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Providing a Framework for Testing the Reasonableness of Terminal Period Cash Flow Investments

Joseph Thompson, CFA,* and David Neuzil, CFA, ASA

Whether using the traditional Gordon Growth formula or the value driver formula, it is common for a valuer to neglect testing the reasonableness of the capitalized free cash flow used in determining the terminal value and, therefore, derive a terminal value that is incorrect. This is troubling considering how important the terminal value is when concluding an equity value; the terminal value most often accounts for a majority of the concluded enterprise value when applying the Discounted Cash Flow method. The purpose of this article is to provide a framework for testing the reasonableness of the amount of terminal cash flow that is reinvested to support the operations into perpetuity. In general, there are three potential areas for a company to reinvest into its future operations: (1) net working capital, (2) purchases of property, plant, and equipment (PP&E), and (3) other investments (e.g., research and development [R&D]). Our article provides an overview of a suggested method for analyzing and calculating the appropriate amount of investments in net working capital and PP&E under the Gordon Growth formula. We also provide an example analysis to illustrate potential issues resulting from expensed investments (e.g., R&D) when applying the value driver formula.

Whether using the traditional Gordon Growth formula or the value driver formula, it is common for a valuer to neglect testing the reasonableness of the capitalized free cash flow used in determining the terminal value and, therefore, derive a terminal value that is incorrect.[1] This is troubling considering how important the terminal value is when concluding an equity value; the terminal value most often accounts for a majority of the concluded enterprise value when applying the Discounted Cash Flow (DCF) method.

The purpose of this article is to provide a framework for testing the reasonableness of the amount of terminal cash flow that is reinvested to support the operations into perpetuity. In general, there are three potential areas for a company to reinvest into its future operations:

(i) Working capital investments (e.g., inventory, accounts receivable)
(ii) Purchase of property, plant, and equipment (PP&E) and other capitalized purchases (e.g., software development) and
(iii) Potential investments not capitalized onto the balance sheet (e.g., research and development [R&D], investments into intangible assets via marketing expenses, development of work force, etc.).

The following provides an overview of our suggested method for analyzing and calculating the appropriate amount of investments in net working capital and PP&E under the Gordon Growth formula. We also provide an example analysis to illustrate potential issues resulting from expensed investments (e.g., R&D) when applying the value driver formula, a method for estimating the net investment in the terminal period,[2] using a real-world transaction.

Related Articles

We present in the list below articles published in *Business Valuation Review* that discuss materials related to the concepts we are espousing in this article:

[1]This article is not intended to address the application of an exit multiple in determining the terminal value. However, our framework for analyzing the normalized cash flow into perpetuity should be used in analyzing the implied perpetuity growth rate from the application of an exit multiple.

[2]For examples, see Aswath Damodaran, *Investment Valuation*, 3rd ed. (New York: Wiley, 2012), and Koller, Goedhart, and Wessels, *Valuation: Measuring and Managing the Value of Companies*, 5th ed. (2010).

- In a 2003 article, Jay B. Abrams provides a framework for analyzing the payout ratio in a DCF analysis. In particular, he provides an analysis for analyzing the wedge between capital expenditures and depreciation in the perpetuity period. His method is mathematically consistent with our method of increasing net PP&E as the long-term growth rate.[3]
- In a 2003 article, Brant H. Armentrout provides a framework for developing capital expenditures in excess of depreciation based on capital expenditures as a percent of revenue. We believe our simplified approach of increasing net PP&E at the perpetuity growth rate is similar in concept and outcomes as those presented by Mr. Armentrout.[4]
- In a 2012 article, Lee et al. provide statistical evidence that capital expenditures in the long run should exceed depreciation, which is consistent with the concepts we have presented in this article.[5]
- In a 2014 article, Gilbert E. Matthews discusses the importance of having capital expenditures exceed depreciation, which is consistent with our calculations herein.[6]

Gordon Growth Formula Application and Common Errors

A widely recognized formula for determining the terminal value in a DCF method is the Gordon Growth formula. The formula is relatively straightforward, as illustrated below:[7]

$$\textit{Future Value of the Terminal Value} = \frac{\textit{Cash Flow}_{n+1}}{(\textit{Discount Rate} - \textit{Perpetuity Growth Rate})}.$$

Most of the technical errors we see in the application of the Gordon Growth formula derive from the numerator in the above formula.[8] Oftentimes we see practitioners using simply the free cash flow in the final discrete year of the projections and growing that amount by an estimated perpetuity growth rate (PGR). If the free cash flow in the final projection year failed to increase all line items at the assumed PGR, the application of the formula results can be severely flawed,[9] for example, by over- or under-investing in net working capital (NWC)[10] and insufficient or excess investment into net PP&E.[11]

Avoiding over- or underinvestment in net working capital

The Gordon Growth formula implicitly assumes that the investment in NWC in the final discrete period increases at the PGR. If the discrete period cash flow was not based on growing the balance sheet and income statement line items at the PGR, then the valuer has either overstated or understated the investment into perpetuity. The following provides an example in which a valuer has overstated the investment in NWC into perpetuity: [12]

- PGR is assumed to be 4.0%
- Revenue growth in the final year of the discrete period is 10.0% and
- Normalized net working capital investment is assumed to be 50.0% of incremental revenue.

Table 1 illustrates the resulting implied investments in NWC applying the PGR to the discrete period investment in NWC as implied by the application of Gordon Growth formula.

As illustrated in the table, when revenue increases by $10 million in final discrete period, it requires a NWC capital investment of $5.0 million to support the revenue (i.e., 50% of $10 million). Simply applying the Gordon Growth formula to the terminal year FCF would assume that $5.0 million NWC would increase at the PGR into perpetuity ($5 million × 1.04, or $5.2 million). A $5.2 million investment into NWC would represent approximately 118% of incremental revenue for the terminal year, more than double the assumed 50% NWC requirement.

[3]Jay B. Abrams, "Forecasting Cash Flow: Mathematics of the Payout Ratio," *Business Valuation Review* (June 2003). While Mr. Abrams focuses on the wedge, the net PP&E increases exactly at the long-term growth rate in his example presented on pages 68–70.

[4]Brant H. Armentrout, "A Sanity Test When Estimating Capital Expenditures in Excess of Depreciation," *Business Valuation Review* 22 (2003):136–141.

[5]Brian H. Lee, Daniel L. McConaughy, May Ann K. Travers, and Steven R. Whitehead, "The Long-Term Relationships between Capital Expenditures and Depreciation and the Long-Term Net Working Capital to Sales across Industries," *Business Valuation Review* 23 (2012):14–24.

[6]Gilbert E. Matthews, "Capital Expenditures, Depreciation, and Amortization in the Gordon Growth Model," *Business Valuation Review* 33 (2014):113–123.

[7]Shannon Pratt, *Valuing a Business*, 5th ed. (New York: McGraw Hill, 2008), p. 242.

[8]One potential error in the numerator would be failing to increase the prior year's free cash flow by the perpetuity growth rate.

[9]Conceptually, all line items in the terminal period are increasing at the perpetuity growth rate. Not only should all line items in the projected income statement increase at the perpetuity growth rate, but the hypothetical, projected balance sheet (assuming all items are recorded at their economic or market values) should also be increasing at the perpetuity growth rate.

[10]Note that NWC in this article is assumed to exclude cash.

[11]The most egregious error would be to have depreciation expense in excess of capital expenditures, which fails valuation logic because eventually net PP&E would be a negative number. See, for example, Pablo Fernandez and Andrada Bilan, "119 Common Errors in Company Valuations" (May 25, 2019). IESE Business School Working Paper No. 714, accessed at https://ssrn.com/abstract=1025424.

[12]The assumptions used in the example may not be reasonable for a given company. The values selected are at the high of the ranges to allow for a larger impact to the cash flow for illustration purposes.

Table 1
Incorrect NWC Application

	Final Discrete Period	Terminal Year	Terminal Year + 1
Revenue	$110.0	$114.4	$119.0
% Growth	10.0%	4.0%	4.0%
Incremental Revenue	$10.0	$4.4	$4.6
Net Working Capital (Gordon Growth)	$(5.0)	$(5.2)	$(5.4)
% Growth	NMF	4.0%	4.0%
% of Incremental Revenue	**50.0%**	**118.2%**	**118.2%**

Table 2
Corrected NWC Application

	Final Discrete Period	Terminal Year	Terminal Year + 1
Revenue	$110.0	$114.4	$119.0
% Growth	10.0%	4.0%	4.0%
Incremental Revenue	$10.0	$4.4	$4.6
Net Working Capital (50%)	$(5.0)	$(2.2)	$(2.3)
% Growth	NMF	−56.0%	4.0%
% of Incremental Revenue	**50.0%**	**50.0%**	**50.0%**

The proper analysis would have been to extend the discrete period forecast by one year and grow all balance sheet and income statement line items at the PGR of 4.0%. Table 2 illustrates this.

The NWC investment needed to support the $4.4 million of incremental revenue is $2.2 million (50%). However, when a valuer simply capitalizes the final discrete period cash flow, the NWC investment of $5.0 million is increased by the PGR into perpetuity, which results in NWC being more than 100% of incremental revenue. Thus, the investment is overstated because the NWC investment required to support 10% growth in revenue is greater than what is required to support 4% revenue growth.

This example demonstrates the need for valuers to analyze the projected free cash flow in the final year of the discrete period and likely develop a normalized free cash flow in the terminal period where the line items are individually projected based on the PGR. Otherwise, the valuer runs the risk of overstating or understating the NWC investment into perpetuity.[13]

Avoiding over- or underinvestment in net PP&E

In addition to NWC, a valuer should analyze the appropriate amount of net investment that should flow into fixed assets (i.e., PP&E). The net investment is based on the amounts of capital expenditures less depreciation for the terminal period.[14] It is common for management projections to have depreciation expense outstripping capital expenditures throughout the discrete projected period (i.e., net PP&E is declining even though revenue is increasing). Although this may be reasonable for a limited time, it is unreasonable for a company with expected positive revenue growth into perpetuity to have depreciation outpace capital expenditures into perpetuity.[15] At some point, the net PP&E would turn negative, which would not be allowed under tax regulations and is nonsensical.

If the final year of the discrete period anticipates depreciation exceeding capital expenditures and the resulting free cash flow from that period is simply grown by the PGR when calculating the terminal value, the valuer has implicitly assumed that fixed assets will decrease into perpetuity and eventually will turn negative. Table 3 provides an example of what can happen when

[13]We note that the alternative is true if the revenue growth rate in the final year of the discrete period is less than the perpetuity growth rate. Failing to normalize the NWC in the terminal period would understate the investment in NWC and cause the valuer to overstate the value of the subject company.

[14]There is also potential for sale of PP&E, but that is not typically included in the terminal period, and we have assumed no sales of PP&E for purposes of this article.

[15]Note that it is important for the valuer not to conflate depreciation and amortization. Barring the unreasonable assumption that a company can continue to make acquisitions into perpetuity, amortization of intangible assets cannot be carried into perpetuity. We would advise that in the terminal period amortization be separated from depreciation and the tax benefit of the remaining amortization be valued separately and added to the DCF value. We also note that the valuer should be careful to ensure the amortization is deductible for corporate income tax purposes.

Table 3
Failure to Normalize Investment in Fixed Assets Results in Declining Fixed Assets into Perpetuity ($ in millions)

	Perpetuity Growth Rate at 4.0%									
	Final Disc. Period	Terminal Year	Terminal Year + 1	Terminal Year + 2	Terminal Year + 3	Terminal Year + 4	Terminal Year + 5	Terminal Year + 6	Terminal Year + 7	Terminal Year + 8
Revenue	$150.0	$156.0	$162.2	$168.7	$175.5	$182.5	$189.8	$197.4	$205.3	$213.5
Capital Expenditures	$10.0	$10.4	$10.8	$11.2	$11.7	$12.2	$12.7	$13.2	$13.7	$14.2
Depreciation	$20.0	$20.8	$21.6	$22.5	$23.4	$24.3	$25.3	$26.3	$27.4	$28.5
Fixed Assets	$100.0	$89.6	$78.8	$67.5	$55.8	$43.7	$31.0	$17.9	$4.2	$(10.1)

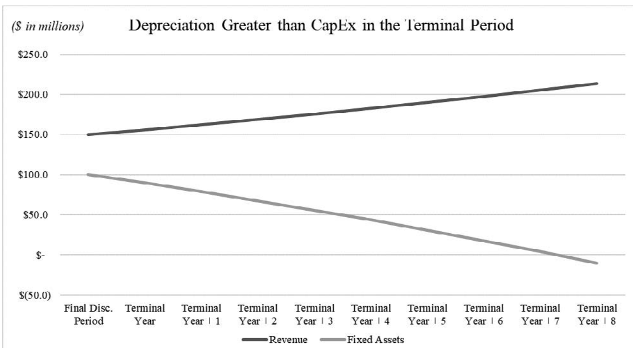

Figure 1
Depreciation Greater than CapEx in the Terminal Period

the valuer does not correct for depreciation exceeding capital expenditures in the terminal period.[16]

In the above example, seven years following the final year of the discrete period, the subject company will have negative $0.3 million in net PP&E even though revenue is increasing at the PGR of 4.0%. The negative fixed asset balance will grow even more negative in each successive projected period. Figure 1 illustrates this relationship.

Again, that it may be reasonable for various reasons for a company's fixed assets to decrease during the discrete period; however; it fails logic (and tax rules) for this to continue in the terminal period in cases where revenue is projected to increase.

Table 4
Normalized Depreciation ($ in millions)

Terminal Year Revenue	$156.0
Divided by Normalized FATR	1.50×
Net PP&E Required at Terminal Period	$104.0
Less Terminal Period CapEx	10.4
Less Net PP&E at End of Disc. Period	100.0
Indicated Depreciation in Terminal Period	−$6.4

We suggest determining the net investment in fixed assets in the terminal period based on an analysis of an appropriate fixed asset turnover ratio (FATR, or annual revenue divided by a corresponding net PP&E) for the subject company.[17] Selecting an appropriate FATR can be accomplished via analyzing historical and projected FATRs for the subject company and/or analyzing industry statistics and trends regarding FATRs. Once an appropriate FATR has been selected, then we suggest the following calculations for the terminal period:

1. Divide the terminal year revenue by the selected long-term FATR, which yields the net PP&E needed at the end of the terminal year.
2. Increase the projected capital expenditures in the final discrete period at the PGR.[18]
3. Calculate the depreciation amount that would allow the net PP&E to reach the amount calculated in Step 1.
4. This calculation is equal to the net PP&E at the end of the terminal period (Step 1) less the terminal year capital expenditures (Step 2) less the net PP&E at the end of the discrete period.

Table 4 provides a numerical example of applying this methodology for a company with the following characteristics:

[16]Note that although this may be an extreme example, depreciation outpacing capital expenditures by nearly two times, we have witnessed similar assumptions carried into perpetuity in numerous valuation analyses.

[17]Note that for this article, the fixed asset turnover ratio has been simplified from average fixed assets to ending fixed assets. Applying the traditional definition of FATR could cause the valuer to overstate the required investment in certain cases, because the net investment based on average assets creates a step growth pattern to fixed assets, trading off between significant growth to flat growth each year. Using the end-of-year fixed assets simplifies the analysis and allows for a smooth growth to the net PP&E into perpetuity.

[18]This assumes the capital expenditures were at a normalized level. If the capital expenditures were not at a normalized level, the valuer will need to estimate a normalized level for the terminal period.

Table 5
Normalized Investment in Fixed Assets Results in Fixed Asset Growth at the Perpetuity Growth Rate ($ in millions)

	Perpetuity Growth Rate at 4.0%									
	Final Disc. Period	Terminal Year	Terminal Year + 1	Terminal Year + 2	Terminal Year + 3	Terminal Year + 4	Terminal Year + 5	Terminal Year + 6	Terminal Year + 7	Terminal Year + 8
Revenue	$150.0	$156.0	$162.2	$168.7	$175.5	$182.5	$189.8	$197.4	$205.3	$213.5
% Growth	***N/A***	***4.0%***	***4.0%***	***4.0%***	***4.0%***	***4.0%***	***4.0%***	***4.0%***	***4.0%***	***4.0%***
Capital Expenditures	$10.0	$10.4	$10.8	$11.2	$11.7	$12.2	$12.7	$13.2	$13.7	$14.2
Depreciation	$20.0	$6.4	$6.7	$6.9	$7.2	$7.5	$7.8	$8.1	$8.4	$8.8
Fixed Assets	$100.0	$104.00	$108.16	$112.49	$116.99	$121.67	$126.53	$131.59	$136.86	$142.33
% Growth	***N/A***	***4.0%***	***4.0%***	***4.0%***	***4.0%***	***4.0%***	***4.0%***	***4.0%***	***4.0%***	***4.0%***
Normalized FAT	**1.50×**	**1.50×**	**1.50×**	**1.50×**	**1.50×**	**1.50×**	**1.50×**	**1.50×**	**1.50×**	**1.50×**

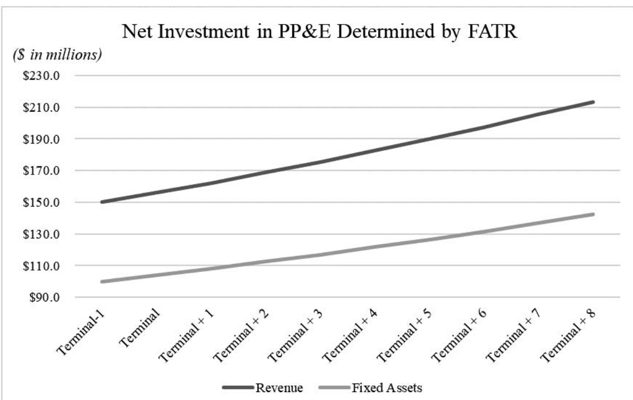

Figure 2
Net Investment in PP&E Determined by FATR

- PGR assumed to be 4.0%
- Revenue and net PP&E in the final year of the discrete period of $150 million and $100 million, respectively
- Capital expenditures of $10 million in the final year of the discrete period and
- A FATR of 1.50× (i.e., for every $1 invested in net PP&E, the company can generate $1.50 of revenue).

Using those values and the methodology set forth above, the following calculations provide an estimate of depreciation that allows for fixed assets to increase at a reasonable level. Table 5 and Figure 2 shows how using this methodology allows for the implied FATR to remain constant and net PP&E to increase at the PGR.[19]

Summary

Applying the terminal year normalization adjustments discussed above, the subject company will be at a steady state with all items on the income statement and balance sheet increasing at the PGR under the Gordon Growth formula. As a result, the analysis will be consistent with sound financial theory.

Applying and Testing the Value Driver Formula

Overview

Although most appraisers are likely well versed in applying the Gordon Growth model, appraisers may have less familiarity with the value driver formula (i.e., the "plowback" method). The value driver formula is rooted in the Du Pont formula for determining sustainable growth. The financial theory and applications are memorialized in valuation textbooks such as those authored by Prof. Aswath Damodaran and Tim Koller, Marc Goedhart, and David Wessels of McKinsey & Company.[20] Further, the concept has been applied in high-profile Delaware Court of Chancery cases in recent years when applying DCF models in appraisal matters.[21]

[19]Note that the sudden and significant decrease in depreciation, from $20 million in the final year of the discrete period to $6.4 million in the terminal period, is unlikely to naturally occur. Instead, we forced the depreciation to its long-term relationship with capital expenditures. Potentially it would take years for the depreciation to decrease to this relationship. Ignoring this incremental depreciation serves to slightly undervalue the subject company. This incremental depreciation can be valued separately and added back to the DCF value; however, the valuer needs to determine if this reasonable to do so. The present value of this incremental depreciation tax shield is likely to be *de minimis* because it is highly discounted due to occurring after the end of the discrete projection period with a value being limited to the incremental tax shield (income tax rate times depreciation).

[20]Aswath Damodaran, *Dark Side of Valuation*, 2nd ed. (New York: Pearson, 2010), p. 285, and Tim Koller, Marc Goedhart, and David Wessels, *Valuation: Measuring and Managing the Value of Companies*, 5th ed. (2010), p. 38.

[21]See, for examples, In Re: Appraisal of Solera Holdings, Inc. (CA no. 12080-CB) and In Re: Appraisal of Jarden Corporation (CA no. 12456-VCS).

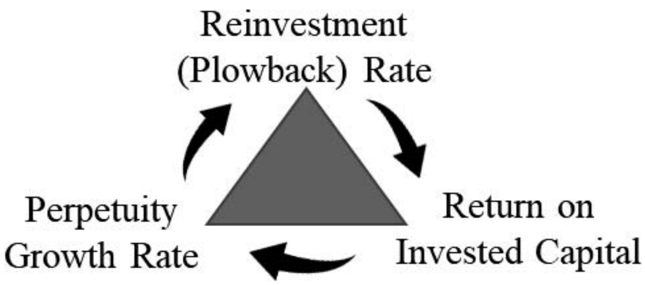

Figure 3
A Company's Sustainable Growth Rate Is Determined by How Much of Its Earnings Are Reinvested Back into the Company and What Returns the Company Can Expect on Those Reinvested Earnings

The general concept is that a company's sustainable growth rate is determined by how much of its earnings are reinvested back into the company and what returns the company can expect on those reinvested earnings. Figure 3 illustrates the concept.

Given the above relationship, the valuer can plug in his or her concluded PGR and return on invested capital to determine how much of the firm's earnings need to be reinvested back into the company to support the selected PGR. The reinvestment amount is derived using the following formulas:[22]

$$Reinvestment\ (Plowback)\ Rate = \frac{Perpetuity\ Growth\ Rate}{Return\ on\ Invested\ Capital},$$

$$Net\ Reinvestment = NOPAT \times Reinvestment\ (Plowback)\ Rate.$$

In the above formulas, NOPAT is net operating profit after tax, and return on invested capital (RoIC) is the weighted average cost of capital (WACC).[23]

The net reinvestment, or plowback, represents all the typical cash flow adjustments (e.g., NWC, capital expenditures, and depreciation) and should incorporate all other investments in capital, inclusive of investments that flow through the income statement generating intangible assets (e.g., R&D, sales and marketing, human resources, etc.) that are not captured on the balance sheet. R&D and other expenses that represent investment into intangible assets can be an important consideration when valuing technology and service-based companies and should not be double-counted when applying the value driver formula.

Example application: NetSuite

If one were to ignore those investments when applying the value driver formula, the valuer can overstate the need for investment into NWC and net PP&E when analyzing companies with low to negative NWC balances and/or relatively low fixed assets (e.g., a software company) by effectively double-counting the investment as a negative net cash flow adjustment and simultaneously expensing the expenditures in deriving NOPAT.

The following provides an example of how to test the reasonableness of the terminal cash flow adjustments under the value driver formula using a real-world transaction involving Oracle Corporation's acquisition of NetSuite, Inc., a software company, in 2016 for an implied $8.9 billion equity value.[24] To assist us in this example, we extracted forecasted financial data for NetSuite's operations from the related SEC Form 13E-3 filed in anticipation of its pending acquisition in Table 6.[25]

Using this information, Qatalyst, the financial advisor to NetSuite's board of directors, developed a DCF model that supported the $8.7 billion enterprise value using a 12.0% discount and an PGR implied by the Gordon Growth formula of 8.14%.[26] Note that Qatalyst simply used the final discrete period free cash flow in calculating the implied PGR's from their exit multiples and did not apply the value driver formula.

Using the information above and applying the value driver formula results in a dramatic change to the DCF value based on Qatalyst's assumptions. The first step in the value driver formula is to calculate the reinvestment

[22]The authors note Prof. Michael Bradley and Prof. Gregg Jarrell's work on adjusting the formula for inflation; however, for simplicity, we will be applying the formula without adjusting for inflation. Note that this methodology can also be employed when adjusting for inflation. Valuers applying this methodology should be fully informed and make the decision as to whether or not to adjust the formula for inflation. We would direct them to Bradley and Jarrell's article "Expected Inflation and the Constant-Growth Valuation Model," Morgan Stanley's *Journal of Applied Corporate Finance* 20 (2008):66–78, and Bradford Cornell and Richard Gerger's white paper "Estimating Terminal Values with Inflation: The Inputs Matter—It Is Not a Formulaic Exercise" (October 20, 2017).

[23]There are variations to the RoIC depending on the academic source. For example, Prof. Damodaran allows for RoIC to be no greater than 4–5% in excess of the WACC; see Damodaran, *Dark Side of Valuation*, p. 286. Further, other models suggest adjusting both the PGR and the RoIC for inflation to capture only the investment required to support real growth.

[24]See S&P's *Capital IQ* Database.

[25]NetSuite, Inc., SEC Form 13E-3, filed August 18, 2016, available at https://www.sec.gov/Archives/edgar/data/1117106/000104746916015744/a2229816zsc13e3.htm.

[26]NetSuite, ibid. Note that the implied PGR listed in the presentation was 8.5%, but the indicated value exceeded the deal value. Changing the PGR to 8.14% allows Qatalyst's model to reconcile to the purchase price. To be clear, the authors would be wary of using a PGR that significantly exceeds the growth rate expected for the overall economy. As a precursor, a 25% revenue growth rate leads to significant theoretical financial implications when the unadjusted cash flows are increased in the terminal value calculation.

Table 6
NetSuite Financial Projections ($ in millions)

	2016	2017	2018	2019	2020	2021
Revenue	$960.0	$1,218.0	$1,533.0	$1,929.0	$2,425.0	$3,023.0
Research and Development	$125.0	$165.0	$207.0	$260.0	$327.0	$408.0
Sales and Marketing	$421.0	$524.0	$643.0	$797.0	$982.0	$1,185.0
Net Operating Profit after Tax	$38.0	$53.0	$100.0	$172.0	$268.0	$298.0
(Increase)/Decrease in NWC	$62.0	$79.0	$100.0	$125.0	$158.0	$196.0
Capital Expenditures	$50.0	$60.0	$72.0	$91.0	$112.0	$139.0
Depreciation	$33.0	$42.0	$54.0	$72.0	$95.0	$125.0
Unlevered Free Cash Flow	$83.0	$115.0	$182.0	$279.0	$409.0	$480.0
Implied Reinvestment	−$45.0	−$61.0	−$82.0	−$106.0	−$141.0	−$182.0
PP&E	$106.6	$124.6	$142.6	$161.6	$178.6	$192.6

Table 7
NetSuite Terminal Cash Flow

Perpetuity Growth Rate	8.14%
Divided by RoIC	12.00%
Reinvestment Rate	67.83%
($ in millions)	Terminal
Net Operating Profit after Tax	$298.0
Times Reinvestment Rate	67.83%
Reinvestment Amount	−$202.1
Indicated Net Free Cash Flow	$95.9

rate and the implied net investment on NOPAT. Table 7 illustrates the calculation for NetSuite given the data in Table 6 and Qatalyst's assumptions (RoIC equals Qatalyst's midpoint WACC estimate of 12.0%).

As illustrated in Table 7, the value driver formula would indicate that the free cash flow used by Qatalyst should be reduced from $480 million (see Table 6) to $96 million for the terminal period. Using $96 million in the terminal period and holding all other assumptions in the DCF model constant reduce the indicated equity value from $8.9 billion (deal value) to less than $2.6 billion. Does this mean Oracle paid 3.5 times above the value of NetSuite and that the freely traded share price of NetSuite was grossly inflated?[27] Perhaps a more reasonable explanation is that traditional accounting rules result in classifying investments for software companies that are immediately expensed rather than being capitalized on the balance sheet. NetSuite both historically and on a projected basis spends considerable amounts on R&D, which are immediately expensed. As set forth in Table 6, projected R&D spending ranges from $125 million in 2016 to $408 million in 2021. Those expenses are unlikely to contribute only to the current earnings of a company and would likely impact future earnings. Thus, they should be considered as a form of invested capital. However, strict application of the traditional value driver formula would not recognize those expenditures as investments.

We had previously noted that it may be reasonable to apply an estimated RoIC greater than the WACC of up to 5%. Table 8 illustrates the sensitivity of the terminal cash flow relative to the incremental RoIC.

Applying our method for NWC and Net PP&E to NetSuite

Before applying our method for calculating terminal year cash flow, we should note that NetSuite's projected revenue increase in the final discrete period was 25%. This fact suggests applying a three-stage DCF model would be more appropriate, but we will keep our analysis more simplistic. With that backdrop, we calculated the following cash flow adjustments for NetSuite using our methodology for NWC and net PP&E set forth previously as illustrated in Table 9.

As is typical with many software companies, NetSuite's NWC is actually a source of cash because the company receives payment for services up-front, meaning that growth in revenue increases the company's deferred revenue liability at a much faster rate than its short-term noncash assets. By using the 2021 cash flow without adjustment, Qatalyst is understating the implied PGR from their model (i.e., the terminal year cash flow is overstated, and the implied PGR would need to be higher to compensate for the downward adjustment). We find it difficult to imagine the investment in NWC

[27] Per Oracle's 2019 SEC Form 10-K, there was has been no write-down of the $6.7 billion goodwill booked in the NetSuite acquisition. We note that there is an ongoing derivative litigation in Delaware Chancery Court, where it is being asserted that Oracle overpaid for NetSuite. This article is not intended to provide any commentary on whether that assertion is valid or invalid. Details on the litigation matter are available at https://courts.delaware.gov/Opinions/Download.aspx?id=298880.

Table 8
Terminal Free Cash Flow Sensitivity Table

	WACC Plus Incremental RoIC					
	+0%	+1%	+2%	+3%	+4%	+5%
Perpetuity Growth Rate	8.14%	8.14%	8.14%	8.14%	8.14%	8.14%
Divided by RoIC	12.00%	13.00%	14.00%	15.00%	16.00%	17.00%
Reinvestment Rate	67.83%	62.62%	58.14%	54.27%	50.88%	47.88%
($ in millions)	Terminal	Terminal	Terminal	Terminal	Terminal	Terminal
Terminal (2021) NOPAT	$298.0	$298.0	$298.0	$298.0	$298.0	$298.0
Times Reinvestment Rate	67.83%	62.62%	58.14%	54.27%	50.88%	47.88%
Reinvestment Amount	−$202.1	−$186.6	−$173.3	−$161.7	−$151.6	−$142.7
Indicated Net Free Cash Flow	$95.9	$111.4	$124.7	$136.3	$146.4	$155.3

Table 9
Projected Terminal Free Cash Flow Normalized Versus Implied by Exit Multiple ($ in millions)

	2016	2017	2018	2019	2020	2021	Terminal–Corrected	Terminal–Qatalyst
Revenue	$960.0	$1,218.0	$1,533.0	$1,929.0	$2,425.0	$3,023.0	$3,269.1	$3,269.1
NWC	$62.0	$79.0	$100.0	$125.0	$158.0	$196.0	**$80.7**	**$212.0**
% of Incremental Revenue	N/A	30.6%	31.7%	31.6%	31.9%	32.8%	**32.8%**	**86.1%**
Capital Expenditures	$50.0	$60.0	$72.0	$91.0	$112.0	$139.0	$150.3	$150.3
Depreciation	33.0	42.0	54.0	72.0	95.0	125.0	**141.9**	**135.2**
Implied Fixed Assets	$17.0	$35.0	$53.0	$72.0	$89.0	$103.0	**$111.4**	**$118.1**
Fixed Asset Turnover	56.5×	34.8×	28.9×	26.8×	27.2×	29.3×	**29.3×**	**27.7×**

Table 10
Implied Reinvestment Ignoring Investments in the Income Statement ($ in millions)

	2016	2017	2018	2019	2020	2021
Capital Expenditures	$50.0	$60.0	$72.0	$91.0	$112.0	$139.0
Less NWC	62.0	79.0	100.0	125.0	158.0	196.0
Less Depreciation	33.0	42.0	54.0	72.0	95.0	125.0
Implied Reinvestment	−$45.0	−$61.0	−$82.0	−$106.0	−$141.0	−$182.0

remaining a positive 86% of incremental revenue into perpetuity.[28] Regarding FATR, while capital expenditures exceeded depreciation, it may have been too large of a wedge, as the implicit assumption is that FATR will continue to decline into perpetuity. However, we note the overall impact to value from the net investment into PP&E between our method and Qatalyst is minimal.

[28]This 86% NWC investment is inflated because the Gordon Growth formula applied without a terminal year results in capitalizing a NWC investment required for approximately 25% growth in revenue in the final year of the discrete period (2021). This is consistent with the NWC issue presented above in the discussion of common issues seen in the Gordon Growth formula and further illustrates the problem created by not including a terminal year where items like NWC are normalized.

NetSuite's other forms of investment

As illustrated in Table 10, ignoring the investment in intangible assets and focusing only on the traditional capital investments (e.g., NWC and net PP&E) make it appear that NetSuite was not forecasting any positive investment.

Given the above, one might question how NetSuite could possibly increase revenue and profitability. This point of view erroneously ignores the significant investments the company is making in intangible assets that are being run through the income statement (i.e., expensed and not capitalized). As illustrated in Table 11, including only the research and development while ignoring the sales and marketing efforts employed to

Table 11
Implied Reinvestment Recognizing Investment in the Income Statement ($ in millions)

	2016	2017	2018	2019	2020	2021
Capital Expenditures	$50.0	$60.0	$72.0	$91.0	$112.0	$139.0
Less NWC	62.0	79.0	100.0	125.0	158.0	196.0
Less Depreciation	33.0	42.0	54.0	72.0	95.0	125.0
Plus Research and Development	125.0	165.0	207.0	260.0	327.0	408.0
Implied Reinvestment	$80.0	$104.0	$125.0	$154.0	$186.0	$226.0

drive long-term growth, the investment being made into the company is not insignificant.[29]

The implication of using the value driver formula is that failing to make the necessary adjustments to the income statement in the terminal period will significantly understate the value of the company. Investments made by the company would be double counted because they are captured once in the calculation of terminal net operating profit after tax and again in the reinvestment amount.

Conclusion

We have presented various methods by which we believe a valuer should analyze the free cash flow used in the terminal period. In performing business valuation, we encourage a valuer to consider the terminal cash flow implications regarding NWC investment and net PP&E investment when applying the Gordon Growth method. Additionally, we would encourage the valuer to analyze the difference in terminal year cash flow if one were to apply the value driver formula as the method is becoming more widely used. If the valuer elects to apply the value driver formula, it is imperative that he or she account for the investments flowing through the income statement and be able to explain the makeup of the reinvestment prescribed by the formula. If the subject company has relatively low fixed asset balances and relatively high amounts of intangible assets, there is likely to be a wide gap that may be explained by investments made by the company that are being expensed and not capitalized as an investment (e.g., R&D).

[29]This is a simplistic approach to analyzing reinvestment. We refer readers to Prof. Damodaran's framework for adjusting income statement line items that are more akin to investments in intangible assets, available at http://pages.stern.nyu.edu/~adamodar/.

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