thoughtpieces

Incisive analysis of topical issues

INTANGIBLE BUSINESS

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Understanding Discounted Cash Flows ("DCF")

About this issue

This issue has been prepared by Intangible Business, based on experience gained from preparing, reviewing and challenging DCF analyses over the last 30 years. This work has been provided for a number of reasons, including:

- Commercial business development, including mergers and acquisitions.
- Dispute resolution.
- Financial reporting.
- Taxation.
- Banking and lending.

This thought piece is primarily aimed at DCF analyses used for business and intangible asset valuation, although many of the considerations would equally apply to other uses of DCF analyses.

1. Overall DCF framework

In overall terms a DCF analysis has the following two key components:

- Forecast cash flows.
- A discount rate, which is applied to forecast cash flows to state them as a single present value.

The basic concept is that forecast cash flows should be reduced or discounted to reflect the time value of money and the risks associated with the cash flows. An example DCF calculation is shown below:

DCF calculation	Forecast year				
	2018	2019	2020	2021	2022
	£m	£m	£m	£m	£m
Free cash flow	80	120	220	300	306
Discount period	1.000	2.000	3.000	4.000	5.000
Discount factor	1.080	1.166	1.260	1.360	1.469
Discounted cash flow	74	103	175	221	208

Terminal profit growth %	2.0%
Discount rate	8.0%

Summary	£m
Specific forecast	780
Terminal value	3,540
DCF value	4,321

2. Forecast cash flows

In practice forecast cash flows obtained for a DCF analysis are often applied without critical due diligence, review or checking. This is not necessarily that insightful or even appropriate, and some due diligence procedures on the forecast cash flows should be considered, such as:

- Checking forecasts against past trends and experience of forecasting.
- Comparing forecasts with overall anticipated market growth and share.
- Considering a business's potential for delivering forecast sales and profits.
- Checking against anticipated customer requirements and contractual arrangements.
- Checking arithmetical accuracy and reasonableness.

In one case where we were instructed as expert witness a number of technology valuations were considered by the High Court. These valuations had not involved due diligence on the cash flows used. It was held that the failure to carry out due diligence on the business plans and projected income figures was a shortcoming of the valuations.

3. Discount rate

The discount rate used is generally an important input to a DCF calculation. When building a discount rate using the cost of equity as a start, the required rate of return for equity is higher than the required rate of return for debt to compensate for the additional risk associated with equity. The cost of equity is then usually weighted with the cost of debt to give a blended rate of return attributable to alternative sources of capital.

Methodologies and inputs do vary, in particular for the use of beta and the equity risk premia in building the cost of equity. These inputs can be derived from different sources and are sometimes calculated in different ways, so it is important to understand their basis. It is also important to review the output and consider whether an adjustment needs to be made to ensure that the discount rate applies to the specific cash flows to which it is to be applied.

As well as building a specific discount rate, there are now some published discount rates used for various purposes such as in broker notes, for valuations of intangible assets and for impairment reviews in companies' annual reports. This information is often useful for making comparisons although care needs to be taken that like is compared with like. In particular it is necessary to be careful about comparing post tax discount rates with published pre-tax discount rates required under International Financial Reporting Standards ("IFRS").

4. Clear inputs and assumptions

It is vital for a good understanding of DCF analyses that the key inputs and assumptions are highlighted and the way in which the information is processed is clear and logical:

We have seen in a case in the High Court where an opposing expert set out a DCF process in unclear steps. He was unable to explain this in cross examination which discredited the analysis.

5. Recognising alternative inputs and assumptions

Given clear inputs, assumptions and process it follows that a helpful DCF will allow for changes to certain key inputs, to help gauge the impact of changes made.

Certain changes may not be so easy if, for example, they require a structural change in the calculations such as adding an extra year or changing the point at which a terminal value is calculated.

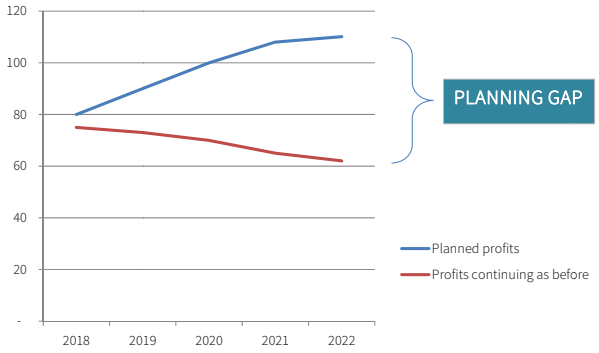
We have presented DCF calculations on the value of goodwill in an entertainment business at a mediation where changes to certain inputs were proposed. We prepared alternative calculations which could be viewed as reasonable but refused to process changes we consider flawed or unreasonable. The DCF analyses were then helpful in resolving the amount at stake, and consequently the dispute itself.

6. Pros and cons of DCF analyses

The main advantage of the DCF method is that its purpose is to quantify and value the fundamental economic premise of value, which is based on anticipated economic benefits or cash flows.

A distinction can be drawn between the pros and cons of the methodology itself and the pros and cons of applying the methodology.

One of the main advantages is that it specifically requires the articulation of forecasts for periods into the future. Planning is required for this, the benefits of which are indicated by the "planning gap" which indicates a difference between a business which plans for the future compared with a business that does not plan and carries on doing what it has done in the past.



However no one can actually see into the future, so forecasting will always be inherently uncertain. For a DCF calculation other assumptions need to be deployed such as when the cash flows are assumed to arise in a period when the specific forecast cash flows should end, and how forecasts after that should be shown in terminal period calculations.

The Gordon Growth Model is often used for a terminal period calculation, and computes the terminal value assuming a constant growth of cash flows into perpetuity. This is broadly based on an assumption that a business will keep its market share at that point indefinitely. No business will last for ever, but there will be a point in the future to which discounted cash flows will approximate to the bulk of the indefinite value because of the impact of discounting.

Generally the pros of using DCF analyses outweigh the cons. The process should be helpful, and will inform better financial analysis. The cons of using the DCF method should be recognised but should not generally completely negate its use.

We have seen DCF analyses for a corporate acquisition prepared by a number of people with a high degree of detail and complexity. However it reached the stage where no one was able to understand the model and how to make valid further changes. The model had to be discarded and rebuilt, more simply, from scratch.

7. Simplicity -v- complexity

There is a constant trade-off between simplicity and complexity in compiling DCF and other analyses:

- Simple – this is more easily understood but has more conceptual limitations.
- Complex – this is more difficult to understand but has less conceptual limitations.

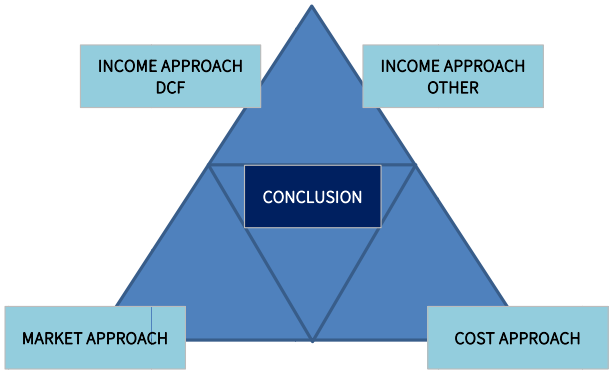
Our general preference is to keep DCF analyses as simple as is practicable. This has higher utility, is more practical and has less chance of error.

A DCF calculation does not need to be complex

8. Alternatives and cross checks

Even a simple DCF calculation can be somewhat complex. In order to confirm that such analyses are grounded in reality it is useful at all stages to have cross checks, benchmarks and simple alternatives.

In a valuation this can be done by using different methods to arrive at value indications using different data. There can also be triangulation between different approaches giving more assurance that DCF analyses are reasonable in overall terms.



9. Issues

We note below some of the issues which we have often encountered with respect to DCF analyses

- Arithmetical errors do sometimes find their way into spreadsheets, which can then still look plausible and convincing. There is a general need to check that the arithmetic is correct particularly after changes have been made.
- There is sometimes a debate about the point in a period where the cash flows are assumed to arise, for example at the end or mid-point of a year. We consider that this should be simply recognised and seen as an assumption.
- Dovetailing the terminal value calculation with the specific forecast cash flows can be problematic. We think the best way of dealing with this is to extend the cash flows beyond the terminal value point as a check.
- A longer specific period will reduce the significance of the terminal value. However the validity of a long specific period can be debatable. In our view the balance of these periods needs to be considered.
- As stated above, DCF analyses can often display excessive degrees of detail or complexity. We think it is usually better to avoid this and focus on the key issues.

In conclusion

We embrace the use of the DCF method, it is a fundamental tool underlying much of the work which we do.

There are limitations to, and issues with, the use of DCF analyses, but this should not negate their overall usefulness in economic analysis.

DCF analyses can be sensitive to small changes in key inputs or processes. This is mainly where experience of such analyses is useful in gauging their utility, given their strengths and weaknesses.

Due to the confidential nature of much of our work, only a few details can be disclosed and some of the examples given have been edited to preserve confidentiality (whilst fairly illustrating something which has actually occurred in our experience).

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Intangible Business Limited
Dolphin House, 14 Woodside Road
Kingston upon Thames, Surrey KT2 5AT
Tel: +44 (0)20 8392 0193
www.intangiblebusiness.com

Our team of experts

Thayne Forbes

Thayne is a qualified accountant and marketer who has worked in consulting firms on valuation, dispute resolution and other special assignments since 1988. Thayne specialises in advising on dispute resolution projects on a range of issues across many different industries.

e: thayne.forbes@intangiblebusiness.com
t: +44 (0) 79 7965 5653

Stuart Whitwell

Stuart is a qualified accountant and marketer who has 20 years commercial experience with Reed International, Haliburton, Sea Land and Allied Domecq. Since 2000 Stuart has focussed on dispute resolution projects and has particular experience in the global beverage industry.

e: stuart.whitwell@intangiblebusiness.com
t: + 44 (0) 77 4703 7824

Paul Cliff

Paul is a qualified accountant with 20 years of experience in the valuation of businesses and assets across a variety of industries. Paul has held senior positions at a number of investment banks in corporate finance and equity research.

e: paul.cliff@intangiblebusiness.com
t: + 44 (0) 79 6626 2288