

# Using a Value Driver Model in the Capitalized Income Method

An alternative terminal value model is the value driver model (VDM).<sup>1</sup> The VDM in directly valuing equity is as follows:

## Formula A10-1

$$FV_n = [NI_{n+1} \times (1 - b)] / [k_e - b \times k_{BV}]$$

where:

$FV_n$	=	Terminal value at time n
$NI_{n+1}$	=	Net income, after-tax, expected in period n + 1 (often called NOPAT, net operating profit after-tax)
b	=	Retention ratio = 1 - payout ratio = $0 \leq 1 - b < 1$
$k_e$	=	Cost of equity capital
$k_{BV}$	=	Rate of return on book value (retained portion of net income usually estimated as $NI_{n+1} / BV_n$ )
$BV_n$	=	Book value of equity at time n

This model will be equal to the Gordon growth model only under some very unrealistic assumptions. First, accounting income and economic income may differ significantly. Often, users of the VDM calculate the book rate of return or expected reinvestment rate,  $k_{BV}$ , using historical realized returns based on accounting relationships. If accounting relationships are used, an analyst often needs to make adjustments to NI and BV in prior years before estimating  $k_{BV}$  from historical relationships.

For example, for accounting purposes, research and development has probably been expensed for financial reporting purposes. Successful prior research is no different than prior capital expenditures. Both are prior period outlays supporting current and future period returns. This expensing has reduced the net income in prior periods and, therefore,

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<sup>1</sup> Tim Koller, Marc Goedhart, and David Wessels, *Valuation: Measuring and Managing the Value of Companies*, 4th ed. (Hoboken, NJ: John Wiley & Sons, 2005), pp. 271–290. Note that the original VDM has been modified for an inflationary adjustment. See Michael Bradley and Gregg Jarrell “Expected Inflation and the Constant-Growth Valuation Model,” *Journal of Applied Corporate Finance*, Vol. 20 (2) (Spring 2008), pp. 66–78 and Bradford Cornell and Richard Gerger, “Consistent Treatment of Inflation in Discounted Cash Flow Valuation,” (July 2019). Available at SSRN: <https://ssrn.com/abstract=3435615>.

the book value of assets. Therefore, the book rate of return,  $k_{BV}$ , can differ from the current return on investment because its book value,  $BV_n$ , is less than the true investment dollars expended in prior years.

Similarly, if the business leases many of its assets using operating leases, its book value,  $BV_n$ , does not reflect the business's economic investment in assets.

An analyst can adjust for these differences by capitalizing and amortizing research and development and capitalizing all leases.

Another adjustment involves excess cash and investments that may be included in the book value. The analyst is trying to measure the return on investing in operations, NOPAT. Therefore, the rate of return must be measured by subtracting the interest earned on excess cash and investments from  $NI_{n+1}$  and the amount of excess cash and investments from  $BV_n$  before estimating the rate of return on reinvested retained net income.<sup>2</sup>

The VDM will generally not equal the Gordon growth model if growth in net cash flows in the terminal period is greater than zero. Even if real growth in the terminal period is assumed to be zero, inflation is likely to cause the expected net cash flows and NOPAT measured in nominal dollars (including expected inflation) to increase in future years. The positive growth scenario will probably cause the two models to differ in value conclusion because returns inferred from book income and book value will probably differ from economic returns, and that difference is accentuated under conditions of inflation.<sup>3</sup>

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<sup>2</sup> For a discussion on accounting-based measurements of rates of return, see Aswath Damodaran, "Return on Capital (ROC), Return on Invested Capital (ROIC) and Return on Equity (ROE): Measurement and Implications," Working paper (July 2007) available at <http://pages.stern.nyu.edu/~adamodar/pdfiles/papers/returnmeasures.pdf>.

<sup>3</sup> Matthias Meitner, "A Swan Song for the Value Driver Model – Modern Theory and Application of Constant-Growth Equity Valuation Models," Working paper (November 2009) available at <http://ssrn.com/abstract=1513183>.