

International Valuation Guidance Note No. 9

Discounted Cash Flow Analysis for Market and Non-Market Based Valuations

1.0 Introduction

1.1 *Discounted cash flow (DCF) analysis* is a financial modelling technique based on explicit assumptions regarding the prospective income and expenses of a property or business. Such assumptions pertain to the quantity, quality, variability, timing, and duration of inflows and outflows that are discounted to present value. DCF analysis, with appropriate and supportable data and discount rates, is one of the accepted methodologies within the *income capitalisation approach* to valuation. DCF analysis has gained widespread application due in part to the advancement of computer technology. DCF analysis is applied in valuations of real property, businesses and intangible assets; in investment analyses; and as an accounting procedure to estimate value in use. The use of DCF analysis has increased substantially in institutional, investment property and business valuation sectors and is frequently required by clients, underwriters, financial advisers and administrators, and portfolio managers.

1.2 DFC valuations, as with other income-based valuations, are established on analysis of historical data and assumptions about future market conditions affecting supply, demand, income, expenses, and the potential for risk. These assumptions determine the earning capability of a property or business upon which the pattern of its income and expenditures/outgoings is projected.

1.3 The objective of this Guidance Note (GN) is to prescribe Generally Accepted Valuation Principles (GAVP), best practice, and due diligence measures for Valuers to follow in performing DCF analysis for market and non-market based valuations and to distinguish between applications of DCF analysis in these two different types of valuation assignments.

2.0 Scope

2.1 This GN applies to market and non-market valuations developed by means of DCF analysis. It discusses the structure and components of DCF models and the reporting requirements for valuations based on DCF analysis.

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2.2 The scope of this GN extends to the reasonableness and supportability of the assumptions upon which the DCF analyses are based. Assumptions made in any valuation directly affect the value conclusion. In accordance with the International Valuation Standards (IVS) Code of Conduct, all assumptions underlying a valuation should be likely, reasonable, and supportable.

3.0 Definitions

3.1 *Discounted Cash Flow Analysis (DCF)*. A financial modelling technique based on explicit assumptions regarding the prospective cash flow to a property or business. As an accepted methodology within the *income approach* to valuation, DCF analysis involves the projection of a series of periodic cash flows either to an operating property, a development property, or a business. To this projected cash flow series, an appropriate, market-derived discount rate is applied to establish an indication of the present value of the income stream associated with the property or business. In the case of operating real properties, periodic cash flow is typically estimated as gross income less vacancy and collection losses and less operating expenses/outgoings. The series of periodic net operating incomes, along with an estimate of the reversion/terminal value, anticipated at the end of the projection period, is then discounted. In the case of development properties, estimates of capital outlays, development costs, and anticipated sales income are estimated to arrive at a series of net cash flows that are then discounted over the projected development and marketing periods. In the case of a business, estimates of periodic cash flows and the value of the business at the end of the projection period are discounted. The most widely used applications of DCF analysis are the Internal Rate of Return (IRR) and Net Present Value (NPV).

3.2 *Financial Modelling*. The projection of a business' or property's periodic income or cash flow pattern from which measures of financial return can be calculated. Income or cash flow projections are generated through the use of a financial model that takes into account historical relationships between income, expense, and capital amounts as well as projections of those variables. Financial modelling may also be used as a management tool to test expectations for property performance, to gauge the integrity and stability of the DCF model or as a method to replicate the steps taken by investors in making decisions involving the purchase, sale, or holding of a property or business.

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3.3 Investment Analysis. A study undertaken for the purposes of development and investment, the evaluation of investment performance, or the analysis of a transaction involving investment properties. Investment analyses are variously called (economic) feasibility studies, market or marketability analyses, or financial projection studies.

3.4 Discount Rate. A rate of return used to convert a monetary sum, payable or receivable in the future, into present value. Theoretically it should reflect the opportunity cost of capital, i.e., the rate of return the capital can earn if put to other uses having similar risk. Also called *yield rate*.

3.5 Internal Rate of Return (IRR). The discount rate that equates the present value of the net cash flows of a project with the present value of the capital investment. It is the rate at which the Net Present Value (NPV) equals zero. The IRR reflects both the return on the invested capital and the return of the original investment, which are basic considerations of potential investors. Therefore, deriving the IRR from analysis of market transactions of similar properties having comparable income patterns is a proper method for developing market discount rates for use in valuations to arrive at *Market Value*.

3.6 Net Present Value (NPV). The measure of the difference between the discounted revenues, or inflows, and the costs, or outflows, in a DCF analysis. In a valuation that is done to arrive at *Market Value*, where discounted inflows and outflows and the discount rate are market derived, the resulting NPV should be indicative of the *Market Value* by the *income approach*.

4.0 Relationship to Accounting Standards

4.1 Discounting is a standard procedure employed by accountants in considering the time value of money.

4.2 The International Financial Reporting Standards (IFRSs) prescribe a discounting procedure to estimate the value in use of an asset. An estimate of the value in use involves a) estimating the future cash inflows and outflows to be derived from the continuing use of the asset and from its ultimate disposal and b) applying the appropriate discount rate to these future cash flows. (IAS 36, para. 31)

4.3 IAS 36, para.55 states that “the discount rate (rates) shall be a pre-tax

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rate (rates) that reflect(s) current market assessments of: (a) the time value of money; and (b) the risks specific to the asset for which the future cash flow estimates have not been adjusted". It is also true that other measures of income or cash flow may be used so long as the discount rate(s) are appropriately matched with the income flow(s).

5.0 Guidance

5.1 Discounted cash flow models are structured upon a specified term, or duration. In real property analysis, although events such as rent reviews, lease renewal/re-letting, redevelopment, or refurbishment can affect the analysis term, this term is typically driven by market behaviour that is characteristic of the class of property and its market sector. For example, the analysis term for investment properties typically runs between five and ten years.

The frequency of inflows and outflows (monthly, quarterly, annually) should also be market derived. As with other accepted methodologies, inflows and outflows should be appropriate and reasonably supported.

A reversion/terminal value can be based on the net income for the year following the last year of the DCF analysis or the net income of the last year of the DCF analysis. Selection of the method for calculating the reversion/terminal value depends upon practices of investors in the market area, and Valuers should mirror these practices and fully disclose the method chosen.

As with all other components of DCF analysis, the discount rate should also reflect market data, i.e., other market-derived discount rates. Discount rates should be selected from comparable properties or businesses in the market. In order for these properties to be comparable, the revenue, expenses, risk, inflation, real rates of return, and income projections for the properties must be similar to those of the subject property.

5.1.1 Present value calculations of cash flows are most often calculated using appropriate discount rates for each class of cash flows. A reversion/terminal value is capitalised at a terminal capitalisation rate, or reversion yield, and discounted to present value at an appropriate discount rate. In many instances, a single discount rate is used for all cash flows.

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5.1.2 The cash flows and sale prices of comparable properties may be analysed to derive market discount rates or internal rates of return (IRR).

5.1.3 DCF model cash flow may be developed on before-tax, after-tax, or nominal, or real (adjusted for inflation) cash flow bases. The IRR must be calculated on the same before-tax, after-tax, or nominal, or real cash flow basis as used for the cash flow. The DCF model must be consistent in the application of the above options, and analysis of market comparables must reflect the same approach.

5.2 In keeping with the IVS Code of Conduct, it is incumbent on the Valuer to identify the components of DCF analysis, including the following:

5.2.1 a projection period wherein the commencement date of cash flow and the number and term of periods are specified;

5.2.2 the components of cash inflow and cash outflow grouped by category and the reason behind their selection;

5.2.2.1 For real property valuation, cash inflow includes income from rents and tenant services adjusted for collection and vacancy loss in the case of completed or built properties, and for income from sales in the case of development properties.

5.2.2.2 For real property valuation, cash outflow includes fixed and variable expenses, replacement allowance/renewal fund, and capital expenditures, where applicable; for development properties, the hard and soft costs should be identified.

5.2.2.3 For business valuation, the cash flow most often includes all cash inflows and outflows, of both an operating nature and a capital nature. The discounted cash flow then represents the money that an investor could remove from the business while leaving adequate cash to fund its operation and growth.

5.2.3 debt finance or debt service (payment of interest and principal) per period and the annual effective rate at which periodic interest is calculated, if applicable;

5.2.4 net cash flows per period (the sum of inflows less the sum of outflows);

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5.2.5 the discount rate or rates that are applied to the net cash flows and the reasoning behind and support for their selection;

5.2.6 the terminal capitalisation rate/reversion yield that is applied to calculate the reversion/terminal value and the reasoning behind its selection; and

5.2.7 a list of all assumptions underlying the analysis.

5.3 DCF analysis makes use of available market evidence and typically reflects the thought processes, expectations, and perceptions of investors and other market participants. As a forecasting technique, DCF analysis should not be judged on the basis of whether or not the specific DCF forecast was ultimately realised but rather on the degree of market support for the DCF forecast at the time it was made.

5.3.1 When DCF is used to develop a *Market Value* estimate, the valuation should meet all criteria for *Market Value* estimates as set forth in IVS 1.

5.4 Where a client provides the Valuer with specific requirements that do not correspond to those for *Market Value* estimates as to holding period, financing terms, taxation, or discount rate, the resultant value estimate is to be considered *Non-Market Value*. The result is an estimate of investment value/worth specific to the assumptions provided rather than an estimate of *Market Value*.

5.5 DCF analysis may also be used to test the validity of conventional views by analysis of varying assumptions. The result of this type of sensitivity analysis is investment value/worth.

If DCF is used in this way, the results should be identified as *Non-Market Value*, and the valuation should meet all criteria for non-market based valuations as set forth in IVS 2.

5.6 A Valuer should carry out sufficient research to ensure that cash flow projections and the assumptions that are the basis for the DCF model are appropriate and reasonable for the subject market.

5.6.1 As an example, the lease-by-lease analysis to support the cash flow projection for a multitenanted property should address contract/passing

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rent and market rent, lease expiration and lease review dates, rent escalations/stepped rents, operating expenses/outgoings, expense pass-throughs/recoverable costs, lease incentives, capital expenditures, and any other specific provisions that apply.

5.6.2 Assumptions of growth or decline in income must be premised on analysis of economic and market conditions. Changes in operating expenses/outgoings should reflect all expense trends and specific trends for significant expense items.

5.6.3 The results of a DCF analysis should be tested and checked for errors and reasonableness.

5.7 To derive discount and terminal capitalisation rates, a Valuer makes use of various sources of data and information on real estate and capital markets. In addition to data on the income streams and resale prices of comparable properties or businesses, surveys of investor opinion and yield indices are useful in selecting discount rates provided that the market for the subject property is consistent with the market for the property acquired by the investors consulted in the survey.

5.8 It is the responsibility of the Valuer to ensure that the controlling input is consistent with market evidence and the prevailing market outlook. Further, the Valuer who supervises the construction of the DCF model or selection of a proprietary model is responsible for the integrity of that model in terms of theoretical and mathematical correctness, the magnitude of the cash flows, and the appropriateness of all inputs. A Valuer must have suitable experience and market knowledge to structure cash flow and provide other inputs to the model.

5.9 In reporting the results of a DCF analysis, a Valuer shall follow the requirements of the IVS Code of Conduct and IVS 3, Valuation Reporting.

5.9.1 Disclosure must be made under those circumstances described in IVS 3, paragraphs 5.1.10, 7.0, and 8.2.3.

5.9.2 Inherent in DCF analysis are the explicit assumptions that are used as inputs for the analysis. To provide users of valuation services the ability to replicate the results, the Valuer must disclose the

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assumptions and support for their use in developing the DCF model. Using real property examples, these include but are not limited to

5.9.2.1 the commencement date, term, and frequency employed in the model;

5.9.2.2 the projected rent and other income and the rate at which income is projected to change;

5.9.2.3 the projected operating expenses and the rate at which expenses are projected to change; and

5.9.2.4 the treatment of lease expirations/break costs, vacancies, and collection losses.

5.9.3 The Valuer must

5.9.3.1 indicate the annual effective rate at which periodic interest is calculated, where finance debt or debt service (payment of interest and principal) is a component of the projected periodic cash flow;

5.9.3.2 specify the rate(s) of taxation used, where applicable;

5.9.3.3 explain the reasoning behind any provision for lease incentives, where applicable;

5.9.3.4 explain the treatment of any capital expenditures incurred in the acquisition or improvement of property or business assets;

5.9.3.5 explain the basis for the adopted terminal capitalisation rate/reversion yield and the adopted discount rate; and

5.9.3.6 identify the cash flow model by name of the developer or, if proprietary software, by product name and version; describe the methods and assumptions inherent in the model; and specify the dates on which the model was developed and employed.

6.0 Effective Date

6.1 This International Valuation Guidance Note became effective 30 April 2003.