Opening Terminal Value's Black Box

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ABSTRACT

When evaluating a company using the discounted cash flow method, terminal value can be a key factor that might highly influence the final result. The reasonableness of this final economic valuation may be doubtful if terminal value is a black box whose contents are unclear. This paper aims to provide a series of criteria to help understanding the reasonableness of terminal value used in intrinsic economic valuation. After summarizing the basic concepts on terminal value and the main criteria to determine its reasonableness, I develop a complete example of a company´s valuation and I include the adjustments on the terminal value. A final discussion on the results shows that the reasonableness of any terminal value depends on the reasonableness of its main economic value generators: the period of time, the growth rate, and the baseline FCF from which the extrapolation will be made.

INTRODUCTION

When attempting to evaluate a company using the discounted cash flow (DCF) method, terminal value[1] frequently becomes a key factor in estimating the company's intrinsic economic value [Cornell, 1993]. Precisely because of its influence on the company's value, terminal value can be a factor that readily lends itself to manipulation, or at least to an excess of *creativity,* so as to arrive at a previously decided –and not necessarily reasonable– economic value.

The reasonableness of a valuation may be doubtful if terminal value is a black box whose contents are a mystery. This paper aims to set out a series of criteria to help understand how reasonable a given terminal value is when used in a valuation, and thus to open up this particular black box.

The paper is organized as follows:
Section 2 includes a summary of basic concepts on terminal value (TV).
Section 3 provides some criteria to analyze reasonableness of TV.
Section 4 develops a complete example of a company´s valuation and adjustments on the TV.
Section 5 summarizes the main conclusions of this paper.

TERMINAL VALUE: SOME BASIC CONCEPTS

Let's start by recapping some of the basic concepts of terminal value.

What is Terminal Value? What Is It Used For?

The purpose of terminal value (TV) is to give a reasonable estimate of the economic value of the company in a given year, n, at which point annual forecasts cease to be given. Obviously, this value will depend on the envisaged future scenario. For example, if it is considered reasonable that the business be wound up in year n, the TV should be the liquidation value, net of tax. If the company is being valued as a going concern, the economic value may be estimated from market data (extrinsic value) or based on company fundamentals (intrinsic value). Table 1 maps out the various alternatives.

(insert Table 1 about here)

How Can A Reasonable Terminal Value Be Estimated?

If the business is being wound up, the TV should reflect a reasonable estimate of the cash flows, after tax, derived from the process of liquidation.If the business is expected to continue, it is logical to set the TV at a value consistent with the estimated cash flows up to that year. That is to say, if up until year n the economic value has been determined by discounting cash flows, it would seem logical for the TV to be calculated using a similar technique, unless there are strong reasons to do otherwise [Damodaran, 2006].

As is commonly known, estimating TV using an extrinsic value is simply a matter of using a multiple for which it is assumed the company can be sold in year n. The reasonableness of the TV calculated in this way depends on the current situation and the likely state of the market. For example, would it be sensible to assume that the company could be sold for 20 times EBITDA five years from now when the market is currently valuing companies at 7 times EBITDA?

In any event, regardless of the method used to estimate the TV, the resulting figure can always be expressed as an extrapolation from the Free Cash Flow (FCF) in the final year, thus making it possible to analyse how reasonable this TV is in terms of the criteria described below.

Terminal value is frequently estimated in the form of an intrinsic value calculated by extrapolating from a baseline FCF. In any intrinsic valuation that uses the discounted cash flow methodology it is essential to determine what the reasonable time horizon for the forecast would be. That is to say, how many years do explicit FCF forecasts need to be made for? In practice, although it depends on the sector and the valuations being made, this horizon is frequently set at five years. Among other reasons this is because, it is said, making predictions over longer time spans is pure science fiction.

In general it seems more reasonable that the number of years over which it is necessary to make an explicit forecast of the cash flows depends on the period needed to arrive at a scenario that could be considered "normal." It should not be overlooked that as of the year in which explicit forecasts cease, all the remaining value is encapsulated in the terminal value. Given that this terminal value is often calculated as an extrapolation from the value in the last year for which an explicit forecast is made, it is important to ensure that this extrapolation is not being made from a situation that could be classed as atypical[2].

How is the rate of sustainable future growth, g, which is often used in the TV formula, determined? It must be arrived at in a way that is consistent with the assumptions used in the valuation. For example, if a scenario of real GDP growth of three per cent is assumed, a reasonable and well founded explanation needs to be given

for using a value of g higher than this growth rate, and in any event, it must refer to a specific period. It does not seem reasonable to use terminal values with real growth rates higher than GDP for unlimited periods.

CRITERIA TO DETERMINE REASONABLENESS OF TERMINAL VALUE

In short, when using the DCF method to estimate terminal value it is necessary to give a reasonable estimate of three variables:

- the rate of growth of the FCF, g,
- the period considered,
- the baseline FCF from which the extrapolation is calculated.

The reasonableness of the growth rate, g, is often associated with the period considered. As mentioned, an infinite period is often used, and a growth rate which does not exceed real GDP growth. This is often reasonable, unless it is known that the business will be wound up after a few years.

The baseline FCF for the extrapolation must be consistent with the value you want to estimate. It is not always appropriate to use the last year's FCF as it may not be representative of the future to perpetuity that the residual value needs to reflect.

How can you detect when the FCF used may not be representative of the future you want to portray? By analysing the three components of FCF used to make the extrapolation: FCF from operations; FCF from needs of operational working capital; and FCF from investments and divestments in fixed assets.

The Operating Component of the Baseline FCF

In scenarios where the business is expected to continue indefinitely it is often extremely useful to check that the forecast value of ROCE[3] is not much higher than that of WACC. As is common knowledge, mature businesses usually have levels of profitability which do not exceed the cost of their resources. If a residual value is forecasted to perpetuity at a level of profitability that is permanently higher than the cost of resources, it is worth asking what permanent competitive advantages the company has that will enable it to enjoy this privileged situation indefinitely. If there is no clear answer to this question, the terminal value should be adjusted downwards by reducing the operational component of the baseline FCF.

For example, let's consider the case of the firm Closed, S.L. We ar going to assume that in year n we have the following estimates:

WACC = 6.6%
EBIAT = €298
TNA = €3,565

These figures enable us to confirm that ROCE in this year is 8.4% whereas WACC is 6.6%. Using the FCF of year n to extrapolate a terminal value –with a value of the growth rate g similar to the likely progress of the sector, and to perpetuity– could result in an overvaluation of the company, as we would be assuming that it will be able to continue growing so as not to lose market share and that it will maintain a permanent competitive advantage enabling it to maintain its profitability above the cost of its resources.

The terminal values in year n with and without the adjustment would be as follows:

TV without the adjustment		
EBIAT	298	
Depreciation	61	
Operating FCF	359	
FCF Working capital	-12	
FA investment FCF	-61	
Baseline FCF	286	
TV with g = 2% to perpetuity	6,342	

TV with adjustment		
EBIAT without adjustment	298	
TNA	3,565	
EBIAT with adjustment	235	(= 3,565 x 0,066)
Depreciation	61	
Operating FCF	296	
FCF Working capital	-12	
FA investment FCF	-61	
Baseline FCF	223	
TV with g = 2% to perpetuity	4,944	

The Components of the Investment in Working Capital and Fixed Assets in the Baseline FCF

The FCF used as the baseline in order to extrapolate an estimate of the terminal value must also include an investment in working capital and in fixed assets, as it is not reasonable to assume that a company may continue indefinitely as a going concern without making investments.

To summarise:

1) The TV should reflect the value the company will have in the year in question. In other words, how much could the company be sold for in that year? (i.e. the value of its total net assets).
2) This TV must be consistent with the total economic value of the business. Therefore, if the method used to estimate the economic value of the business up until year n is DCF, it would be logical to estimate the terminal value using the same method, unless there are good reasons to do otherwise.
3) When using the DCF method to estimate terminal value it is necessary to give a reasonable estimate of three variables: the growth rate, g, of the FCF; the period considered; and the FCF from which the extrapolation is made.
4) If we consider a TV for a scenario in which the company is due to continue, an infinite period is often taken and a growth rate, g, that does not exceed real GDP growth, as already mentioned.
5) The baseline FCF from which the extrapolation is to be made must be consistent with the value you want to estimate. Frequently, it is not appropriate to use the final year's FCF as it may not be representative of the future to perpetuity that the terminal value needs to reflect.
6) How can you detect when the FCF used may not be representative of the future you want to project? In scenarios where the business is expected to continue indefinitely it is often very useful to check that the forecast does not assume a value of ROCE much higher than that of WACC. As is well known, mature

businesses usually have levels of profitability which do not exceed the cost of their resources. If the forecast terminal value to perpetuity implies a level of profitability that is permanently higher than the cost of resources, it is worth asking what permanent competitive advantages the company has that will enable it to enjoy this privileged situation indefinitely. If the answer is unclear, the terminal value should be adjusted downwards.

AN EXAMPLE OF VALUATION AND ADJUSTMENTS ON TV

Let's consider the case of the valuation of the company Globix S.A., which operates in the telecommunications industry. Given the high degree of competition in the sector, the outlook for Globix's future growth over the next five years is fairly conservative:

a) Expected evolution of the Operational Profit & Loss

Years	1	2	3	4	5
Figures in thousand euros					
Sales	4.000	4.200	4.410	4.631	4.862
Cost of Sales	-2.400	-2.520	-2.646	-2.778	-2.917
Gross Margin	1.600	1.680	1.764	1.852	1.945
Operat Expenses	-800	-840	-882	-926	-972
Depreciation	-150	-150	-170	-170	-195
EBIT	650	690	712	756	777
Taxes (30%)	-195	-207	-214	-227	-233
EBIAT	455	483	498	529	544
Operational FCF	605	633	668	699	739

b) Expected evolution of Operational Working Capital and Net Fixed Assets (in thousand euros)

Years	Initial	1	2	3	4	5
Initial Gross Fixed Assets (IGFA)	3.000	3.000	3.000	3.000	3.000	3.000
New Investements			400		500	
Final Grosss Fixed Assets	3.000	3.000	3.400	3.400	3.900	3.900
Accumulated Depreciation	-850	-1.000	-1.150	-1.320	-1.490	-1.685
Net Fixed Assets	2.150	2.000	2.250	2.080	2.410	2.215

Years		1	2	3	4	5
Depreciation Expenses (5% of IGFA)	150	150	150	170	170	195
Operating Working Capital (50% Sales)	1.975	2.000	2.100	2.205	2.315	2.431
Total Net Assets	4.125	4.000	4.350	4.285	4.725	4.646

Based on these forecasts, the FCFs estimated for the next five years are as follows (figures in thousands of euros):

Years	1	2	3	4	5

Operational FCF	605	633	668	699	739
FCF from Operat WC	-25	-100	-105	-110	-116
FCF from Invest FA	0	-400	0	-500	0
Total FCF	580	133	563	89	623

What terminal value should we include in these FCFs in order to value the company? If the valuation assumes the continuity of the business, the value of the company in year 5 may be estimated by extrapolating from the Free Cash Flows. Let's assume that 3% (g = 3%) is a reasonable rate of growth and that the period is infinite. Is it also reasonable to take the cash flow in year 5 as the baseline?

Remember that this FCF in year 5 is made up of the three usual components: Operating FCF (739), FCF from the operational management of working capital (-116), and free cash flow from fixed asset investments and divestments (0). Let's apply the above criteria to this case:

The Operating Component of the Baseline FCF

In year 5:

EBIAT	=	544
Total Net Assets (TNA)	=	4,644
ROCE	=	11.7%

If the WACC in this year is 8%, using the FCF for year 5 as the baseline for the extrapolation will be equivalent to assuming that the company will be able to grow at a rate of 3% so as not to lose market share and maintain a permanent competitive advantage that will allow it to maintain profitability 50% higher than its cost of resources.

If this does not seem reasonable, EBIAT could be adjusted so that the operating component of the baseline FCF is situated at a level of profitability closer to the WACC:

Adjusted EBIAT = 372 (= 4,644 x 0.08)

The Components of the Investment in Working Capital and Fixed Assets in the Baseline FCF

The FCF used as the baseline in order to extrapolate an estimate of the terminal value must also include an investment in working capital and in fixed assets, as it is not reasonable to assume that a company may continue indefinitely as a going concern without making these investments.

In this case an investment in working capital is included, which seems reasonable, but there is no investment in fixed assets. As it does not seem reasonable that a company can survive on a continuous basis without loss of market share if it does not make any investments, it would be necessary to include investments in the baseline FCF from which the extrapolation is made. As the company has made investments of 900,000 euros over the last five years, it may be assumed that the company will need an average annual investment in fixed assets of around 190,000 euros from year 5 onwards.

Value of the Company With and Without Adjustments to the TV

The terminal values in year 5 with, without the adjustment, would be as follows:

TV without the adjustment	
EBIAT	544
Depreciation	195
Operating FCF	739
FCF Working capital	-116
FA investment FCF	0
Baseline FCF	623
TV with g = 3% to perpetuity	12,842
TV with adjustment	
EBIAT with adjustment	372
Depreciation	195
Operating FCF	567
FCF Working capital	-116
FA investment FCF	-190
Baseline FCF	261
TV with g = 3% to perpetuity	5,375

As a consequence, the valuation of the company changes significantly:

Valuation with adjustments =	5,246
Valuation without adjustments =	10,328

Discussion of the Results

The variation in Globix's terminal value produces a situation in which the economic value of its assets may be 5.2 million euros or practically twice that amount. How is this possible? What does it mean for the company to be worth either one figure or another twice as big? Which of the two valuations seems more reasonable?

Let's consider the assumptions we have made when valuing Globix. Basically, over the next five years the company's sales are going to grow by 5%, while its operating efficiency remains constant in terms of ratios of costs, expenses and the management of working capital. Obviously it does not seem that this scenario should produce any increase in value above 5% at most.

If we analyse the results of the valuation without making adjustments to terminal value, the conclusion is that the company is worth 10.3 million euros today, among other reasons because it can be sold at the end of the fifth year for 12.8 million euros. But for someone to buy Globix for 12.8 million euros it will be necessary to convince them that the company will be able to continue business indefinitely, with a sustainable profitability of 50% more than the cost of its resources and without the need to make new investments. Is it reasonable to suppose that there will be a buyer willing to accept this price based on these assumptions?

Moreover, by including the adjustments to operating earnings and investments as of year 6, the value of the company drops to 5.2 million euros, among other reasons because it could be sold at the end of the fifth year for 5.4 million euros. Clearly it seems reasonable to suppose that this is a low price at which to sell the company, as it is a value derived from accepting that immediately as of the sixth year Globix will lose the competitive advantage that has enabled it to maintain its accounting profitability well above the cost of its resources.

Common sense suggests that a reasonable value for Globix at the end of the fifth year is probably neither almost 13 million euros, which is excessive, nor just over five million euros, which is too pessimistic.

In order to make a more reasonable valuation of Globix's terminal value it could be estimated that the loss of profitability will take place gradually over several years, rather than instantaneously at the end of the sixth year. Introducing the assumption that in years 6 to 10 the company's profitability will drop to 9.5% and that as of year 11 it will stand at 8%, the results are as follows:

TV with adjustment = 6,261
Valuation with adjustments = 5,849

Clearly, in this valuation of Globix, which we have classed as conservative, the implicit strategy for the next five years is purely one of maintenance. This type of strategy in highly competitive environments tends to lead to a moderate destruction of economic value, as confirmed by comparing the results in terms of multiples. The apparent creation of value in the case of the valuation without adjustments is based on the assumptions of residual value discussed above which were not reasonable (Table 2). More realistically, by including the adjustments discussed above, the multiple at which the company could be sold in five years is lower than that at present.

(insert Table 2 about here)

SUMMARY AND CONCLUSIONS

Terminal value is frequently a key factor in determining a company's intrinsic value. In order to prevent terminal value from turning into a black box that could be used to justify any economic value, regardless of whether it is reasonable, it is necessary to understand what terminal value is supposed to show and how it is estimated.

In the case of a valuation based on DCF, to analyse the reasonableness of the terminal value used it is necessary to make a reasonable estimate of the main economic value generators: the period of time, the growth rate, and the baseline FCF from which the extrapolation will be made.

ENDNOTES

[1] Also referred to as residual value. In this article we will use the term terminal value.

[2] As might be the case, for example, of a company with a highly cyclical component to its business.

[3] Return on Capital Employed. Defined as earnings before interest after taxes (EBIAT) divided by total net assets (TNA).

REFERENCES

Cornell, B. *Corporate Valuation. Tools for Effective Appraisal and Decision Making* (New York, 1993), Business One Irwin Inc.

Damodaran, A. *Damodaran on Valuation: Security Analysis for Investment and Corporate Finance* (New Jersey, 2006), John Wiley & Sons, Inc.

Table 1

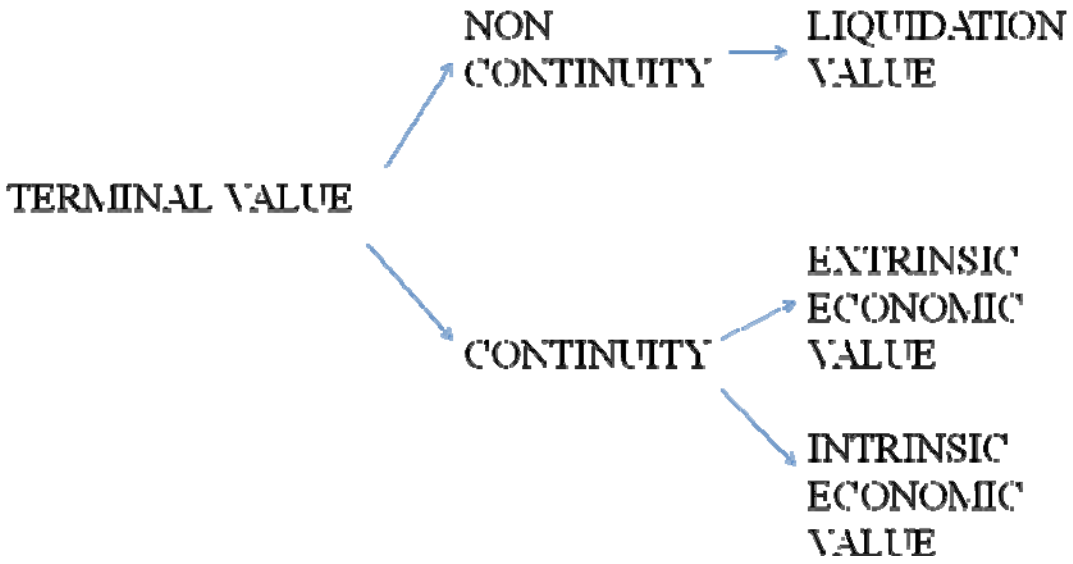

Table 2

Valuation of Globix	Without Adjustments	Radical Adjustement	Progressive Adjustment
Accounting Value of EV	4.125	4.125	4.125
Enterprise Value (EV)	10.328	5.246	5.849
EV /Ebitda	13,07	6,64	7,40
Associated RV	12.842	5.375	6.261
TV /Ebitda year 5	13,21	5,53	6,44