frac{d_2}{(1+r_e)^2}}_{\text{Until horizon}} + \underbrace{\frac{d_3}{(1+r_e)^3} + \ldots}_{\text{Beyond horizon}}$$

2.3. Dividend growth model

Why is dividend yield less than $1/r_e$? That is, why does price exceed capitalized dividends? Because dividends are expected to grow. To capture this idea, the dividend growth model shows that equity value (P_0) equals capitalized forthcoming dividends (d_1/r_e) plus the present value of subsequent capitalized dividend increments [$(d_2 - d_1)/r_e$]. (Note: this transformation differs from the so-called Gordon and Williams model, which assumes a constant growth in dividends.)

$$P_0 = \underbrace{\frac{d_1}{r_e}}_{\text{Anchor}} + \underbrace{\frac{d_2 - d_1}{r_e(1+r_e)}}_{\text{Until horizon}} + \underbrace{\frac{d_3 - d_2}{r_e(1+r_e)^2} + \ldots}_{\text{Beyond horizon}}$$

2.4. Book value growth model (a.k.a. residual income valuation (RIV) model)

Why does price exceed book value? Because of residual expected growth in book value. One measures residual growth in book value as follows:

1. Compute what the ending book value *would have been* before dividends: Cum-dividend book value = $b_t + d_t$.
2. Subtract what the ending cum-dividend book value *would have been* had the firm earned a normal return on its book value = $(1 + r_e)*b_{t-1}$.
3. Residual change in book value = $(b_t + d_t) - (1 + r_e)*b_{t-1}$.

To explain the price to book ratio, the book value growth model shows that equity value equals book value plus the present value of residual changes in book value.

$$P_0 = \underbrace{b_0}_{\text{Anchor}} + \underbrace{\frac{b_1 + d_1 - (1+r_e)*b_0}{(1+r_e)} + \frac{b_2 + d_2 - (1+r_e)*b_1}{(1+r_e)^2}}_{\text{Until horizon}} + \underbrace{\frac{b_3 + d_3 - (1+r_e)*b_2}{(r_e - g)(1+r_e)^2}}_{\text{Beyond horizon}}$$

The analysis can be augmented if $e_t = b_t + d_t - b_{t-1}$. [This relation is called the clean surplus relation.]

Now, residual change in book value = $e_t + b_{t-1} - (1 + r_e)*b_{t-1} = e_t - r_e*b_{t-1}$ = residual earnings.

Residual earnings > 0 if $e_t > r_e*b_{t-1}$, or $e_t/b_{t-1} > r_e$. Since $ROE_t = e_t/b_{t-1}$, residual earnings are positive if ROE exceeds its earnings rate benchmark r_e.

The price to book ratio exceeds 1 when ROE exceeds r_e. This can happen because of two reasons: (i) accounting conservatism causes ROE to exceed the economic return (cash flow IRR), and (2) competitive advantage causes IRR to exceed r_e. Thus, accounting conservatism can cause price to book ratio to exceed 1 even if the firm has lost its competitive advantage.

Accounting conservatism affects book value but not price because the effect of any bias in book value is offset by a compensating change in residual earnings (or residual change in book value).

2.5. Earnings growth model (aka abnormal earnings growth (AEG) model)

Why does price exceed capitalized forward earnings? Because expected residual change in earnings is positive. This new measure is defined as follows:

1. Earnings retained and reinvested in the firm = $e_{t-1} - d_{t-1}$
2. Had the reinvestment yielded a normal return, the change in earnings expected = $r_e*(e_{t-1} - d_{t-1})$
3. Actual change in earnings = $e_t - e_{t-1}$
4. Residual or abnormal change in earnings = $e_t - e_{t-1} - r_e*(e_{t-1} - d_{t-1})$

To explain the forward PE ratio, the earnings growth model shows that equity value equals capitalized forthcoming earnings (e_1/r_e) plus the present value of capitalized residual change in earnings.

$$P_0 = \underbrace{\frac{e_1}{r_e}}_{\text{Anchor}} + \underbrace{\frac{e_2 - e_1 - r_e(e_1 - d_1)}{r_e(1 + r_e)}}_{\text{Until horizon}} + \underbrace{\frac{e_3 - e_2 - r_e(e_2 - d_2)}{r_e(r_e - g)(1 + r_e)}}_{\text{Beyond horizon}}$$

2.5.1. Residual change in earnings = Change in residual earnings

Note that the change in residual earnings = $(e_t - r_e*b_{t-1}) - (e_{t-1} - r_e*b_{t-2}) = e_t - e_{t-1} - r_e(b_{t-1} - b_{t-2})$ $= e_t - e_{t-1} - r_e(e_{t-1} - d_{t-1})$ = residual change in earnings. Thus, book value growth model and the earnings growth model are similar. They differ in so far as they start with different anchors and the book value growth model discounts residual earnings while the earnings growth model discounts capitalized change in residual earnings.

2.6. Comparison of the three transformations with regards to anchor value

The spreadsheet shows that the three transformations differ in the relative contribution of the components of value listed below:

- Anchor value: This is the first term in the expression for equity value.
- Value in addition to the anchor value is split into two components – value added based on forecasts during the explicit forecast horizon period, and beyond.

The closer the anchor is to price, the more efficient is the anchor in capturing value. Empirically, out of the three variables, capitalized forward earnings tend be the closest to price, followed by book value, followed by capitalized forward dividends.

$P_0 > e_1/r_e > b_0 > d_1/r_e$

The first inequality holds because the residual change in earnings tends to be positive. That is, value is created in the future as return on new investments exceeds cost of capital.

The second inequality implies ROE > r_e because ROE = e_1/b_0. The latter typically holds because conservative accounting exerts a larger downward bias on book values than it does on earnings. If ROE equaled r_e, then earnings and book value will both be perfect anchors. However, empirically, ROE hovers around 15%, while r_e is around 10%. This could be because of two reasons: the economic return exceeds cost of capital because of competitive advantage, or the economic return equals the cost of capital but the accounting return exceeds the economic return because of conservative accounting.

The last inequality arises from the fact that dividends represent distribution of retained earnings and wealth distribution often lags wealth creation. Most companies have zero or low dividend payout.

2.7. Specifying the cost of equity and the growth rate

The input section requires two inputs that are outside financial statements: the discount rate (r_e) for residual earnings to equity (aka cost of equity) and the post-horizon growth rate in residual earnings (g). These are discussed next.

2.7.1. The discount rate (r_e)

No commonly accepted procedure exists to measure the discount rate. Some investors use the CAPM model. CAPM states: $r_e = r_f + \beta (r_m - r_f)$.

- r_f is the long-term government bond rate
- β is available from web sites such as Yahoo! Finance.
- $r_m - r_f$ is based on data provided by regular surveys.

Instead of CAPM, subjective assessments of cost of equity are used as well.

2.7.2. Perpetual growth in residual earnings (g)

We suggest three ways of specifying the growth in residual earnings (g).

First, one can equate g to the growth in sales at the horizon. This approach has the drawback that it typically leads to absurdly high valuations.

Second, one can equate g to long-run economic growth rate, which is usually around 3%. This approach has the drawback that it forces all firms to have the same growth rate.

The third approach, which we recommend, is based on the idea that risk and growth go together. Consequently, firms with a high cost of equity should also have a high growth rate. An application of this principle puts $g = r_e - E/P$. This expression is familiar in the form $P= E/(r_e-g)$. E/P is the expected earnings yield in the future. Historical E/P is roughly 6.5%, and it serves as a natural starting point.

2.7.3. Inferring the discount factor or the growth rate

The bottom of the spreadsheet allows one to enter the actual stock price and then infer either the discount factor or the growth rate. This is useful when estimated stock price differs from the actual stock price and one wants to know by how much either the discount factor or the growth rate need to be changed to equate estimated price to actual price. This procedure is called “reverse engineering”.

3. Detailed steps

3.1. Inputs

1. Input: The horizon over which earnings per share forecasts are explicitly available is two years.
2. Input: Current book value per share of common equity, i.e., excluding preferred shares and non-controlling interest.
3. Input: Cost of equity derived using CAPM or subjective assessments.
4. Input: Perpetual growth rate in residual earnings, growth rate beyond the two years. Section 2.8 in the overview recommends that, as a first cut, $g = r_e - 6.5\%$.
    - 4.1. Since residual earnings grow at g, the change in residual earnings also grows at g.
    - 4.2. Since change in residual earnings = residual change in earnings, the growth rate in residual earnings is also the growth rate in residual change in earnings.
    - 4.3. The growth rate g beyond the horizon refers to growth rate of residual earnings, not EPS. One can derive EPS growth rate from the perpetual growth rate in residual earnings coupled with other inputs.
    - 4.4. Specifically, EPS growth typically exceeds g right after the horizon and the asymptotically attenuates to g.

5. Input: EPS forecasts for the two forthcoming years. As a first cut, one can use analyst forecasts available on web sites.

   5.1. Generally, diluted EPS is used here.

6. Input: Dividend payout ratio for the forthcoming year. The model assumes that the dividend payout ratio will remain unchanged from Y1 to Y2. One can override this by typing in a new value for Y2.

   6.1. Advanced: The dividend payout ratios beyond Y2 are value irrelevant, i.e., changing the payout beyond Y2 does not affect stock price. Any change in the dividend payout changes the pattern of dividends, but not its present value. This property is often referred to as "dividend policy irrelevance". The point is subtle, yet intuitive. To get a feel for it, note that an increase in dividends in year t reduces the reinvestment in the business. The lower reinvestment reduces future earnings and dividends due to earnings foregone on reduced reinvestment.

   Specifying a growth rate for earnings rather than residual earnings would violate dividend policy irrelevancy because earnings would not respond to investments foregone due to dividends.

   6.2. Zero dividends for Y1 and Y2 pose no problems. The model effectively assumes that dividend payments will start at some point in the future, which ensures that PVED will not equal zero.

3.2. Financial statements

7. EPS for year Y1 and Y2. EPS for Y2 should not be copied across to EPS for Y3 and beyond because EPS for Y3 and beyond is derived based on forecasts of residual earnings for those years.

8. Dividends = earnings * payout ratio.

9. Book value per share (b_0) at the end of Y0. This should not be copied across.

10. $b_t = b_{t-1} + e_t - d_t$ [Ending book value = Beginning book value + earnings – dividends]

11. Charge for equity = cost of equity * beginning book value = $r_e * b_{t-1}$

12. Residual earnings until the horizon = earnings – charge for equity = $e_t - r_e * b_{t-1}$

13. Residual earnings beyond the horizon = Previous residual earnings * (1 + perpetual growth rate of residual earnings)

14. As stated before, charge for equity = cost of equity * beginning equity = $r_e * b_{t-1}$

15. Earnings = residual earnings + charge for equity, i.e., e_t = residual $e_t + r_e * b_{t-1}$

    15.1. This step shows how residual earnings drive earnings, which then drive dividends based on the payout assumption. Taken together, the steps show how the inputs lead to a sequence of dividends.

16. As stated before, dividends = earnings * payout ratio. As indicated before, a change in the Y2 payout ratio will not affect value.

17. As stated before, ending book value = beginning book value + earnings – dividends ($b_t = b_{t-1} + e_t - d_t$).

3.2.1. Growth rates and returns

18. Earnings growth rate = $(e_t - e_{t-1})/ e_{t-1} = (e_t/e_{t-1}) - 1$

    18.1. Advanced: Beyond the explicit forecast horizon, the earnings growth rate need not equal the growth rate in residual earnings. The earnings growth equals residual earnings growth only if the dividend policy is such that the book value grows at the same rate as the residual earnings. Alternatively, earnings grow at the same rate as residual earnings only if ROE is constant.

19. Dividends growth rate

20. Book value growth rate
21. Residual earnings growth rate

    21.1. Beyond the horizon year, we have specified this growth rate as an input.

22. Return on equity = earnings/beginning book value = e_t/b_{t-1}.

3.3. Intermediate optional computations for Discounted Dividends and Residual Income Models

3.3.1. Terminal value computation

Under residual income valuation model, price = book value + present value of residual earnings

$$P_2 = \underbrace{b_2}_{\text{Terminal book value}} + \underbrace{\frac{\text{Residual earnings in Y3}}{(r_e - g)}}_{\text{PV of perpetuity of residual earnings in Y3 and beyond}}$$

Terminal value

23. Book value at the end of Y2 (b_2) was derived earlier.
24. Residual earnings have been assumed to grow at the constant perpetual growth rate. Therefore, we know the residual earnings in Y3.
25. Terminal value = Terminal book value + PV of residual earnings beyond the terminal year.

Under the discounted dividends model, price = present value of dividends

26. Advanced point that SHOULD be skipped: This point is made here because the spreadsheet includes some robustness checks. In the discounted dividend model, deriving terminal value is computationally and conceptual challenging. The computational challenge is that we cannot use the perpetual growth formula to derive the present value of dividends beyond the terminal year as the dividends need not grow at the perpetual growth rate even if the residual earnings grow at a constant rate. The conceptual challenge is that the dividend policy beyond Y2 is value irrelevant because the marginal investment is zero NPV. We exploit the dividend policy irrelevancy to overcome the computational challenge. Because we can pick any arbitrary dividend policy, we set the dividends to be equal to earnings minus change in book value so that the growth rate in book value equals the growth rate in residual earnings. This ensures that the dividends too will grow at the perpetual growth rate. We can then use the perpetual growth formula to derive the present value of dividends.

    26.1. Dividends that yield perpetual growth = Earnings – perpetual growth rate in book value * book value

27. Terminal value per share = Forthcoming dividends that yield perpetual growth/(r_e – g)
28. Capitalized change in dividends = Change in dividends/Cost of equity = (d_t – d_{t-1})/r_e

End of optional section that can be skipped.

3.4. The structure of valuation models

The three valuation models result in the same value as they are transformations of DDM. For each model, final value is the sum of three components:

- Anchor: This is the starting point for valuation and is based on valuation anchors used by analysts.
- Until the explicit forecast horizon: Value based on earnings forecasts until the explicit forecast horizon.
- Beyond the explicit forecast horizon: Value based on earnings forecasts beyond the explicit forecast horizon.

The models differ in the contribution of an anchor to the total value. The higher the contribution of an anchor to the total value, the more succinctly the anchor captures value relevant information. As shown below, the discounted dividends valuation has no anchor and most of the value is derived from forecasts beyond the terminal year. Thus, it is the least succinct model. In contrast, the earnings growth model captures most value in its anchor, and is the most succinct model. However, sometimes the book value growth model is more succinct than the earnings growth model.

3.5. Dividend discount model (DDM)

$$P_0 = \underset{\text{No anchor}}{0} + \underbrace{\frac{d_1}{(1+r_e)} + \frac{d_2}{(1+r_e)^2}}_{\text{Until horizon}} + \underbrace{\frac{d_3}{(1+r_e)^3} + \dots}_{\text{Beyond horizon}}$$

This formula works for any payout policy.

29. Anchor: None
30. Value derived from forecasts until the explicit forecast horizon: PV of dividends for Y1 and Y2.
31. Value derived from forecasts beyond the explicit forecast horizon: PV of terminal value
32. Total value = Sum of the three components listed above. The percentage of total value derived from each component is shown next to the component.

3.6. Dividend growth model: Capitalized dividends and capitalized change in dividends

$$P_0 = \underset{\text{Anchor}}{\frac{d_1}{r_e}} + \underbrace{\frac{d_2 - d_1}{r_e(1+r_e)}}_{\text{Until horizon}} + \underbrace{\frac{d_3 - d_2}{r_e(1+r_e)^2} + \dots}_{\text{Beyond horizon}}$$

33. Anchor: Capitalized forthcoming dividends = Forthcoming dividends/cost of equity = d_1/r_e
34. Value derived from forecasts until the explicit forecast horizon: PV of change in dividends from Y1 to Y2.
35. Value derived from forecasts beyond the explicit forecast horizon: PV of change in dividends beyond Y2. [This is a plug. One cannot use a perpetuity formula because the dividends need not reach steady growth.]
36. Total value = Sum of the three components listed above. The percentage of total value derived from each component is shown next to the component.

3.7. Book value growth model [aka Residual income valuation model (RIV)]

$$P_0 = \underset{\text{Anchor}}{b_0} + \underbrace{\frac{b_1 + d_1 - (1+r_e)b_0}{(1+r_e)} + \frac{b_2 + d_2 - (1+r_e)b_1}{(1+r_e)^2}}_{\text{Until horizon}} + \underbrace{\frac{b_3 + d_2 - (1+r_e)b_2}{(r_e - g)(1+r_e)^2}}_{\text{Beyond horizon}}$$

Substituting $b_{t+1} = b_t + e_{t+1} - d_{t+1}$, we get:

$$P_0 = \underset{\text{Anchor}}{b_0} + \underbrace{\frac{e_1 - r_e b_0}{(1+r_e)} + \frac{e_2 - r_e b_1}{(1+r_e)^2}}_{\text{Until horizon}} + \underbrace{\frac{e_3 - r_e b_2}{(r_e - g)(1+r_e)^2}}_{\text{Beyond horizon}}$$

37. Anchor: Current book value b_0. The lower the price/book ratio, the higher the contribution of this anchor to overall value and the more useful RIV is cognitively. High future ROE, high future growth,

and accounting conservatism drive the price/book ratio higher and lower the contribution of the anchor to overall value.

38. Value derived from forecasts until the explicit forecast horizon: PV of residual earnings for Y1 and Y2.

    38.1. Residual change in book value = $b_t + d_t - (1+r_e)*b_{t-1} = e_t - r_e*b_{t-1}$ = residual earnings

39. Value derived from forecasts beyond the explicit forecast horizon: PV of residual earnings beyond the terminal year

40. Total value = Sum of the three components listed above. The percentage of total value derived from each component is shown next to the component.

3.8. Earnings growth model [AEG]: Capitalized earnings and capitalized residual change in earnings

3.8.1. Intermediate optional computations for the earnings growth model

This model focuses on earnings and earnings growth.

$$P_0 = \underbrace{\frac{e_1}{r_e}}_{\text{Anchor}} + \underbrace{\frac{e_2 - e_1 - r_e(e_1 - d_1)}{r_e(1+r_e)}}_{\text{Until horizon}} + \underbrace{\frac{e_3 - e_2 - r_e(e_2 - d_2)}{r_e(r_e - g)(1+r_e)}}_{\text{Beyond horizon}}$$

41. Change in earnings = $e_t - e_{t-1}$

42. Amount reinvested = Earnings – Dividends = $e_{t-1} - d_{t-1}$

43. One should expect earnings to increase due to reinvestment of retained earnings. Change in earnings expected next year if reinvestment yields cost of equity, i.e., reinvestments are zero NPV = cost of equity * reinvestment at the end of previous year = $r_e * (e_{t-1} - d_{t-1})$

44. Residual change in earnings = residual $\Delta e_t = e_t - e_{t-1} - r_e(e_{t-1} - d_{t-1})$

    44.1. = Change in earnings - Change in earnings expected from if investment yields r_e.

    44.2. If there is no payout, i.e., $d_{t-1} = 0$, then residual change in earnings is zero if and only if the earnings growth rate equals r_e.

    44.3. If there is full payout, $d_{t-1} = e_{t-1}$, then residual change in earnings is zero if and only if there is no growth in earnings.

45. For checking only: change in residual earnings = $(e_t - r_e b_{t-1}) - (e_{t-1} - r_e b_{t-2}) = e_t - e_{t-1} - r_e(b_{t-1} - b_{t-2}) = e_t - e_{t-1} - r_e(e_{t-1} - d_{t-1})$ = Residual change in earnings

46. Residual change in earnings = change in residual earnings

47. Growth rate of residual change in earnings = (residual Δe_t / residual Δe_{t-1}) – 1

    47.1. The residual changes in earnings reach perpetual growth one year after the terminal year.

48. Value added each year = Forthcoming residual change in earnings/Cost of equity.

    48.1. va_t = residual $\Delta e_{t+1}/r_e$

    48.2. Since capitalized earnings are the anchor, additional value arises only from a residual change in earnings. The residual change in earnings is capitalized because the new earnings become the base for future earnings growth, i.e., the effect of a change in earnings perpetuates.

49. PV of value added during the explicit horizon years.

    49.1. $va_1/(1+r_e)$ = residual $\Delta e_2/(r_e*(1+r_e)) = (e_2 - e_1 - r_e(e_1 - d_1)) / (r_e*(1+r_e))$

49.2. This is the second term in the equation for P_0 in the earnings growth model equation listed at the start of this section.

50. Value added each year beyond the year prior to the explicit forecast horizon grows at the perpetual growth rate, which allows us to use the perpetual growth formula.

50.1. For t>1, PV at t=1 of $\Sigma va_t = va_2/(r_e\text{-}g) = (e_3\text{-}\ e_2 - r_e\ (e_2 - d_2))/(r_e\ (r_e\text{-}g))$

51. Since the perpetual growth formula gives us value at the end of the year prior to the terminal growth year, we have to compute its present value.

51.1. $(e_3\text{-}\ e_2 - r_e\ (e_2 - d_2))/(r_e\ (r_e\text{-}g)\ (1+ r_e))$

End of section that can be skipped.

52. Anchor: Capitalized forthcoming earnings

53. Until horizon: PV of value added each year from a residual change in earnings.

54. Beyond the forecast horizon: This the present value of value attributed to residual change in earnings beyond the explicit forecast horizon.

55. Total value = Sum of the three components listed above. The percentage of total value derived from each component is shown next to the component.

55.1. For “growth stocks,” the anchor value accounts for less than 66% of the total value.

55.2. For “mature stocks,” the anchor value accounts for more than 80% of the total value.

3.9. Valuation ratios

56. Dividend yield = Forthcoming dividends/Current stock price = d_1/P_0

56.1. A crude average is 2.5%.

57. P/B ratio = Current stock price/current book value per share = P_0/b_0

57.1. A crude average is in the range of 1.5 to 2.5

58. Forward P/E ratio = Current stock price/ Forthcoming earnings = P_0/e_1

58.1. A very crude average is in the range of 12 to 15.

59. Forward ROE = Forthcoming earnings/Current book value = e_1/b_0

60. Check: P/B - P/E * ROE = 0

3.10. Inferring cost of capital or growth from price

61. Input: Current stock price

62. Difference between the stock price given and PV calculated using any one of the models.

63. Infer cost of equity: The macro embedded in the button “goal seeks” cost of equity until the difference equals zero. First, choose from the drop down box, and then click “Infer”.

64. Infer perpetual growth rate: The macro embedded in the button “goal seeks” perpetual growth rate until the difference equals zero. First, choose from the drop down box, and then click “Infer”.

65. This line shows the outcome of the choice made in the previous two steps.

4. Questions addressed by the spreadsheet: Summary

One of first steps in fundamental analysis is understanding how market perceptions of the company's future translate into its market value. Market perceptions are often summarized by analyst forecasts. Publicly available analyst forecasts are for bottom-line EPS forecasts rather than line items. Therefore, one needs a parsimonious approach that connects bottom-line forecasts to equity value.

The next step in fundamental analysis is relative valuation. One wants to compare key relative valuation metrics for the company with its peers. Prominent relative valuation metrics are the forward P/E ratio, the market-to-book ratio, and the dividend yield.

This spreadsheet presents parsimonious models that connect equity value to analyst forecasts as well as help us understand drivers of relative valuation. Key questions addressed here are as follows:

1. Given analyst forecasts of near term EPS and dividend payout, what is the stock's intrinsic value?
2. How are the cost of equity and growth affecting the relative valuation metrics?
3. If the intrinsic value differs from market value, to what extent is this due to the market using a different cost of equity or perpetual growth rate?
4. Is the stock a growth stock?