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The Guide to Damages in International Arbitration

Editor
John A Trenor

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prices.[123] Generally, valuation as well as damages assessment implicitly considers inflation (i.e., the financial forecast includes any potential adjustment for expected inflation and thus inflation must not be considered separately).[124] But, in instances of very high and unstable inflation, or even hyperinflation (i.e., an extremely rapid or out of control inflation in excess of 50 per cent per month), inflation must be considered separately.[125]

Considering an appropriate discount rate

To consider the time value of money and the specific risks associated with the business, when applying the DCF methodology, the free cash flow to the firm is compounded or discounted to the valuation date applying an appropriate discount rate.[126] The same principles apply to the determination of damages; i.e., past and future lost profits or cash flows are compounded or discounted to the valuation date applying an appropriate discount rate,[127] which may significantly differ from the discount rate appropriate for the valuation of a business. The appropriate discount rate is usually a matter of substantial dispute.[128]

While there are many approaches to determine the appropriate discount rate, depending on the cash flows to be discounted, the concept of WACC is the most commonly used methodology and enjoys broad acceptance.[129]

Sometimes, risk adjustments in addition to the risk premium already captured within the WACC are discussed to reflect facts and circumstances specific to the market or the valuation object; for example, a country risk premium, a small firm premium or an inflation premium.

The country risk premium is usually derived from a comparison of two countries' bond rates (i.e., as a country bond default spread). It considers the additional risk that a specific country with an immature market may present in comparison to the mature markets from which the financial information to determine the WACC has been derived; for example, a WACC based on US-listed companies is adjusted to reflect the different risk of an investment in an emerging country with little historical data or data too volatile to yield a meaningful estimate of the risk premium.[130]

Some empirical studies indicate that the capital asset pricing model,[131] which is used to determine the equity risk premium within the WACC, may understate the more volatile returns of small firms. A small firm premium is discussed to consider the additional risk or the additional return an investor would require when investing into a smaller firm than those included in the determination of the WACC components (i.e., stock-listed companies). While this premium is regularly applied in the valuation of privately held businesses,

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123 Cf., for example, U.S. Bureau of Labor Statistics, on www.bls.gov.
124 Cf. Allen et al. (2011), pp. 451 ff. for further discussion.
125 Cf. Damodaran (2006), p. 36.
126 Cf. Damodaran (2006), p. 10.
127 Cf. Pollack et al. (2006), pp. 35 ff.; or Robert L. Dunn and Everett P. Harry, 'Modeling and Discounting Future Damages', *Journal of Accountancy*, January 2002 (Dunn/Harry (2002)), p. 3.
128 Cf. Allen et al. (2011), p. 500.
129 Cf. Koller et al. (2015), p. 148; or Pollack et al. (2006), pp. 35 ff.; see Chapter 15 on determining the weighted average cost of capital.
130 Cf. Damodaran (2006) pp. 41 ff.
131 Cf. Pollack et al. (2006), pp. 38 ff.; or Allen et al. (2011), p. 459.

The market price per share can be thought of as the discounted sum of all future dividends.[17] The market price per share can thus be written as follows, under certain assumptions (stable growth and discount rates) and using a perpetuity formula:[18]

$$\text{Market Price Per Share} = \frac{\text{Expected Forward Dividend Per Share}}{r - g}$$

The expected forward dividend per share is the amount of expected forward earnings per share paid out as dividends, that is, not reinvested in the business. Given that the ploughback ratio (pb) is the fraction of earnings that is reinvested, the fraction of earnings that is paid out as dividends is equal to one minus the ploughback ratio. Therefore, replacing expected forward dividends per share (next period's dividend) with the product of forward earnings per share (next period's earnings) and one minus the ploughback ratio (the amount of next period's earnings that is not reinvested but paid out as dividends), yields:

$$\text{Market Price Per Share} = \frac{\text{Expected Forward Earnings Per Share} \star (1 - pb)}{r - g}$$

Plugging this expression into the definition of the PE ratio above yields:

$$P/E = \frac{1 - pb}{r - g}$$

This decomposition shows that PE ratios depend on investment policy (pb or how much of earnings is reinvested in each period) and growth g as well as risk, which affects the discount rate r.[19] Therefore, when applying PE ratios in a valuation, the assets in the comparables set should embed similar investment policy, growth and risk expectations.

Similar calculations can be performed for other valuation multiples. For example, under certain assumptions, an enterprise-value-to-EBITDA multiple can be expressed as a function of the weighted average cost of capital (WACC), a growth rate, net investment, change in working capital and the tax rate, which are all components or inputs of a DCF valuation.

Finally, it is useful to note that DCF valuations sometimes rely on inputs calculated using comparables. This most often arises in two instances. First, it is customary to calculate inputs to cost of capital calculations using peer companies. Second, some DCF valuations apply terminal exit multiples to calculate the terminal value of cash flows instead of making explicit terminal growth rate assumptions. Such exit multiples may again be based on comparable companies. The caveats when choosing the right comparables set would then apply to the DCF valuation as well.

17 This is known as the Gordon growth model.
18 Readers interested in a more detailed discussion are invited to consult a corporate finance textbook (e.g., 'Corporate Finance' by Stephen A. Ross, Randolph W. Westerfield and Jeffrey Jaffe). The expression is based on a perpetuity DCF formula using a constant over time growth and discount rate.
19 Note that investment and growth are linked, which is not explicitly shown above.