



Delaware's Unwarranted Assumption in DCF Pricing

Posted by Arthur H. Rosenbloom (Consilium ADR) and Gilbert E. Matthews (Sutter Securities), on Tuesday, May 15, 2018

Editor's note: Arthur H. Rosenbloom is Managing Director of Consilium ADR LLC, and [Gilbert E. Matthews](#) is Senior Managing Director and Chairman of the Board of Sutter Securities, Inc. This post is based on their recent [paper](#) and is part of the [Delaware law series](#); links to other posts in the series are available [here](#).

Every valuator's kit bag includes income-based approaches such as discounted cash flow or the direct capitalization of earnings, by which to determine fair value or value using other standards.

Delaware fair value proceedings have predominantly adopted the erroneous assumption that capital expenditures should equal the sum of depreciation and amortization in determining terminal value. The assumption makes sense only if one assumes the non-real-world scenario of both no growth and no inflation, as we demonstrate in more detailed fashion in the next section of this article.

Further, survey data based on published financial statements confirms the fact that capex typically exceeds depreciation. A study published in 2004 showed that over the time period 1986-2001, on average, capex exceeded depreciation by 21%, though the amount varied across industries. A current example, and to a similar effect, is contained in a January 2018 document published by the Stern School of Business at NYU, which shows that, on average, capex exceeded depreciation by 16½%. It too shows differences between and even within given industries.

Why capex should exceed depreciation

The assumption that depreciation equals capital expenditures is only appropriate if it is also assumed that there is no growth and no inflation. However, many valuers and courts do not recognize that the normalized capital expenditures of a growing company must materially exceed depreciation over time. Indeed, inflation alone makes it a rare occurrence for depreciation to be adequate for replacement cost; Prof. Bradford Cornell points out that the traditional approach "errs by failing to account for the impact of inflation and that "depreciation is rarely equal to [maintenance capex] even if there are no additional working capital requirements."

In any given year, capital expenditures can be lower than depreciation, but a company cannot grow unless its *normalized* capex exceeds depreciation. This can easily be demonstrated by using the simple example of a company that is growing at 3% annually and depreciates its assets on a straight-line basis over a five-year period to a zero residual value. If its capital expenditures

are \$100,000 in the first year and increase 3% annually, capex in year six would be \$115,900. As shown in Table A, depreciation in year six would be \$107,800, 7% less than capex.

Table A: 5-Year Straight-Line Depreciation with 3% Growth

Year	Capital	Depreciated in 2023	
Purchased	Expenditures	%	Amount
	--- (\$000) ---		
2018	100.0	10%	10.0
2019	103.0	20%	20.6
2020	106.1	20%	21.2
2021	109.3	20%	21.9
2022	112.6	20%	22.5
2023	115.9	10%	11.6
Total			107.8

The longer the depreciation period, the greater that the difference between capex and depreciation. Table B shows that, for 15-year straight-line depreciation and a 3% growth rate, depreciation in year 16 is only 81% of capital expenditures. Put differently, capex are 24% higher than depreciation.

Table B: 15-Year Straight-Line Depreciation with 3% Growth

Year	Capital	Depreciated in 2033	
Purchased	Expenditures	%	Amount
	--- (\$000) ---		
2018	100.0	3.333%	3.3
2019	103.0	6.667%	6.9
2020	106.1	6.667%	7.1
2021	109.3	6.667%	7.3
2022	112.6	6.667%	7.5
2023	115.9	6.667%	7.7

2024	119.4	6.667%	8.0
2025	123.0	6.667%	8.2
2026	126.7	6.667%	8.4
2027	130.5	6.667%	8.7
2028	134.4	6.667%	9.0
2029	138.4	6.667%	9.2
2030	142.6	6.667%	9.5
2031	146.9	6.667%	9.8
2032	151.3	6.667%	10.1
2033	155.8	3.333%	5.2
Total			125.9

In most DCF calculations, terminal value is 70% or more of the total value. Therefore, the error of equalizing depreciation and capex can have a material effect on discounted cash flow valuations.

Jim Hitchner, the author of several books on business valuation, has asked valuers in his webinar audiences, “How do you typically handle depreciation and cap ex when calculating cash flows?” The responses published in his bi-monthly newsletter, *Financial Valuation and Litigation Expert*, were:

	June 2011	June 2013	Feb. 2015	June 2017
Capex less than depreciation[!]	6%	4%	6%	2%
The same or very similar	66%	68%	55%	45%
Capex more than depreciation	28%	28%	38%	53%

These results show the increasing recognition in the valuation community that capital expenditures should exceed depreciation.

Delaware’s default rule is capex = depreciation

These facts notwithstanding, case law in Delaware appraisal demonstrates a strong tendency to genuflect to the faulty assumption that capex and depreciation should be equal. The baleful effect of such an approach raises DCF valuations to excessive levels.

The first mention of the capex/depreciation relationship in Delaware was in 1992:

[T]he proxy statement discloses IBC's expectation that capital expenditures in the future will approximate depreciation charges.

Salomon Brothers Inc. v. Interstate Bakeries Corp., 1992 Del. Ch. LEXIS 100 (May 1, 1992) at *14

In the long-running *Technicolor* case, the Court stated:

I will calculate fixed capital investment as 1.8% of the following year's net sales, and depreciation as 1.8% of net sales.

Cede & Co. v. Technicolor, Inc., 2003 Del. Ch. LEXIS 146 (July 11, 2003) at *83; *aff'd in part, rev'd in part on other grounds*, 884 A.2d 26 (De. 2005)

The Court of Chancery explicitly ruled in 2012 that terminal value should be calculated on the assumption that capital expenditures and depreciation were equal, but it relied on both a prior case and a valuation text that did not support its conclusion:

The petitioners' challenge is grounded in the sound valuation principle that because the terminal value is meant to capture the present value of all future cash flows of the company, typically the net cash flow figure used to generate the terminal value should be normalized, rather than "unrealistically extrapolate[] [a company's] short run circumstances into perpetuity" [citing *Kleinwort Benson Ltd. v. Silgan Corp.* ("*Kleinwort Benson*"), 1995 Del. Ch. LEXIS 75 (Del. Ch. June 15, 1995) at *21]. The Gordon growth model indicates the equity value of a firm assuming full distribution of its net earnings [citing Z. Christopher Mercer, *The Integrated Theory of Business Valuation* (Peabody 2004), p. 15]. One of the important implications of this assumption is that "[c]apital expenditures are equal to depreciation" [citing Mercer, p. 15, and *Kleinwort Benson* at *21].

In Re: Appraisal of The Orchard Enterprises, Inc. ("*Orchard*"), 2012 Del. Ch. LEXIS 165 (Del. Ch. July 18, 2012) at *54.

The references to Mercer's text are misguided because Mercer's example on the cited page expressly assumes a company with *no growth*. A growing company needs capex greater than depreciation in order to sustain its growth.

The reference to *Silgan* is odd because the Court in that case actually used depreciation greater than capital expenditures.

Kovacs correctly recognized the need for an adjustment in the data so that capital investment relates to growth and depreciation in a sustainable manner. [This sentence was quoted in a footnote in *Orchard*.] ... Kovacs testified that *capital investment should slightly exceed depreciation* to sustain perpetual growth. ... Kovacs' theory that capital expenditures should slightly exceed depreciation is just as plausible as the "zero out" approach, *so I will not alter Kovacs' terminal value calculation* [emphasis added].

Kleinwort Benson at *21-22.

A 2013 decision rejected expert testimony that capital expenditures should be greater than depreciation in the terminal value calculation and accepted testimony that they would be equal:

Gokhale used depreciation figures from the 2009 LRP and set capital expenditures equal to depreciation. Kursh made the assumption that depreciation would be higher than capital expenditures into perpetuity... . Because I have adopted Gokhale's model as a general framework, I adopt his treatment of capital expenditures and depreciation, as well.

Towerview LLC v. Cox Radio, Inc., 2013 Del. Ch. LEXIS 159 (Del. Ch. June 13, 2013) at *90-*91.

In 2014, the Court again accepted the assumption that capex and depreciation should be equal.

I therefore adopt ... Kimball's assumption that "[d]epreciation and capital expenditures are assumed to be equal over the long-term" [quoting the expert's report].

Laidler v. Hesco Bastion, 2014 Del. Ch. LEXIS 75 (Del. Ch. May 12, 2014) at *44.

In 2016 the Court explicitly rejected expert testimony that capex should be greater than depreciation over the long term:

In the last year of the projection period, however, the Updated Base Case contemplated an amount for depreciation that exceeded capital expenditures. To bring the two into harmony, Hausman assumed that capital expenditures would exceed depreciation over time by an amount sufficient to cause net amortizable assets to grow at the Company's long-term growth rate. Fischel chose to increase capital expenditures to equal depreciation. The record shows that the Company historically had high levels of depreciation relative to capital expenditures, so it is more reasonable to assume depreciation would decrease during the terminal period to match capital expenditures. This decision adopts that approach.

Merion Capital v. Lender Processing, 2016 Del. Ch. LEXIS 189 (Del Ch. Sept. 21, 2016) at *72-*73.

The clearly erroneous decisions—Delaware cases where capex is less than depreciation in the terminal value calculation

It is virtually impossible for depreciation to be greater than capital expenditures in perpetuity since depreciation is based on prior years' capex. Nonetheless, in a 2004 decision in a consolidated fiduciary and appraisal action, the Court accepted a terminal value based on a growth model in which capital expenditures in the final year on the projection period were \$9.1 million and depreciation was \$21.8 million:

Nor is there merit to the defendants' criticism (articulated through Matthews) that in Zmijewski's terminal year (2002), depreciation exceeds CapEx, a state of affairs that cannot go on forever. The flaw in this criticism is that Zmijewski's projected cash flows only; he did not forecast the individual components of free cash flow, including CapEx or

depreciation. Accordingly, there is no basis to conclude that Zmijewski's forecasts perpetual divergent depreciation and CapEx.

In re Emerging Communications, Inc. Shareholders Litig., 2004 Del. Ch. LEXIS 70 (Del. Ch. May 3, 2004) at *57, n.56.

The Court's explanation is puzzling. In this case, terminal value was derived by applying a growth rate of 2.9% to a free cash flow that was calculated by adding depreciation to, and deducting capex from, projected EBIT. The computation of terminal value was based on a forecast in which depreciation perpetually dwarfed capital expenditures, a mathematical impossibility regardless of the accounting method used.

The plaintiff in this case received a judgment with respect to more than 20% of the outstanding shares. Due to the size of the award and a decline in the value of the company subsequent to the 1998 transaction date, the amount of the judgment exceeded the equity value of the company in 2004. Therefore, the Court of Chancery's error could not be appealed to the Delaware Supreme Court because the defendants were unable to bond the appeal.

Another 2004 decision also used a projection in which depreciation materially exceeded capital expenditures. In that case, capital expenditures were projected to be \$100,000 per year, while depreciation and amortization declined from \$487,000 in the first year of the projection to \$368,000 in the final year. The opinion calculated terminal value based on 5% perpetual growth of projected free cash flow, effectively assuming that capex and D&A both would grow at the 5% rate.

The rare Delaware decisions where capex exceeded depreciation

In a 2007 decision, capital expenditures were estimated at \$25,000,00 in the terminal year and depreciation was \$22.7 million. In this case, the Court used the projections in the company's proxy statement and did not comment on the fact that capex were higher.

In a 2015 decision, the Court of Chancery relied on a DCF analysis in which capital expenditures exceeded depreciation over time. In this case, it appears that both experts took this view:

[T]he experts arrived at different plowback ratios, which is the percentage of net operating profit after tax that is reinvested in capital expenditures. The idea is that "[i]n order to adequately support a perpetual growth rate in excess of expected inflation (*i.e.*, positive real growth), a firm will need to reinvest in capital expenditures at a sustainable rate that is above that of projected depreciation." [quoting expert testimony at trial]

In Re Appraisal of Ancestry.com, Inc., 2015 Del. Ch. LEXIS 21 (Jan. 30, 2015) at *36-37.

Federal cases

The small sample of federal decisions which expressly discuss capex and depreciation in income-based valuations show a mixed bag of adherence to or departure from the heuristic idea that capex and depreciation should be equal.

A U.S. Tax Court decision used a DCF analysis in which capex was lower than depreciation. A U.S. Bankruptcy Court decision based its valuation on the assumption that that depreciation should equal capex; the Court rejected plaintiffs' claim that capital expenditures should be *less* than depreciation. On the other hand, a U.S. Tax Court decision used a valuation where annual capital expenditures were 28.2% greater than depreciation.

The issue was addressed again in a 2010 decision where the U.S. District Court accepted expert testimony that capex would exceed depreciation and rejected the testimony that they should be equal:

Bayston assumes capital expenditures of approximately 109% of depreciation. This follows from ... a belief that capital expenditures must outpace depreciation if the company intends to manufacture the number of units necessary to achieve terminal value revenue assumptions...

On the other hand, Giesen assumes that capital expenditures will equal depreciation in the terminal period According to Bayston, Giesen's analysis is flawed because it implicitly assumes revenue growth without additional investment in ATS's asset base.

* * *

Bayston's assumption that ATS will experience 6% volume growth and 3% revenue growth appears more reasonable than Giesen's for the terminal period. This indicates additional investment in the asset base is necessary at a level consistent with Bayston's analysis.

Albert Trostel & Sons Co. v. Notz, 2010 U.S. Dist. LEXIS 108778 (E.D. Wisc., Sept 28, 2010) at. at *36-38.

Responsibility of experts to explain relationship to judges

There's some light at the end of the valuation tunnel. As discussed above, the valuation profession has, from June 2011 to June 2017, moved from a situation in which only 28% of valuers typically assumed that capex would exceed depreciation to one in which 53% did so. While far too many valuation practitioners continue to perpetuate the error that fact-based data reveals, there is movement in the right direction.

In valuation cases, the courts normally rely on expert testimony to guide and inform them. The courts' errors in their DCF calculations can be attributed to the failure of valuation experts to understand and explain why capex must exceed depreciation. One can only hope that more enlightened experts are engaged and that their expert reports and testimony will reflect the

realities we have tried to illustrate. While one would expect that, since correct approach will result in lower DCF valuations, the lesson will be emphasized by respondents' experts, its impact should be evident to and considered by those called by petitioners as well.

The complete paper, including footnotes, is available for download [here](#).