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Deconstructing Private Equity Buyout

Valuations

Bobby V. Reddy*

Abstract- *Private equity grows from strength-to-strength, with 2021 being a record year for private equity buyouts. The success of private equity is dependent upon making large returns on investment. Partly, success is derived from growing acquired companies, making acquired companies more efficient, and through the use of substantial leverage. However, it is also critical not to overpay for targets. Accordingly, the manner in which private equity firms value potential targets is crucial. The most common valuation method is “discounted cash-flow” (DCF). For those without finance backgrounds, however, DCF valuation methodology can appear intimidatingly complex. In this article, DCF is deconstructed and simplified to enable practitioners without finance backgrounds, such as lawyers, and any students of the field to more easily understand the fundamentals of the concept. For an M&A lawyer, a deeper understanding of how companies are valued can be an important aid to providing effective advice to private equity clients.*

Keywords- Private Equity, Mergers and Acquisitions, M&A, Valuations, Discounted Cash Flow, Buyouts

Introduction

Private equity funds collate cash from investors and employ those resources in acquiring companies (“buyouts”) with a view to eventually selling them (“exiting”) for profit.¹ Those returns are eventually distributed, less the private equity firm’s compensation, at the end of the fund’s life. Private equity

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¹ The difference between private equity and venture capital is sometimes opaque (BVCA, “A Guide to Private Equity” (February 2010) 1, 6), but for the purposes of this article, traditional venture capital, where minority interests are made in early-stage companies, is ignored. This article focuses on private equity “buyouts” where the private equity firm acquires a large majority interest (usually a sliver of the equity is reserved for management) in later-stage companies.

buyouts and exits hit record highs in 2021.² Although the academic evidence is inconclusive, numerous studies have lauded the success of private equity.³ The successful generation of returns can partly be attributed to the use of extensive leverage for acquisitions, the implementation of efficiencies within acquired companies, and exiting with high exit valuations.⁴ However, just as critical, is ensuring that the valuation of the target company is realistic when acquired and that the private equity firm does not overpay. It is therefore no surprise that private equity valuation techniques, particularly where the target is a private company, are more sophisticated than simply sticking a finger in the air.

When a target company is a publicly-listed company, valuations are fairly simple, since the price of the firm's shares is a matter of public record and, theoretically in an efficient capital market, reflects all public information pertaining to the company.⁵ Furthermore, a private equity firm can forensically compare the book value of a listed company's assets to its share price to determine if further efficiencies could be fostered by taking the company private and changing the management team and/or the company's strategy.⁶ However, when the target is a private company already, with no liquid public

² H. MacArthur, "Global Private Equity Report 2022" (2022) Bain & Company 1, 4 https://www.bain.com/globalassets/noindex/2022/bain_report_global-private-equity-report-2022.pdf

³ A number of studies have illustrated the outperformance of private equity portfolio companies over publicly-listed companies – for example, see: V. Acharya et al, "Corporate Governance and Value Creation: Evidence from Private Equity" (2013) 26 *The Review of Financial Studies* 368; E. Nikoskelainen and M. Wright "The impact of corporate governance mechanisms on value increase in leveraged buyouts" (2007) 13 *Journal of Corporate Finance* 511; S. Kaplan, "The effects of management buyouts on operations and value" (1989) 24 *Journal of Financial Economics* 217. However, the returns accruing to investors in private equity has been questioned, especially outside the most prestigious private equity firms – for example, see: S. Kaplan and A. Schoar "Private equity performance: Returns, persistence, and capital flows" (2005) 60 *Journal of Finance* 1791; L. Phalippou and O. Gottschlag, "The Performance of Private Equity Funds" (2009) 22 *The Review of Financial Studies* 1747.

⁴ F. Barber and M. Goold, "The Strategic Secret of Private Equity" (2007) *Harvard Business Review* <https://hbr.org/2007/09/the-strategic-secret-of-private-equity>

⁵ E. Fama, 'Efficient Capital Markets: A Review of Theory and Empirical Work' (1970) 25 *J. Financ.* 383, 383.

⁶ The ratio of market value to the replacement value (often reduced to book value in calculations) of assets of a publicly-listed firm is known as "Tobin's Q", and has in recent years been used as a proxy for firm value (B. Reddy, *Founders Without Limits: Dual-Class Stock and the Premium Tier of the London Stock Exchange* (Cambridge: Cambridge University Press, 2021) 265). In essence, a deviation between market value and asset value represents the market's expectations of future success and assessment of risks (R. Bartlett and F. Partnoy, "The Misuse of Tobin's Q" (2020) 73 *Vand. L. Rev.* 353, 369).

market for its shares, a private equity firm cannot use share price as a proxy for company value. Moreover, with the clue being in the name, information material to the value of a private company may not be publicly available. Private company valuations are therefore based upon numerous predictive factors, and a private equity deal team will need to carefully factor-in various risk dynamics that could prejudice the accuracy of the relevant valuation. Accurately shaping those predictions and building-in the risks are central to the skillset of a successful private equity professional. This paper does not allude to instructing readers as to how such professionals effectively predict those elements. However, once determined, the next step, which is the focus of this paper, is using that information in a coherent manner to appraise firm value. The technique most commonly utilised by private equity firms to value potential targets is “discounted cash flow” (“DCF”).⁷

The finance literature is rich with scrutiny of DCF,⁸ and business schools and economics courses regularly demonstrate the formula used for DCF-derived valuations. However, for a lawyer without a finance background, the formula can, on its face, be dauntingly impenetrable. This can be a concern, since understanding how private equity deal teams have valued an enterprise is an important facet of optimally advising clients. Legal diligence is more effective and relevant if lawyers grasp the tenets of private equity valuations and accordingly ascertain which risks are material, and which are largely inconsequential, to clients. This article will peek behind the curtains of the DCF formula, stripping away the jargon, and explaining the underpinnings of each element of the mathematical model. Although certainly not a guide to lawyers carrying-out company valuations, this article will make it easier for lawyers to understand the processes behind private company buyout valuations.

⁷ W. Brotherson, “Company Valuation in Mergers and Acquisitions: How is Discounted Cash Flow Applied by Leading Practitioners?” (2014) 1 *Journal of Applied Finance* 1, 3; Brotherson et al, “Best Practices in Estimating the Cost of Capital: An Update” (2013) 23 *Journal of Applied Finance* 1, 15; P. Fernandez, “Company Valuation Methods. The Most Common Errors in Valuations” (2007) IESE Working Paper No. 449 1, 14; M. Capiński and W. Patena, *Company Valuation - Value, Structure, Risk* (Hof: University of Applied Sciences, 2008) 7, 9.

⁸ DCF can be traced back to the early works of: J. Gordon and E. Shapiro, “Capital Equipment Analysis: The Required Rate of Profit” (1956) 3 *Management Science* 102; and M. Miller and F. Modigliani, “Dividend Policy, Growth, and the Valuation of Shares” (1961) 34 *Journal of Business* 411.

The first section of this paper illustrates why an understanding of buyout valuations is a beneficial tool in the armoury of private equity lawyers. In the second section, the basic premise of DCF is explained. The next section discusses why free cash flow, the very basis of DCF valuations, is an appropriate measure and how free cash flow is derived. The following section outlines the DCF formula, conceptually splitting it into two phases – a phase during which annual free cash flow is specifically predicted, and a phase during which free cash flow is more generally predicted based upon a fixed growth rate. In the next two sections, two key components of the mathematical model – discount rates and terminal values – are taken in turn elucidating what is happening beneath the hood in simple terms and explaining why those elements are included in the DCF formula. The penultimate part of the article brings the discussion of DCF together, explaining the relevance of DCF valuations to acquisition pricing, and briefly distinguishing DCF valuation methodology from another commonly known valuation approach, comparable company multiples. The article finishes with concluding remarks.

The Relevance of Understanding Buyout Valuations

Without intending to diminish the value of this paper from the outset, it should be acknowledged that understanding valuations is not an essential attribute of a private equity lawyer. Indeed, many private equity lawyers will spend their entire careers without fully appreciating how or why their clients have attributed values to the private companies they acquire. However, the best private equity lawyers understand the fundamentals of their clients' businesses, and apply those commercial realities to the legal advice they provide. A knowledge of the inner workings of buyout valuations is conducive to providing advice that is relevant and deal-specific, since the valuation process can identify "sources of economic value creation and destruction within the company".⁹

Due diligence is an area where a deeper understanding of valuations is beneficial. A key role of corporate lawyers acting for purchasers in any mergers and acquisitions ("M&A") transaction is to conduct a legal due diligence exercise on the target to ascertain any inherent legal issues that could

⁹ P. Fernandez, "Company Valuation Methods. The Most Common Errors in Valuations" (2007) IESE Working Paper No. 449 1, 3.

either prejudice the completion of the transaction or impair the value of the target.¹⁰ Accordingly, the basis of the company's valuation can be instructive in performing that exercise. If, for instance, a company is being valued based upon predicted free cash flow generation over time (as with DCF valuations), diligence should focus on issues which could materially hamper earnings going forward, since free cash flow, which is the amount of cash generated each year that is free and clear of all internal or external obligations,¹¹ is, *prima facie*, derived from earnings.¹² For example, a change of control clause in an important contract of the company that permits a third party to terminate the contract upon the acquisition of the company by the private equity firm could result in a significant drop in earnings for the target. If the company has been valued based upon DCF, the private equity firm may be assuming that similar future earnings will not simply vanish upon the completion of the acquisition. Similarly, it is crucial to inform private equity clients of any variable payment terms in agreements that could impact earnings over time. Additionally, current liabilities will reduce free cash flow, and, therefore, lawyers, when conducting diligence, should be mindful of any future liabilities that may be incurred by the company. For example, rent changes under leases and potential litigations will be relevant. Any future required capital expenditure will also be critical, and lease terms will be important to emphasise to clients, as will any compulsory purchase notices issued by governmental authorities on the company's real assets. Of course, most, if not all, of these issues will be important to highlight to clients whatever the method of valuation, and good lawyers will intuitively identify those risk factors even with little understanding of the valuation mechanics. However, if the valuation is better understood, a more commercial discussion can be held with clients, and the determination of materiality becomes more straightforward.

Another key role of purchaser's counsel in M&A transactions is the negotiation of warranties in the acquisition documentation. Warranties given by the seller of an asset serve two purposes – they provide a means of recourse if the purchaser suffers damages due to the target company not being in

¹⁰ In an auction process, a legal due diligence report will often be prepared by the seller's lawyers. However, the purchaser's legal counsel will still be required to complete further confirmatory due diligence.

¹¹ A. Matthiessen, "Startup valuation: applying the discounted cash flow method in six easy steps" (Ernst & Young, 2019), https://www.ey.com/en_nl/finance-navigator/startup-valuation-applying-the-discounted-cash-flow-method-in-six-easy-steps

¹² See "Deriving Free Cash Flow" below.

the condition expected, and they elicit disclosure of issues by the seller,¹³ since a seller can usually avoid liability for breach of warranty if it has disclosed in advance why the warranty is not true.¹⁴ An understanding of valuation mechanics can be helpful in determining what warranties are required from the seller, and whether any materiality or knowledge qualifiers are acceptable. For example, if a young company has been primarily valued on the basis of its potential to grow over time (which, as will be discussed below, can be a key feature of DCF valuations), certain warranties may be more material than others - the ownership of the company's patents and the terms of the employment contracts of key personnel may be crucial. Warranties can be tailored and prioritised accordingly.

If the acquisition involves a gap between signing of the acquisition documents and completion of the transaction, the purchaser will be keen to include a suite of restrictive covenants that prohibit the seller from taking, and positive covenants that require the sellers to take, certain actions during the interim period. While law firms often use boilerplate "pre-closing" undertakings that do not vary substantially between different transactions, if the valuation process of a private equity client is better understood, value can be added by tailoring those covenants to more specifically reflect the protection of deal value. Such an understanding can also aid lawyers in the drafting of post-closing covenants of management.¹⁵ Also, post-completion, private equity sponsors desire to give management sufficient freedom to manage the company on a day-to-day basis, but with restrictions that prevent the managers from taking actions that harm the value that has been attributed to the company (and which could, therefore, impact the returns of the private equity sponsor). The importance of earnings, liabilities and

¹³ M. Tedjani, "Indemnities in private share deals" (2019) 40 *Company Lawyer* 39, 40.

¹⁴ On UK deals, acquisition documentation will inevitably qualify warranties by information "fairly disclosed" in a disclosure letter. However, even without such a qualification, case law suggests that a purchaser cannot make a claim for breach of warranty by the seller if it has actual knowledge of the relevant breach (*Infiniteland Ltd v Artisan Contracting Ltd* [2005] EWCA Civ 758). In Delaware, usually warranties in acquisition documents are qualified by disclosures in a disclosure schedule, but absent such disclosure, it has been left open as to whether actual knowledge could bar a claim for breach of warranty (*John D. Arwood, et al. v. AW Site Services, LLC*, (C.A. No. 2019-0904-JRS) (Del. Ch. Mar. 9, 2022)).

¹⁵ The relationship between a private equity firm and the management of a portfolio company is crucial to private equity strategy. Usually, the management team will be heavily incentivised and will retain and/or receive equity in connection with the acquisition.

growth rate to the company's valuation will have a bearing on the types of management actions on which private equity firms will seek veto rights, and the information and access rights required on an ongoing basis.¹⁶

Finally, any provisions in the transaction documents that invoke the ongoing performance of the target company will be influenced by the manner in which the private equity sponsor has valued the company. Although lawyers will inevitably seek instructions from their clients, and the financial advisors of those clients, in implementing the relevant proposals, an understanding of the valuation mechanics will lead to more effective drafting. For example, if part of the acquisition consideration is deferred with payment conditional upon the future performance of the company, the provisions that define how that performance is measured will be tied closely to the principles used to value the company.¹⁷ Additionally, if management is to be incentivised by "receiving" further equity immediately prior to the private equity firm's exit from the investment if the exit is a success,¹⁸ the definition of "success" will be tied to the returns of the private equity sponsor, often based upon an internal rate of return hurdle. Again, lawyers will lean heavily on their clients to provide the relevant definitions; however, comprehending the initial valuation will assist in the drafting of the corresponding terms. Equally, the initial valuation method can also influence the terms applicable to any post-closing adjustment in purchase price, pursuant to which accounts determining the position of the company as of completion of the acquisition are prepared after the completion of the transaction. If the completion accounts vary from the financial information that the purchaser has used to determine the company's

¹⁶ Although private equity firms will delegate day-to-day management of portfolio companies to management, they will secure veto and information rights in relation to material aspects of the company's business.

¹⁷ Deferred consideration may be tied to how the company performs post-acquisition – so-called "earn-out" provisions. The measure of performance, the manner in which it is determined, and the actions that the purchaser can take during the earn-out period will be heavily negotiated by the parties.

¹⁸ In the UK, for tax reasons, rather than management "receiving" further equity, it is more common for the proportion of equity held by management to be increased through a "ratchet" mechanism that reduces the proportion of equity held by the private equity firm by converting its shares into worthless deferred shares.

value, an adjustment in purchase price is made post-completion.¹⁹ Usually, common generally accepted accounting principles will be applied when preparing the completion accounts,²⁰ but more bespoke principles will also often be included in the acquisition documentation. The drafting of those bespoke principles may mirror the processes that the private equity firm has used to value the company in the first place.

An understanding of the process used by a private equity firm to value a target company may only be beneficial, rather than essential, to a lawyer's representation of their client. However, being able to converse financially with a client as a peer with good knowledge of the commercial realities of the transaction can aid the relationship between lawyer and client, engendering faith that a corporate lawyer can be a trusted advisor rather than merely a purveyor of legal services. As such, we next turn to the most common method used by private equity firms to value targets – DCF.

Discounted Cash Flow Valuations

DCF, or variations thereof, has become the most common method employed by private equity firms to value potential buyout targets.²¹ DCF involves predicting the “free cash flow” of the target company over time. The process can be divided into two phases. In the first phase, which will last a number of years after the private equity firm has acquired the company, the free cash flow for each year is specifically predicted – in this article, this phase will be called the “specific prediction phase” during

¹⁹ Where the seller is itself a private equity firm, and, increasingly commonly even where the seller is not a private equity house, rather than post-completion adjustments, a locked-box mechanism may be used, whereunder the company's fundamentals are based upon historic accounts with covenants from the seller that no “leakage” of value to the seller has occurred between the date of those accounts and completion of the acquisition (P. Dolman, “Acquisition documentation” in C. Hale (ed.), *Private equity: A Transactional Analysis 4th Edition* (Woking: Globe Law and Business, 2020) 139).

²⁰ The accounting standards used by the company when preparing its accounts will, to a large extent, depend upon the jurisdiction of incorporation of the company. For example, UK generally accepted accounting principles (UK GAAP) and International Financial Reporting Standards (IFRS) are commonly used by private companies in the UK, and IFRS must be used by UK-listed UK companies (Companies Act 2006, s.403). In the US, usually US generally accepted accounting principles (US GAAP) are used and must be applied by US-listed US companies (17 CFR § 210).

²¹ Note 7 above and accompanying text.

which free cash flow is “specifically predicted”. In the second phase, which will cover the entire lifetime of the company after the specific prediction phase, rather than predicting specific free cash flow sums for each year, a general assumption is made that free cash flow will simply continue to grow at a steady rate. For the purposes of this article, this phase will be labelled the “general prediction phase” during which free cash flow is “generally predicted”.

DCF does what it says on the tin – it “discounts” cash flow. The rationale is discussed in simple terms later in this article,²² but briefly, the discount model accounts for the opportunity costs lost by the free cash flow only being produced at some point in the future even though the private equity firm is paying for it immediately. The predicted free cash flows from both the specific prediction phase and the general prediction phase are discounted to the date of the acquisition.

Before sending shivers down the spines of lawyers everywhere and drilling down into the mathematical formula for DCF, the first step in examining DCF is explaining why free cash flow is a salient basis on which to value companies and identifying the discrete elements of the calculation of free cash flow.

Free Cash Flow

The key behind DCF is predicting the ongoing free cash flow generation of the target company. As described above, free cash flow is the amount of cash generated each year that is free and clear of all internal or external obligations.²³ In this section, the logic behind using free cash flow as the primary facet of valuing a company will be explained. Additionally, the way in which free cash flow can be derived from a company’s annual accounts will be outlined. Although the DCF method involves predictions of future free cash flows, the manner in which free cash flow can be developed from a company’s existing annual accounts is instructive in understanding the types of accounting line items for which private equity professionals will need to make predictions to determine future free cash flow. Furthermore, the free cash flow of the company in the year prior to its acquisition will not be irrelevant

²² See “The Discount Rate” below.

²³ Note 11 above and accompanying text.

to the predictions to be made, since it will serve as the basis upon which future performance can be gauged.

Why Free Cash Flow?

Why use the concept of free cash flow to value a company? An analogy perhaps makes the point clearer. Imagine that a private equity firm is purchasing a company that is in the business of growing and selling apples. The company owns many apple trees. The company could be valued on the basis of the aggregate current value of each of those apple trees. However, those apple trees have finite life-cycles, after which they will no longer be capable of producing apples. The value of those apple trees will be less at the time of the private equity firm's exit, and, at exit, any potential acquiror's valuation or initial public offering valuation of the company's assets will take into account the depreciating value of those assets over time. Those considerations make valuations based upon assets a difficult proposition. The task is made even more difficult if the company's business does not involve much in the way of tangible fixed assets. For instance, it can be challenging to value the assets of a young tech company, where most of the value is in patents and human capital with little in the way of tangible fixed assets.

Back to apple trees. Instead of a valuation based upon the value of the apple trees, free cash flow could come to the rescue. Free cash flow represents the cash flow available to the company to either invest or, in theory, pay-down debt²⁴ or distribute to shareholders²⁵ at the end of each year.²⁶ Essentially, the value of the company is being ascribed to the potential returns available to the providers of capital to the company over the life-time of that company, rather than the value being calculated

²⁴ Such sums may only in theory be used to pay-down debt, since the relevant debt terms may not permit early-repayment or may include penalty fees (sometimes known as "call protection") for early settlement.

²⁵ The laws that apply to the company in question may prohibit the distribution of free cash flow to shareholders. For example, companies incorporated in England and Wales can only make distributions to shareholders if they have sufficient "distributable profits" (Companies Act 2006, s.830).

²⁶ A. Matthiessen, "Startup valuation: applying the discounted cash flow method in six easy steps" (Ernst & Young, 2019), https://www.ey.com/en_nl/finance-navigator/startup-valuation-applying-the-discounted-cash-flow-method-in-six-easy-steps

based upon that company's assets.²⁷ The value is determined based upon the freely available cash that will be generated by the sale of the company's apples over time. Free cash flow is not simply the revenue produced from apples each year, since the company will also have various expenses that eat into the cash of the company. Additionally, trees may need to be replaced by younger trees over time which will require capital expenditure. The intention may also be to grow the company, in which case new trees may be purchased over time to increase the number of apple trees producing apples. The expenditure on those new trees will reduce cash when they are purchased, but the ongoing revenue stream should be enhanced. The concept behind DCF valuations is that the total free cash flow that could be generated by the company in perpetuity can be predicted, and then discounted to reflect the fact that those cash flows will only be generated many years in the future, even though the private equity firm is paying the purchase price for the company now.

Of course, free cash flow may not be the most appropriate determinant of company valuation in all circumstances. For example, if the intention of the private equity firm is to sell substantial fixed assets of the company post-acquisition, it may be more appropriate to value the company based upon the market value of those fixed assets (*less* net debt), or through a combination of fixed asset value and free cash flow.²⁸ However, for an acquisition where the intention is to acquire the company, grow it and make it more efficient, and finally sell or list the company, free cash flow can be a useful measure of the value of that company to the private equity firm.

Deriving Free Cash Flow

Making the relevant predictions of free cash flow will be a manifestation of thorough due diligence, experience with other buyouts, and a deep-dive into the most recent financial statements of the company. From a lawyer's perspective, though, the first step is to understand the basic elements that contribute to the calculation of free cash flow. Although the eventual company valuation will be based upon future predicted free cash flow, it is instructive, for a private equity professional to use the most

²⁷ M. Capiński and W. Patena, *Company Valuation - Value, Structure, Risk* (Hof: University of Applied Sciences, 2008) 7.

²⁸ *ibid* 16.

recent annual free cash flow derived from the company's latest annual accounts as a foundation to predicting how that baseline may change over time.

It is challenging to deduce a universal means of calculating free cash flow, since the elements required to be included on company accounts vary depending upon which accounting principles are applied. For example, differences exist between US GAAP, UK GAAP and IFRS.²⁹ The accounting line items used to calculate free cash flow will differ depending upon the information available in the company's accounts.³⁰ It is, therefore, felicitous to describe how free cash flow is calculated in broad terms.

Since free cash flow represents the freely available cash of the company generated in a financial year,³¹ the starting point is the annual revenue of the company, being the income derived from the sale of a company's goods or provision of services. Of course, revenue does not reflect the gross profits of the company, since the direct costs to the company of producing those good or providing those services will eat into those revenue figures. Examples include equipment costs, the cost of raw materials to produce the goods, and the salaries and other employment costs of the persons manufacturing the goods or providing the relevant services. Therefore, those direct costs must be deducted, leaving a figure for gross profits. Furthermore, the company will have indirect annual costs, or "operating expenses", that must be paid to enable the company to operate on a daily basis. These must also be deducted from revenue. Examples include administrative expenses, rents, salaries for executives and human relations

²⁹ Also see: note 20 above.

³⁰ For example, if a company's accounts disclose earnings before interest, tax, depreciation and amortisation ("EBITDA"), EBITDA is a good starting point to calculate free cash flow. However, EBITDA is not a required accounting line item under US GAAP, UK GAAP or IFRS. If, on the other hand, earnings before interest and tax ("EBIT") is included as a line item, EBIT can be used as the starting point in the calculation of free cash flow, as long as depreciation is then deducted (see: text accompanying notes 33-35 below).

³¹ A. Matthiessen, "Startup valuation: applying the discounted cash flow method in six easy steps" (Ernst & Young, 2019), https://www.ey.com/en_nl/finance-navigator/startup-valuation-applying-the-discounted-cash-flow-method-in-six-easy-steps

staff, marketing costs, and utilities. Gross profits *less* operating expenses is often described as “earnings before interest, tax, depreciation and amortisation” (“EBITDA”).³²

Importantly, in the context of free cash flow, EBITDA does not deduct depreciation from the earnings of the company. Depreciation spreads the cost of a capital asset over the life-time of the relevant asset, since, eventually, the value of that asset will revert to zero at the end of its useful life. Depreciation is therefore an annual expense of the company that will reduce the company’s profits. However, depreciation is a non-cash expense that does not impact annual free cash flow, since it does not affect the physical cash available to the company at the end of the financial year.³³ If a practitioner commences a free cash flow calculation with “earnings before interest and tax” (“EBIT”), “operating income”, “operating profits” or “profits before interest and tax”,³⁴ measures that do not ignore depreciation when stating the earnings of the company, depreciation must be *added* back to the EBIT or operating profits figure.³⁵

Next, taxes on the operating profits of the company must be deducted from EBITDA, since tax will reduce the free cash available to the company. One may, at this stage, ask why interest payments on debt are also not also deducted from EBITDA. A true value for free cash flow would take into account interest payable on debt, since such payments will reduce the company’s available cash. However, interest payments are factored into the valuation at a later stage,³⁶ since, in a private equity context, buyouts are inevitably substantially financed by debt,³⁷ and it will be expected that the ongoing

³² It should be noted again, though, that EBITDA is not a commonly required line item under the accounting principles applied by most UK and US companies (note 30 above).

³³ Of course, when it comes to replacing a depreciating asset at the end of its operating life, it will be a cash expense of the firm – the impact on free cash flow is reflected by deducting annual capital expenditure from EBITDA as described below.

³⁴ UK income statements tend to use the term “operating profits” or “profits before interest and tax”, whereas US income statements are more likely to list the line item as “operating income” or “EBIT”.

³⁵ M. Capiński and W. Patena, *Company Valuation - Value, Structure, Risk* (Hof: University of Applied Sciences, 2008) 19; P. Fernandez, “Company Valuation Methods. The Most Common Errors in Valuations” (2007) IESE Working Paper No. 449 1, 17.

³⁶ Capiński and Patena (*ibid* 19); also see: “Determining the Discount Rate – the Cost of Capital” below.

³⁷ K. Hutchinson and C. Lawrence, “Debt finance” in C. Hale (ed.), *Private equity: A Transactional Analysis 4th Edition* (Woking: Globe Law and Business, 2020) 79.

costs of the new debt will be financed by the operations of the target company. Therefore, the current debt position of the company will bear little relation to the debt burden after the buyout. Interest payments are, instead, incorporated into the “discount rate”, explained further below.³⁸ Another consideration is that interest payments are generally tax deductible in the UK and US – in the US the tax deductibility of interest payments is sometimes referred to as a “tax shield”. As interest payments increase, tax should decrease. Again, this is not factored into the calculation at this stage,³⁹ so the tax figure that is deducted from EBITDA does not include tax deductions for interest payments, since, again, current tax deductions will bear little resemblance to the tax deductions post-completion of the acquisition derived from much greater debt levels.⁴⁰ The tax to be deducted at this stage can therefore be simply expressed as “[EBIT *multiplied by* the corporation tax rate]”.

Two further line-items must also be accounted for – capital expenditure and any change in working capital over the course of the relevant financial year. Any net capital expenditure during the year, such as on new equipment, plants or research and development must be deducted from EBITDA (or, where net cash has been generated, such as through the sale of assets, added to EBITDA). In the UK and US, such net capital expenditure is often listed in the cash flow statement of the company as “net cash from investment and financing activities”.

Working capital represents the current assets (excluding cash) *less* current liabilities (excluding debt), and usually simply reduces to accounts receivable *plus* inventory *less* accounts payable. In the context of free cash flow, though, it is important to appreciate the effect of changes in working capital on the cash available to the company. If the company’s accounts receivable decreases over the course of the year, it is indicative of the company’s cash position improving as trade debtors pay-off sums owed to the company. On the other hand, a decrease in accounts payable is indicative of the company’s cash position worsening as the company has used cash to pay-off debts owed to trade creditors. An

³⁸ See: “Determining the Discount Rate – the Cost of Capital” below.

³⁹ Since existing debt is usually paid-down upon completion of the transaction, and, where a private equity buyout is concerned, replaced by substantially more debt, the existing tax deductions of the target will likely bear no relation to the future tax deductions available post-acquisition.

⁴⁰ Tax deductions accruing to interest payments are factored into the discount rate (see: “Determining the discount rate – the Cost of Capital” below).

increase in inventory also reduces free cash flow, since cash will have been expended on purchasing inventory. Therefore, overall, if working capital increases, the company's free cash flow decreases (and *vice versa*), and changes in working capital must be deducted or added to EBITDA as appropriate to calculate free cash flow. Working capital can be deducted from line items under "cash flows from operating activities" in a company's cash flow statement (or, in some cases, in the notes to the financial statements).

Ultimately, the free cash flow of the company can be calculated by extracting the relevant accounting line items and treating them as follows:

"EBITDA *less* [EBIT *multiplied by* corporation tax rate] *less* "net capital expenditure" *less* "net increase in working capital"

Calculating the free cash flow of the company from its latest annual accounts is not, therefore, a particularly complicated process. However, the annual accounts only provide a historic snapshot of the company's finances, and is thus just the first step in the process when it comes to valuation. The next, more complex, step is to predict the future free cash flows of the company and use them to determine valuation.

The DCF Formula

The free cash flow of a target company for the previous financial year can be used to assist a private equity professional in predicting future free cash flows of the company, with a view to ascertaining the total free cash flows of the company over its life-time.

Predicting life-time free cash flow is where the skills of the private equity deal team come to the fore. They must forensically deduce how the operations, capital expenditure, growth and expenses of the company may change over time. The procedures, rules and techniques used by private equity professionals to improve the accuracy of such predictions are beyond the scope of this article. The remainder of this article will therefore focus on how those predicted free cash flow figures can be extrapolated into a valuation. Here comes the maths.

The DCF valuation formula will first be stated, before deconstructing each element of that formula to make it clearer as to why each part is included when determining valuation. The DCF valuation formula is commonly stated as:

$$\text{Valuation} = [\text{CF}_1/(1+d)] + [\text{CF}_2/(1+d)^2] + [\text{CF}_3/(1+d)^3] + \dots + [\text{CF}_Y/(1+d)^Y] + [\text{TV}_Y/(1+d)^Y]$$

where:

- (i) CF = predicted free cash flow for each respective financial year post-acquisition;⁴¹
- (ii) d = the discount rate;
- (iii) Y = the number of years post-acquisition for which specific (rather than general) predictions are being made for free cash flow; and
- (iv) TV_Y = the terminal value at year Y.

Predicting to Perpetuity – Specific v General Predictions of Free Cash Flow

Arriving at a valuation of the company using DCF requires a prediction of total free cash flow generated by the company's business in perpetuity. Unless there is some known reason why the business will cease on a specific date (such as an intention to liquidate the assets), a company is deemed to be a going concern with an infinite economic life, and must therefore be valued on an assumption that it will continue forever. Free cash flow can be determined for each financial year post-acquisition by predicting the values of each relevant element in the calculation of free cash flow outlined above.⁴² A private equity firm acquiring a target will intend to grow the annual free cash flow over time. However, after a number of years, the accuracy of those predictions becomes questionable, since variables such as the state of the economy, tax rates, interest rates and the emergence of competitors are more likely to change the further into the future predictions are made. Additionally, the private equity firm will have an exit horizon, after which it will no longer be in control of the company's

⁴¹ The predictions for predicted free cash flow will entail predicting values for each accounting line-item from which free cash flow is derived (see: "Deriving Free Cash Flow" above).

⁴² *ibid.*

growth. Furthermore, at some point, the company is presumed to reach a steady state, when increases in free cash flow will plateau. The DCF method resolves this issue by only specifically predicting free cash flow for a finite number of years post-acquisition (the “specific prediction phase”), then using a general prediction that will apply to all years subsequently in perpetuity (the “general prediction phase”). During the general prediction phase, it is assumed that free cash flow increases with a constant annual rate (the “growth rate”) starting from the final specifically predicted free cash flow figure. The general prediction phase ultimately calculates the “terminal value”, discussed further below.⁴³

In the DCF formula, the specific prediction phase is represented by the part of the equation delineated as:

$$[CF_1/(1+d)] + [CF_2/(1+d)^2] + [CF_3/(1+d)^3] + \dots + [CF_Y/(1+d)^Y]$$

The general prediction phase is represented in the DCF formula as:

$$[TV_Y/(1+d)^Y]$$

It is evident from the formula that free cash flow is specifically predicted for each year after completion of the buyout up to year “Y”. For private equity buyouts, when choosing year “Y”, a rational choice is to specifically predict up to the year when it is intended to exit the investment. It is during that time that the private equity firm will have complete control over the operations of the company, and it is over that period that it will be simpler to specifically predict free cash flow. Additionally, the sense behind ascribing a terminal value after a specific number of years relates to the value that may be ascribed to the company by third parties at a time when the private equity firm is seeking an exit. Most private equity funds have a life of around ten years with the option to extend by two or three further years,⁴⁴ but usually private equity deal teams will be seeking to exit an investment

⁴³ See: “Terminal Value” below.

⁴⁴ S. Witney, *Corporate Governance and Responsible Investment in Private Equity* (Cambridge: CUP, 2020) 32.

within three to seven years⁴⁵ with a view to reinvesting some of the returns (or distributing them to investors early). “Y” will therefore be in the region of three to seven years, after which the terminal value will reflect the free cash flow to perpetuity.⁴⁶

The Discount Rate

Immediately obvious from the DCF formula is the importance of the “discount rate” (“d”). In this section the relevance of the discount rate primarily to the specific prediction phase will be explained. We will then revert to the discount rate again when discussing the terminal value in the general prediction phase.

Applying the Discount Rate

In the DCF formula above, the DCF value for the specific prediction phase involves specific calculations for free cash flow in years up to “Y” post-acquisition. Taking years 1, 2 and 3 – CF₁, CF₂ and CF₃, respectively – the predicted cash flows are, in the calculation, each divided by “(1+d)”. The formula is, here, attempting to discount the future value of free cash flows to take account of the fact that, if the sums were received today (at the time of the acquisition), the private equity firm could have used those sums and earned returns between today and the date on which those sum are actually received. Another way of looking at it is that the private equity firm has had to pay today (the acquisition date) for something it will only receive in the future, so the predicted free cash flow should be discounted by the increased cost of the capital the private equity firm has had to employ for the period between the acquisition date and the company generating the relevant free cash flow. That cost of capital is the discount rate, “d”.⁴⁷

⁴⁵ D. Cooke, *Private Equity Law and Practice* (London: Sweet & Maxwell, 2021) 19.

⁴⁶ With the difficulties of predicting free cash flow even seven years into the future, some commentators have noted that the specific prediction phase will often only endure two to five years (A. Damodaran “Valuing Young, Start-Up and Growth Companies: Estimation Issues and Valuation Challenges” (2009) 1, 14 <http://dx.doi.org/10.2139/ssrn.1418687>

⁴⁷ In relation to the calculation of “d”, see: “Determining the Discount Rate – the Cost of Capital” below.

Why divide by “(1+d)”? Let’s focus on the free cash flow generated in the first year post-acquisition – CF₁. In layperson’s terms, the formula is trying to deduce what notional present-day sum could be received on the acquisition date which, when applying the cost of capital as a rate of return (since the private equity firm would not be incurring that cost of capital if the free cash flow had been received on the acquisition date), would result in the predicted free cash flow after one year. If the cost of capital (essentially the discount rate, “d”) were, for example, 12%, CF₁ would be the notional present-day sum as increased by a 12% per annum return over one year. Therefore, CF₁ would be the notional present-day sum *multiplied by* (1+0.12). Correspondingly, the present notional day sum (or, more appropriately, the discounted value of CF₁) is CF₁ *divided by* 1.12 (“(1+d)”).

For CF₂, similar considerations apply, except that the free cash flow is only received two years post-acquisition rather than one year post-acquisition. Therefore, the discount to CF₂ to result in the notional present-day sum, must take into account two years’ worth of capital costs. Again, with a “d” value of 12%, what notional present-day sum would result in CF₂ if a rate of return on the notional present-day sum of 12% per annum were applied to it for two years? In the first year, the notional present-day sum increases by 12%, so must be multiplied by 1.12. In the second year, the notional present-day sum has already grown by 12%, so that larger sum must itself be *multiplied by* 1.12 again to arrive at CF₂. The calculation is:

$$CF_2 = (\text{“notional present-day sum”} \textit{ multiplied by } 1.12) \textit{ multiplied by } 1.12$$

or, $CF_2 = \text{“notional present-day sum”} \textit{ multiplied by } 1.12^2$

or, $CF_2 = \text{“notional present-day sum”} \textit{ multiplied by } (1+d)^2$

Therefore, the discounted value of CF₂ is equal to CF₂ *divided by* (1+d)². For the third year, the discounted value of CF₃ is CF₃ *divided by* (1+d)³, and for the fourth year, CF₄ *divided by* (1+d)⁴, and so on.

Determining the Discount Rate – the Cost of Capital

In the example above, the discount rate has been assumed to be 12%. However, how would that 12% be determined? The key, as discussed, is the private equity firm's cost of capital. The capital the firm has utilised to acquire the target has a cost. A private equity buyout will involve debt and equity financing. The vast majority of the purchase price for the target will usually be debt, with the remainder an equity contribution from the private equity firm. If the firm had received the free cash flow on the date of the acquisition, conceptually, it could have been used immediately to reduce the capital employed and so reduce the cost of capital (by paying-off debt, thereby reducing the cost of debt, and/or by making a distribution, thereby reducing the cost of equity by freeing it up to invest elsewhere).⁴⁸ The cost of capital is the aggregate of the cost of debt and the cost of equity.

The cost of debt is determined by the interest rate on the borrowings of the private equity firm used to acquire the target.⁴⁹ The existing debt of the target at the time of acquisition will usually be irrelevant, since private equity buyouts commonly entail the satisfaction of the existing debt upon the change of control of the target. However, if any of that existing debt is to remain in the company post-acquisition, it must also be aggregated with the new acquisition debt when calculating the cost of debt (and, in turn, the discount rate), since the relevant free cash flow could have been used to reduce that debt on the acquisition date if it had been available immediately. If the finance package comprises various debt instruments with different interest rates, a weighted average must be calculated.⁵⁰ The

⁴⁸ Although, in practice, there may be restrictions on paying down debt or making distributions (see: notes 24 and 25 above).

⁴⁹ A fair challenge as to the accuracy of DCF is that the capital structure of the target may change over time. It is not uncommon for a private equity firm to restructure the debt prior to exit, and, upon exit, the debt package of a future acquirer may be very different from the debt package put in place upon the initial acquisition. The discount rate does not account for these potential changes, and, instead, applies a fixed rate (E. Talmor and F. Vasvari, *International Private Equity* (Chichester: Wiley, 2011) 220).

⁵⁰ Although in recent years the private equity industry has seen financings consisting of unitranche debt with a single interest rate, in the past, tiered finance packages were more common with senior debt utilised alongside second lien or mezzanine debt each with differing interest rate (K. Hutchinson and C. Lawrence, "Debt finance" in C. Hale (ed.), *Private equity: A Transactional Analysis 4th Edition* (Woking: Globe Law and Business, 2020) 89-96). High yield debt may also be issued to finance private equity buyouts (D. Cooke, *Private Equity Law and Practice* (London: Sweet & Maxwell, 2021) 267).

inclusion of interest payments in the discount rate explains why, as discussed above,⁵¹ interest is not deducted from EBITDA when predicting the free cash flow sums for each year post-acquisition. If it were, interest payments would be double-counted between those free cash flow calculations and the discount rate.⁵² It should be further noted that the imposition of interest payments on debt can result in deductions against a company's tax liabilities (the "tax shield" in US parlance).⁵³ However, the tax deducted from EBIT when predicting free cash flows as described above is the corporation tax rate as applied to EBIT,⁵⁴ even though the incurrence of debt in connection with the acquisition would have reduced the tax burden. This issue is resolved by taking into account tax deductions as a result of debt interest payments when applying the discount rate – a sum equivalent to "interest" *multiplied by* the "corporation tax rate" is *deducted from* the interest rate when calculating the cost of debt (decreasing the discount applied to free cash flow predictions to evince the company's reduced tax burden).

Estimating the cost of equity is more complicated and the detail is outside the scope of this article. Broadly, though, the cost of equity will be the annual returns that a private equity firm could receive if it had invested the equity sum in a company similar to the target. This can be an exercise fraught with peril when private companies are involved, since comparable companies may be difficult to identify, or, to the extent that similar companies are identifiable, the relevant financial information may not be available. Sometimes, therefore, returns on publicly-listed firms with similar characteristics are used to determine the cost of equity. To simplify matters, the private equity firm may, instead, equate the cost of equity to the minimum return that the private equity firm intends to make on the investment – that way, the company's valuation will reflect the maximum price that the private equity firm will be willing to pay for the company.⁵⁵ In such circumstances, some commentators have

⁵¹ See text accompanying notes 36-38 above.

⁵² J. Lerner et al, *Venture Capital and Private Equity: A Casebook* (New Jersey: Wiley, 2012) 183.

⁵³ P. Fernandez, "Company Valuation Methods. The Most Common Errors in Valuations" (2007) IESE Working Paper No. 449 1, 19; M. Capiński and W. Patena, *Company Valuation - Value, Structure, Risk* (Hof: University of Applied Sciences, 2008) 19.

⁵⁴ See: "Deriving Free Cash Flow" above.

⁵⁵ P. Fernandez, "WACC: Definition, Misconceptions and Errors" (2011) IESE Working Paper 914 1, 2; also see: "Putting it Altogether" below.

described the discount rate as a mixture of cost of capital and rate of return – it comprises the cost of debt and a required rate of return on equity.⁵⁶ The discount rate is then often increased to reflect any company-specific risks of investing in the relevant target. For example, if the target is a relatively early-stage company, the risks that the predicted free cash flows are inaccurate will be higher, and therefore the discount rate will also be higher.⁵⁷

The discount rate is sometimes referred to as the “weighted average cost of capital”,⁵⁸ since the cost of debt and the cost of equity must be weighted based upon the ratio of debt to equity used by the private equity firm to fund the transaction. Therefore, the calculations for the cost of debt and the cost of equity must each be *multiplied by* the ratio of debt to total funding, and the ratio of equity to total funding, respectively. As such, the discount rate can be calculated as follows:

$d = [\text{weighted average cost of debt accounting for tax shield}] \textit{ plus } [\text{weighted average cost of equity}]$

where:

(i) $[\text{weighted average cost of debt accounting for tax shield}] = (D/(E+D)) \textit{ multiplied by } [“\text{interest rate on debt}” - (“\text{interest rate on debt}” \textit{ multiplied by } “\text{corporation tax rate}”)]$;

(ii) $[\text{weighted average cost of equity}] = (E/(E+D)) \textit{ multiplied by } “\text{cost of equity}”$;

(iii) D = estimated amount (market value) of debt funding; and

(iv) E = estimated amount (market value) of equity funding.

A chicken-and-egg scenario emerges in relation to estimating “D” and “E” above – how is it possible to estimate the amount of funding required before knowing the valuation of the target? However, since “D” and “E” are only used to “weight” the relevant costs of debt and equity, the absolute values of “D” and “E” are irrelevant, so long as the proposed allocation between “D” and “E” is correct.

⁵⁶ *ibid.*

⁵⁷ E. Talmor and F. Vasvari, *International Private Equity* (Chichester: Wiley, 2011) 220.

⁵⁸ D. Cooke, *Private Equity Law and Practice* (London: Sweet & Maxwell, 2021) 35.

The Terminal Value

Having discounted and aggregated each of the specifically predicted annual free cash flow sums, a value for the subsequent free cash flows of the company generated in perpetuity must be further included in the company's valuation. This is the general prediction phase, and, at this stage, it is assumed that the company has reached a stable state and will simply continue to grow at a steady rate. The free cash flow for the final specifically predicted year can be used, and a growth rate applied to determine the future, more generally, predicted year-on-year free cash flow. Reverting to intimidatingly complicated looking equations, the terminal value is usually expressed as below, but we will next unpack each element:

$$TV_Y = [CF_Y * (1+g)] / (d-g)$$

where:

- (i) CF_Y = cash flow rate predicted for the final year of the specific prediction phase;
- (ii) g = growth rate; and
- (iii) d = discount rate.

The Growth Rate

The component " CF_Y multiplied by $(1+g)$ " corresponds to the free cash flow that would be generated the year following the final year in which the free cash flow was specifically predicted. With a growth rate of, say 2%, and a "Y" of, say, three years, in the fourth year post-acquisition, the free cash flow generated will have grown to CF_3 multiplied by 1.02 (" $(1+g)$ ").

A key assumption in generally predicting the year-on-year free cash flow generation is the growth rate. The machinations involved in determining the growth rate is beyond the scope of this article. Suffice to say, accurately predicting growth in perpetuity is challenging, especially for a private company without the sell-side analyst estimates of growth found in the publicly-listed company

sphere.⁵⁹ The company's historic growth may also not be salient if the company is an early stage company,⁶⁰ since it will eventually mature and growth rate decline. Usually, growth rate will encompass inflation as well as the predicted stable state growth rate of the company,⁶¹ but practitioners are cautious and will not arbitrarily impose a high growth rate. In particular, since the growth rate will apply to the company in perpetuity, it cannot be greater than the growth rate for the economy as a whole, otherwise the implication is that the company will in time become larger than the economy.⁶²

The Lump Sum Concept of Terminal Value

As above, “CF_Y multiplied by (1+g)” represents the free cash flow for the year following the final year for which free cash flow has been specifically predicted. Why though *divide by* “(d-g)”? The answer is that the notion behind terminal value is that the company's free cash flow will continue growing by the growth rate on a year-on-year basis – the company's valuation must reflect that free cash flow generation in perpetuity, rather than just for the single year following the final year for which free cash flow has been specifically predicted.

It is not, though, possible to keep predicting free cash flow sums for every year of the general prediction phase *ad infinitum* and discount each of them to the acquisition date. Life is literally too short. Instead, the terminal value concept involves attributing a lump sum value that would, if an appropriate rate of return were applied to the lump sum, result in income equal to the free cash flows generally predicted to be generated each year going forward forever.⁶³ That lump sum is the terminal

⁵⁹ E. Talmor and F. Vasvari, *International Private Equity* (Chichester: Wiley, 2011) 219.

⁶⁰ *ibid.*

⁶¹ *ibid.*; Brotherson et al, “Best Practices in Estimating the Cost of Capital: An Update” (2013) 23 *Journal of Applied Finance* 1, 6.

⁶² A. Damodaran, “The Stable Growth Rate” Brotherson et al, “Best Practices in Estimating the Cost of Capital: An Update” (2013) Stern Business School, New York University https://pages.stern.nyu.edu/~adamodar/New_Home_Page/valquestions/stablegrowthrate.htm

⁶³ An alternative way to view the terminal value is that it is the value of the business at the end of the specific prediction period (E. Talmor and F. Vasvari, *International Private Equity* (Chichester: Wiley, 2011) 218).

value. Essentially, the concept envisages an endowment sum being received at the end of the final year for which free cash flow has been specifically predicted from which sufficient income will be generated and distributed (rather than capitalised) each year going forward that represents the free cash flow of the company. In a way, the terminal value lump sum captures the business value at the end of the specific prediction period.⁶⁴

It is at this stage, when contemplating the ongoing rate of return, that we revisit the discount rate, “d”, discussed previously. A presumption (which is of course merely a rough estimate) can be made that the appropriate rate of return to apply to the relevant lump sum is the discount rate. The idea here is that the discount rate equates to the weighted cost of capital for the private equity firm, so receiving the lump sum, deemed to be received at the end of the specific prediction phase, reduces that cost of capital (if the lump sum were used to satisfy debt and distribute returns to equity providers) by an amount that, each year, represents the annual free cash flow predicted. If the growth rate were zero, and the income from the lump sum needed only to cover a fixed free cash flow sum each year, the lump sum could be simply calculated by *dividing* the fixed free cash flow (CF_Y) *by* the discount rate. The amount by which the cost of capital would be notionally reduced would be the discount rate applied to that lump sum, and the same saving on cost of capital will be generated in each subsequent year since that lump sum has reduced the capital employed permanently.

However, it is assumed that the free cash flow will grow by the growth rate, “g”, each year. As such, the “income” generated each year when applying the rate of return (equal to the discount rate) to the lump sum must continually increase if the cash flow is predicted to increase year-on-year (at the non-zero growth rate). With the discount rate applied to the lump sum as a rate of return being constant (fixed), a continually increasing annual income from the lump sum will only be possible if the “principal” of the lump sum also increases over time, so that the rate of return is applied to an ever-growing principal. Therefore, to ensure that the “principal” of the terminal value lump sum grows over time, when calculating the terminal value, we *deduct* the growth rate from the discount rate and then *divide* the free cash flow sum for the last year of the specific prediction phase as increased by the growth rate (CF_Y *multiplied by* “(1+g)”) *by* “(d-g)”. In effect, *dividing by* a smaller denominator results in a

⁶⁴ *ibid* 218.

larger lump sum or terminal value which allows that lump sum to produce free cash flow “income” each year (or annual savings on the cost of capital) that increases with the growth rate when the notional rate of return (“d”) is applied annually. Further adjustments may also be made to the terminal value to embody the greater risks in predicting free cash flow to perpetuity.⁶⁵

The mechanics can become simpler to envisage if we imagine that the relevant lump sum has actually been received and the discount rate applied as a rate of return to generate notional income returns on the lump sum. It is also helpful to visualise the application of the discount rate that generates income returns on the lump sum as a two-stage process – the first involving the application of a rate equal to “(d-g)”, and the second involving the application of a rate equal to “g”. After all, those two stages aggregated equal the overall rate of return – the discount rate (“d”). If we take the first year of the general prediction phase, applying the first stage rate of “(d-g)” results in the predicted free cash flow for that year (the previous year’s free cash flow as increased by the growth rate). Applying the second stage rate of “g” generates further income that can be added to the “principal” of the lump sum (alternatively that income can be viewed as reducing the capital employed further, and therefore increasing the capital cost savings for future years). The lump sum, now larger, will generate greater income the following year when the notional rate of return “d”, is again applied. That larger income will encompass a sum equal to the free cash flow for the previous year as increased again by the growth rate (the “(d-g)” stage), and a further sum increasing the lump sum’s “principal” (the “g” stage), enabling the same mechanics to apply the following year.

Taking an example with numbers, imagine a growth rate of 2%, a discount rate of 12% and the final year of the specific prediction phase being three years post-acquisition. “Y” therefore equals 3. Further assume that the specifically predicted free cash flow rate for that final year of the specific prediction phase (CF₃) is £35m. In the fourth year after the acquisition, being the first year of the general prediction phase, the free cash flow, applying the general growth rate would be predicted to be

⁶⁵ Brotherson et al, “Best Practices in Estimating the Cost of Capital: An Update” (2013) 23 *Journal of Applied Finance* 1, 5). Even if the discount rate already incorporates a degree of risk (see text accompanying note 57), the terminal value may be reduced to reflect the greater degree of risk attaching to the general prediction phase due to it covering a period many further years into the future.

£35.7m (£35m *multiplied by* $(1+0.02)$). If we *divide by* the discount rate *less* the growth rate (“(d-g)”), the lump sum terminal value is deduced, being £357m (£35.7m *divided by* 0.10). Applying the discount rate to that lump sum as a rate of return in the fourth year post-acquisition, results in income of £42.84m (£357m *multiplied by* 0.12). £35.7m of that income (being the lump sum *multiplied by* “(d-g)”) corresponds to the predicted free cash flow in the fourth year, with the remaining £7.14m (being “g” *multiplied by* the lump sum) added to the lump sum. Taking it forward to the fifth year post-acquisition, the lump sum is now £364.14 (£357m *plus* £7.14m). If we apply the discount rate to this sum again as a rate of return, the income generated is £43.6968m (£364.14 *multiplied by* 0.12). We can again split that income into £364.14 *multiplied by* 0.10 (“(d-g)”), which equals £36.414m, and £364.14 *multiplied by* 0.02 (“g”), which equals £7.2828m. £36.414m is the predicted free cash flow in the fifth year post-acquisition, equating to £35m *multiplied by* $(1+0.02)^2$. The £7.2828m is added to the lump sum to allow the calculation for the sixth year post-acquisition to again generate the growing free cash flow along with an increase to the lump sum to ensure sufficient income is generated each year. It can, therefore, be observed that the lump sum (the “terminal value”) provides an endowment that, when the discount rate is applied as a rate of return, generates a free cash flow growing at the rate of the growth rate year-on-year in perpetuity between the end of the fourth year post-acquisition and the end of time.

Discounting the Terminal Value

In the formula for DCF above,⁶⁶ it is assumed that the terminal value is received at the end of the specific prediction phase. In our numerical example in the previous section, we assumed that this was three years post-acquisition, such that it could be used to produce the necessary income equivalent to the generally predicted free cash flow (growing at the growth rate) for the first year of the general prediction phase onwards. However, since that terminal value lump sum is not deemed to be received until a period of time post-acquisition, it must be discounted back to the date of the acquisition (three years previously in the numerical example) - the private equity firm has paid for that terminal value at the date of the acquisition but is only deemed to receive it three years later. This thought experiment

⁶⁶ See: “The DCF Formula” above.

involves the same considerations as outlined earlier when discussing discounting the free cash flow amounts during the specific prediction phase.⁶⁷ Therefore, in the DCF master formula,⁶⁸ the terminal value must be *divided by* $(1+d)^Y$ (£357m *divided by* $(1+0.12)^3$ in the numerical example, resulting in £254.11m as the valuation attributable to the general prediction phase).

Putting it Altogether

Like a complex dessert, once deconstructed into its individual ingredients, the magic behind DCF valuations becomes less of a mystery. Simply put, DCF values a company based upon the company's predicted capacity to generate freely available cash over its lifetime, discounted to present-day value to compensate the purchaser of the company for having to pay for that future cash flow now, expending debt and equity costs in financing the acquisition. The discount rate therefore represents the private equity acquiror's cost of capital. A private equity purchaser will specifically predict free cash flows for a number of years post-acquisition, usually until when it is intended to exit the investment. For subsequent years, a fixed growth rate is assumed, since it is presumed that the company's growth will remain stable in perpetuity. A fixed, and conservative, growth rate is necessary due to the uncertainties in predicting free cash flow many years into the future, and due to the fact that the company's growth will, at some point, eventually stabilise. For those fixed growth rate years, a terminal value that represents the value of those cash flows in perpetuity is calculated, discounted to present-day, and aggregated with the discounted free cash flow predictions for the previous years for which specific free cash flow predictions had been made.

A numerical example brings the formula home. Let's assume that free cash flows have been predicted during a specific prediction phase of three years, amounting to £24m, £30m, and £35m, respectively. The discount rate is 12% and the growth rate for years subsequent to year-three post-acquisition is 2%. The valuations attributable to the specific and general prediction phases are as follows:

⁶⁷ See: "Applying the Discount Rate" above.

⁶⁸ See: "The DCF Formula" above.

$$\begin{aligned}
\text{Specific prediction phase valuation} &= [CF_1/(1+d)] + [CF_2/(1+d)^2] + [CF_3/(1+d)^3] \\
&= \text{£}24\text{m}/(1+0.12) + \text{£}30\text{m}/(1+0.12)^2 + \text{£}35\text{m}/(1+0.12)^3 \\
&= \text{£}21.428\text{m} + \text{£}23.915\text{m} + \text{£}24.912\text{m} \\
&= \text{£}70.26\text{m}
\end{aligned}$$

$$\begin{aligned}
\text{General prediction phase valuation} &= TV_3/(1+d)^3 \\
&= [(CF_3*(1+g))/(d-g)]/(1+d)^3 \\
&= [(\text{£}35\text{m}*(1+0.02))/(0.12-0.02)]/(1+0.12)^3 \\
&= \text{£}254.11\text{m}
\end{aligned}$$

$$\begin{aligned}
\text{Total valuation} &= \text{£}70.26 + \text{£}254.11\text{m} \\
&= \text{£}324.37\text{m}
\end{aligned}$$

Unsurprisingly, the terminal value, which encapsulates many more years than the specifically predicted free cash flow years, accounts for easily the largest proportion of the overall DCF valuation of the company⁶⁹ - in the numerical example above, 78% of the total valuation. For high-growth younger firms, which are traditionally the preserve of venture capital investors rather than private equity investors,⁷⁰ the terminal value may even account for practically all of the company's value.⁷¹

Importantly, though, DCF valuations should not be confused with price.⁷² Price will be what the private equity purchaser and the seller of the target company agree as the consideration to be paid for the acquisition. Private equity firms are in the business of making cash returns, and, therefore, having calculated the DCF valuation of the company, the price that the private equity firm offers for a company will need to factor-in the return that it seeks to achieve. If the "cost of equity" component of

⁶⁹ D. Cooke, *Private Equity Law and Practice* (London: Sweet & Maxwell, 2021) 34; A. Damodaran "Valuing Young, Start-Up and Growth Companies: Estimation Issues and Valuation Challenges" (2009) 1, 10 <http://dx.doi.org/10.2139/ssrn.1418687>

⁷⁰ In relation to the difference between venture capital and private equity, see: note 1 above.

⁷¹ Brotherson et al, "Best Practices in Estimating the Cost of Capital: An Update" (2013) 23 *Journal of Applied Finance* 1, 2; Darmadan (*ibid* 10).

⁷² P. Fernandez, "Company Valuation Methods. The Most Common Errors in Valuations" (2007) IESE Working Paper No. 449 1, 2.

the discount rate already includes the minimum rate of return that the private equity firm is seeking,⁷³ the determination of offer price becomes easy – the private equity firm will not pay above the DCF valuation. Crucially, it is likely that the seller of the company will also be conducting a DCF valuation of the company in a similar manner. However, the private equity firm’s DCF valuation is based upon the predicted free cash flows that the target is likely to make under the control of the private equity firm aggregated with the terminal value which could be considered to be a proxy for the price that a future purchaser of the company would be willing to pay when the private equity firm exits. Therefore, ignoring extraneous issues (for example a seller desperate to liquidate assets or regulatory issues spurring a sale), the ability of private equity to make returns hinges upon the company generating greater free cash flow under the private equity firm’s future ownership than the seller predicts will be made under its own ownership⁷⁴ (or upon the seller requiring higher returns and/or the company having a higher cost of debt than would be the case post-acquisition). That divergence can create the discrepancy between the enterprise value (value of equity *plus* debt) at which the seller is willing to sell the company and the value that the private equity firm believes can be ascribed to the company – assuming that discrepancy is net positive in the direction of private equity firm valuation, the possibility of the private equity firm making positive returns upon the private equity firm’s eventual exit arises.

It should be noted, though, that DCF is not the be-all-and-end-all of company valuations. Other types of valuations exist. A common substitute (or adjunct) to DCF is the use of EBIT multiples. With multiples methodology, a company with a known value, which is comparable (in terms of industry, sector and size) to the intended target, is selected and its financials scrutinised. The factor by which that comparable company’s enterprise value (equity *plus* debt) exceeds its EBIT, results in an EBIT multiple.⁷⁵ That multiple can then be applied to the EBIT of the target company to deduce a valuation.

⁷³ See text accompanying note 55 above.

⁷⁴ P. Fernandez, “Company Valuation Methods. The Most Common Errors in Valuations” (2007) IESE Working Paper No. 449 1, 2.

⁷⁵ Occasionally, a profits to equity value ratio (“P/E”) is used. However, the benefit of using a ratio of EBIT/enterprise value (debt *plus* equity) is that it, unlike P/E, includes debt, and, therefore, allows a more effective comparison between two companies with similar characteristics except for having differing levels of debt (M. Capiński and W. Patena, *Company Valuation - Value, Structure, Risk* (Hof: University of Applied Sciences, 2008) 12; J. Lerner et al, *Venture Capital and Private*

A mixture of DCF and multiples may also be used - the specific prediction phase could be calculated using the orthodox DCF method, but earnings or profits multiples could be used in the general prediction phase to determine the terminal value.⁷⁶

With multiples methodology, usually, publicly-listed company comparables are used, since their values can be ascertained from share price, whereas there is no publicly observable market for private company values.⁷⁷ If a private equity firm has plentiful internal data on buyouts of similar private companies to a private company target, occasionally a market value for the target can be calculated from comparable private companies, which would be preferable if the target is also a private company, since public company valuations will embrace factors not relevant to equivalent private companies.⁷⁸ However, unless the private company data derives from buyouts conducted by the private equity firm itself, since those comparable companies are private, financial and non-financial information apposite to the relevant multiples may be unknown, and there may be extraneous reasons why a specific purchaser ascribed a valuation to a comparable private company (for example, synergies in the case of a trade purchaser).

In some circumstances, multiples methodology may, in fact, be preferable to DCF. For example, a young company may not have any predicted free cash flow in its early years, when all profits are being invested to grow the company. Free cash flow may be zero or even negative for a number of years, and, therefore, free cash flow predictions could become incredibly uncertain. A multiples

Equity: A Casebook (New Jersey: Wiley, 2012) 183; J. Koeplin et al, "The Private Company Discount" (2000) 12 *Journal of Applied Corporate Finance* 94, 97; D. Cooke, *Private Equity Law and Practice* (London: Sweet & Maxwell, 2021) 37).

⁷⁶ Cooke (*ibid* 35).

⁷⁷ J. Koeplin et al, "The Private Company Discount" (2000) 12 *Journal of Applied Corporate Finance* 94, 94.

⁷⁸ For example, the market price of a public company may include premium for greater liquidity than private companies (J. Lerner et al, *Venture Capital and Private Equity: A Casebook* (New Jersey: Wiley, 2012) 183; Koeplin et al (*ibid* 94)), and the public companies usually have far greater scale and are less risky than private companies (D. Cooke, *Private Equity Law and Practice* (London: Sweet & Maxwell, 2021) 36). On the other hand, a public company valuation based upon share price will be premised on a minority interest in the company and not, therefore, reflect the control premium attributed to the benefits of a single majority owner controlling the company (as would be the case post-private equity buyout) (Cooke (*ibid* 36)).

methodology may be more appropriate.⁷⁹ However, unlike venture capitalists, a private equity buyout firm is unlikely to ever acquire a company that is not predicted to generate free cash flow immediately after acquisition. Private equity buyouts are heavily leveraged,⁸⁰ and it is a fundamental part of private equity strategy that the relevant buyout target be able to sustain those debt obligations and satisfy interest payments. DCF also has advantages over multiples methodology, since the specific prediction phase can be used to predict how the private equity firm will be able to grow the target company (through efficiencies for example) over the coming years, rather than using historic earnings or profits figures from the target and using multiples derived from companies that, although perhaps broadly comparable, may not be exact matches for the target company being acquired.⁸¹ Furthermore, the use of public company comparables assumes that the public markets are efficient⁸² and that prices are not misguided by periodic sector sentiments.⁸³ For now, in the private equity sphere, DCF is king.

Conclusion

DCF is the most common method by which private equity firms value buyout targets. DCF has been embraced by the private equity industry as the most appropriate valuation methodology in the context of highly leveraged buy-outs. However, unlike simpler valuation methods, such as various forms of earnings multiples, the DCF process and formula can appear complicated and intractable.

The DCF formula can be taken apart piece-by-piece, though, to make it more intelligible. When viewed through the prism of a sequence of predicted post-acquisition cash flows, in the early years specifically predicted and in the later years predicted on the basis of an ongoing fixed growth rate, that

⁷⁹ For a discussion of this rationale, see: A. Damodaran “Valuing Young, Start-Up and Growth Companies: Estimation Issues and Valuation Challenges” (2009) 1, 11-12.

⁸⁰ K. Hutchinson and C. Lawrence, “Debt finance” in C. Hale (ed.), *Private equity: A Transactional Analysis 4th Edition* (Woking: Globe Law and Business, 2020) 79.

⁸¹ M. Capiński and W. Patena, *Company Valuation - Value, Structure, Risk* (Hof: University of Applied Sciences, 2008) 13.

⁸² Capiński and Patena (*ibid* 5).

⁸³ J. Lerner et al, *Venture Capital and Private Equity: A Casebook* (New Jersey: Wiley, 2012) 182; Capiński and Patena (*ibid* 13).

are discounted back to present-day value, the formula becomes more accessible. A more intuitive understanding of DCF can give corporate lawyers, particularly those advising private equity clients, an advantage in providing legal services. Comprehending a client's valuation mechanics can enlighten the legal advice given, and, moreover, enable lawyers to speak to their clients on an equal footing, engendering trust on the part of the client that its lawyer is cognisant of the commercial realities of the transaction. Lawyers apprehending materiality when furnishing legal advice is prized by clients. The most highly-regarded corporate lawyers are recognised as deal-makers not legally pedantic deal-blockers.

Although DCF valuation can be simplified when taken to first principles, it is not the intention of this article to belittle the skills of private equity professionals. Understanding how DCF works is one thing, making the relevant predictions to feed into the formula is another. DCF is, in particular, sensitive to the relevant discount and growth rates,⁸⁴ and the level to which risk is ingrained in those rates. Additionally, specifically predicting free cash flows, even soon after acquisition, requires high degrees of speculation as to the value that can be unlocked from the investment⁸⁵ (often in a manner thought not possible by the seller). The secret sauce of private equity success is to make those predictions accurately and, subsequently, negotiating a price for targets that fosters a sufficient internal rate of return to be achieved. It is not the role of lawyers to make those predictions. However, by deconstructing DCF, the mysteries of DCF can be solved, and lawyers can advise their private equity clients from a surer footing.

⁸⁴ Lerner et al, (*ibid* 182); E. Talmor and F. Vasvari, *International Private Equity* (Chichester: Wiley, 2011) 221.

⁸⁵ Brotherson et al, "Best Practices in Estimating the Cost of Capital: An Update" (2013) 23 *Journal of Applied Finance* 1, 8.