



AMERICAN SOCIETY OF APPRAISERS Business Valuation Committee Special Topics Paper #2

Reinvestment Considerations in Terminal Value Estimates: Capital Expenditures and Depreciation Levels That Result in Appropriate Reinvestment Rates^a

When using a valuation method that incorporates a terminal period net cash flow estimate, the valuation analyst will need to estimate a stabilized level of net cash flow. Two primary components of this net cash flow estimate are normalized depreciation expense and normalized capital expenditures. This technical paper will discuss research that has focused on (1) the long-term relationship between depreciation expense and capital expenditures and (2) the variables that influence this relationship. This paper will also highlight the various factors that a valuation analyst may consider when estimating a normalized level of depreciation expense and a normalized level of capital expenditures in a single-period net cash flow estimate.

Introduction

Whether using a discounted cash flow method or a single-period capitalization method, the valuation analyst is faced with the decision of how to appropriately estimate capital expenditures and depreciation expense in the single-period net cash flow estimate. In both valuation methods, the terminal period net cash flow is capitalized in perpetuity using a capitalization rate to arrive at a terminal value. Given that the terminal value may represent either a significant portion (in the case of a discounted cash flow method) or all (in the case of the capitalization method) of an entity's enterprise value, it is important that the valuation analyst uses care when estimating capital expenditures and depreciation expense in the terminal period net cash flow.

This technical paper will discuss research that has focused on (1) the long-term relationship between depreciation expense and capital expenditures and (2)

the variables that influence this relationship. This paper will also highlight the various factors that a valuation analyst may consider when estimating a normalized level of depreciation expense and a normalized level of capital expenditures in a single-period net cash flow estimate.

Estimation of Capital Expenditures and Depreciation Expense in a Single-Period Measurement of Net Cash Flow

The capitalization method involves the capitalization of a single-period estimate of net cash flow to arrive at a present value for the subject business or security.

The discounted cash flow method usually includes (1) prospective financial information (i.e., a net cash flow forecast) over a discrete number of years and (2) a single-period net cash flow estimate at the end of the discrete forecast period. This single-period net cash flow estimate is capitalized to arrive at a terminal value. The present value of the terminal value is then added to the present value of the annual net cash flow over the discrete forecast period. The resulting value represents the present value of the subject business or security.

^aThis paper is intended to represent the recommended approach according to the Business Valuation Committee of the American Society of Appraisers. However, it does not constitute a standard and is not authoritative. Facts and circumstances could require the use of further professional judgment and a different approach.

In both of the above-described income-based methods, the valuation analyst estimates a stabilized level of net cash flow, which is capitalized using a capitalization rate. More specifically, the single-period net cash flow estimate used in the capitalization method and the terminal period net cash flow estimate used in the discounted cash flow method should reflect the entity's normalized net cash flow at the point where a constant rate of growth and profitability is expected in the future. Given that the concluded value is based largely (in the case of the discounted cash flow method) or exclusively (in the case of the capitalization method) on the single-period net cash flow estimate, the valuation analyst must properly estimate each of the components that comprise net cash flow.

Net cash flow can be estimated on either an equity basis or an invested capital basis. The following is a summary of the formula that is commonly used to estimate net cash flow on an equity basis:

Net Income
plus: Depreciation and Amortization Expense
less: Capital Expenditures
plus/less: Change in Working Capital
plus/less: Proceeds/Payment of Debt
equals: Net Cash Flow to Equity

The following is a summary of the formula that is commonly used to estimate net cash flow on an invested capital basis:

Net Operating Profit After Taxes (NOPAT)
plus: Depreciation and Amortization Expense
less: Capital Expenditures
plus/less: Change in Working Capital
equals: Net Cash Flow to Invested Capital

Whether estimating net cash flow on an equity basis or an invested capital basis, the level of depreciation expense and capital expenditures, and, more specifically, the relationship between depreciation expense and capital expenditures, may have a significant effect on the estimated net cash flow and, ultimately, the conclusion of value.

Historically, many valuation analysts have made the simplifying assumption that, for purposes of estimating a normalized level of net cash flow, it is appropriate to have depreciation expense equal capital expenditures. Recent surveys by valuation analysts have indicated that approximately 44% to 68% of analysts believe that depreciation expense and capital expenditures should be equal (or at least similar) in estimating net cash flow.¹

¹“Did the DE Chancery Draw a ‘Bright-Line Rule’ Requiring Normalization of Capex/Depreciation in Terminal Values?” *BVWire* (October 31, 2012). and “Valuation Update: Webinar Poll Results Reveal Common Industry Practices,” *Financial Valuation and Litigation Expert* (December 2013/January 2014):1, 5.

Proponents of this concept often argue that, over the long term and in the aggregate, an entity will eventually depreciate all of the depreciable assets that it purchased and capitalized. Consequently, it is logical to conclude that, over the long term, average annual depreciation expense will approximate average annual capital expenditures. While logical, this conclusion is overly simplistic and may lead to an overvaluation of the entity.

However, various research has concluded that, in a growing entity, it is appropriate to have capital expenditures exceed depreciation expense in the stabilized net cash flow estimate.² This concept is generally based on the fact that when capital spending grows at a constant rate (even if merely because of inflation), annual depreciation expense—depending on the depreciation method selected—will generally lag behind the level of annual expenditures.

Additional research has shown that, over the long term, on average, capital expenditures may exceed depreciation expense by approximately 21%, when a large sample of companies is analyzed across many different industries.³ While the 21% differential would not necessarily suggest a stabilized level of net cash flow, this research has generally found that the degree of difference between depreciation expense and capital expenditures over the long term has generally been influenced by the rate of growth in capital spending, the depreciable life of the acquired assets, and the cyclical nature of capital spending.

In summary, a large number of valuation analysts continue to believe that it is appropriate to have depreciation expense equal capital expenditures when estimating a stable net cash flow estimate. In contrast, various empirical research has concluded that, over the long term with a growing entity in a capital-intensive industry, capital expenditures tend to exceed depreciation expense. This same research has concluded that, in a declining industry, an industry participant may have periods where depreciation expense exceeds capital expenditures.⁴ It is important for the valuation analyst to realize that, over the long term, aggregate depreciation

²Gilbert E. Matthews, “CapX = Depreciation Is Unrealistic Assumption for Most Terminal Values,” *Business Valuation Update* 8 (March 2002):1, 3.

³Daniel L. McConaughy and Lorena Bordi, “The Long Term Relationships between Capital Expenditures and Depreciation across Industries: Important Data for Capitalized Income Based Valuations,” *Business Valuation Review* 23 (March 2004):14.

⁴Brian H. Lee, Daniel L. McConaughy, Mary Ann K. Travers, and Steven R. Whitehead, “The Long-Term Relationships between Capital Expenditures and Depreciation and Long-Term Net Working Capital to Sales across Industries,” *Business Valuation Review* 31 (Summer/Fall 2012):91. Depreciation expense in excess of capital expenditures may be appropriate for a discrete period of time, but it would be inappropriate in a terminal value calculation because the relationship would imply negative assets in perpetuity.

expense cannot exceed aggregate capital expenditures. Also, although this technical paper addresses various factors that the valuation analyst may consider in forecasting both capital expenditures and depreciation expense, the relationship between capital expenditures and depreciation expense should be the key focus area of the analyst.

Factors to Consider in Forecasting Capital Expenditures in Estimating Net Cash Flow

Valuation analysts often analyze an entity's recent, historical performance when estimating a level of normalized capital expenditures in a single-period net cash flow estimate. This analysis may involve analyzing historical capital expenditures as a percentage of a specific financial metric such as historical revenue or historical units of production.⁵ While these analyses may provide a reasonable basis for estimating a normalized level of capital expenditures in some instances, there are other instances in which various other factors may need to be analyzed.

Various factors influence an entity's level of capital spending. These factors may include, but are not limited to, the following:

1. Whether the business is capital intensive and the industry in which it operates
2. Whether the business is growing or declining
3. Cyclical nature of the business
4. The degree to which the business has overinvested to underinvested in the recent past
5. Competitive environment in which the business operates
6. Expected technological changes that will affect the business
7. Expected increases in efficiency or productivity in the business
8. Issues related to regulatory compliance
9. Expectations related to projected growth and return on investment

While each of the above-listed factors may not be applicable to every business, it is prudent for the valuation analyst to consider whether any of the factors are applicable to the subject analysis and the degree to which any of the factors may influence the level of stabilized capital expenditures. The following is a discussion of each of the above-described factors.

⁵Various research has quantified the level of an entity's capital expenditures relative to its sales. This research has cast further light on how these expenditures as a percentage of sales, over the long term, have varied by industry category. See *ibid*.

1. Whether the business is capital intensive and the industry in which it operates

All else being equal, a capital-intensive business having significant investments in real property, personal property, and intangible assets will generally have relatively large, annual capital expenditure requirements. Generally speaking, these annual requirements should be considered by the valuation analyst when estimating a stabilized level of annual capital expenditures. In addition to one-time large capital expenditures that relate to new projects, these entities routinely have sizeable annual capital budgets for ongoing, maintenance expenditures. The industry in which the entity operates may also influence its level of normalized capital expenditures over the long term. Research conducted on the issue has highlighted how capital investment varies—in some cases to a large degree—industry by industry.⁶

2. Whether the business is growing or declining

As a business grows, it is logical to conclude that its long-term capital expenditure requirements will grow as well. This concept speaks to the need for having a level of capital expenditures in the net cash flow estimate that is theoretically consistent with the projected growth rate of the entity's net cash flow. Likewise, for a mature business that either is not growing or is declining, it may be logical to conclude that a long-term estimate of normalized capital expenditure may be lower than what the business incurred in the past.

3. Cyclical nature of the business

Many businesses are cyclical in nature. These cycles can be exacerbated by movement in both regional and national economic activity. Cyclical businesses may exhibit annual variability in capital spending. This variability often makes it difficult for the valuation analyst to estimate a normalized level of capital expenditures for a single-period net cash flow estimate. Oftentimes it is helpful for the valuation analyst to review an entity's capital spending over the course of an economic cycle to have a better sense to the degree of variability in annual capital spending. With a cyclical business, it may be insufficient for the valuation analyst to review only the two or three years immediately preceding the valuation date to estimate an appropriate level of stabilized capital expenditures.

4. The degree to which the business has overinvested to underinvested in the recent past

Rarely do businesses incur a consistent level of capital expenditures each year. It is more common for a

⁶Ibid.

business to incur large capital expenditures for a brief period as it builds or acquires additional manufacturing or warehouse capacity, improves information technology systems, acquires other businesses, or updates its current facilities. After a period of overinvestment, the business may have excess capacity that will take years to utilize. This often leads to a subsequent period of underinvestment while the business grows, in part, through the use of its excess capacity. Evaluating the business over a period of overinvestment may lead to an inaccurately high view of what a normalized level of capital expenditures may be in a stabilized state. Likewise, a business may go through a period of underinvestment. In this case, a historical view of the capital expenditures would lead to an artificially low indication of annual capital expenditures.

5. Competitive environment in which the business operates

The competitive environment in which the business operates will often affect the business' level of capital spending. In generally, many businesses will have a higher level of capital spending when operating in a highly competitive environment and a lower level of capital spending when competition is low. The valuation analyst may consider how the competitive landscape affects the business's level of capital spending.

6. Expected technological changes that will affect the business

Most businesses, whether manufacturers, distributors, or service-related business, are impacted by technological advances. These advances, while costly at times, may lead to lower capital expenditures in the future. It is prudent for the valuation analyst to consider how past investments in technological advances may impact an entity's future level of capital spending.

7. Expected increases in efficiency or productivity in the business

Successful businesses always look for ways to be more efficient and productive. Expected increases in productivity should not be overlooked by the valuation analyst, especially when the increase in productivity is expected to affect future capital expenditures.

8. Issues related to regulatory compliance

Businesses may be faced with both expected and unexpected regulatory compliance issues. These entities are consistently monitoring the local, state, and federal regulatory environments to assess how proposed changes

in regulations may impact their businesses. In some cases, these regulatory changes may require entities to spend significant amounts of capital to either become, or remain, compliant with new regulations. In estimating a stabilized level of capital expenditures, it is prudent for the valuation analyst to consider how nonrecurring, regulatory-related capital spending may have affected historical spending and how it may affect future capital spending.

9. Expectations related to projected growth and return on investment

In a single-period capitalization method, a net cash flow estimate is capitalized by a capitalization rate. The capitalization rate comprises (1) an expected rate of return on investment and (2) a projected perpetuity growth rate. Commentators have stated that the level of capital expenditures within the net cash flow forecast should be sufficient to allow the business to grow at the expected perpetuity growth rate and still provide a reasonable return on investment to the investor.⁷ This relationship can be expressed mathematically as the following retention, or plowback, formula:⁸

$$R = g/ROI,$$

where

R = Reinvestment rate (i.e., percentage of aftertax income that will be reinvested in the business)

g = Stabilized perpetuity growth rate

ROI = Stabilized return on investment

For example, a hypothetical entity may have stabilized NOPAT of \$1,000. If the perpetuity growth rate is 4% and the desired return on investment is 16%, we can estimate the required reinvestment rate of 25% as follows:

$$25\% = 4\%/16\%.$$

In this example, the retention formula suggests that 25%, or \$250 of the entity's \$1,000 of NOPAT, would need to be reinvested in the business for the entity to grow at a constant rate of 4% and achieve a return on investment of 16%.⁹ While the retention rate formula may not be applicable in

⁷See Aswath Damodaran, *The Dark Side of Valuation*, 2nd ed. (New York: Pearson Education, 2010), chapter 9.

⁸The retention rate formula in most finance texts is expressed as $R = g / ROE$, where ROE is return on equity. Our hypothetical examples assume that we are capitalizing net cash flow to arrive at the value of invested capital. In this context, the proper denominator for the retention formula is return on investment (ROI) rather than ROE.

⁹Some valuation analysts would view the \$250 reinvestment net of depreciation expense such that the level of capital expenditures in the net cash flow estimate would exceed depreciation expense by \$250. Other analysts may view the \$250 reinvestment as a total net reinvestment such that the sum of capital expenditures and the increase in net working capital would exceed depreciation expense by \$250.

every situation, it often provides guidance of a reasonable estimate of capital expenditures in the stabilized state.

Factors to Consider in Determining Depreciation Expense in the Net Cash Flow Estimate

As discussed above, a valuation analyst may consider many factors in estimating normalized capital expenditures for a single-period net cash flow estimate. Furthermore, it is worth noting that normalized capital expenditures are usually estimated independently of normalized depreciation expense. That is, historical depreciation expense does not have an effect on what an entity's future capital expenditures may be. However, the reverse is usually not true. An entity's historical and projected capital spending will have a direct effect on the entity's normalized level of depreciation expense.

An entity's depreciation expense may vary widely from year to year. Some of the yearly variation may be attributed to the following:

1. Inconsistent capital spending from year to year
2. Acquiring assets with different depreciable lives
3. Different depreciation methods and whether depreciation is reported on a GAAP/book value basis or an income tax basis
4. The effect of bonus depreciation and other depreciation adjustments
5. Inclusion of amortization expense with depreciation expense

One or more of the above-listed factors will usually impact nearly every valuation where the analyst is tasked with estimating a normalized level of depreciation expense. As a result, it is prudent for the valuation analyst to consider each of the factors and then assess the degree to which any of the factors influences the level of depreciation expense. The following is a discussion of each of the above-noted factors.

1. Inconsistent capital spending from year to year

Capital spending for many entities can vary significantly from year to year. These variations can cause large fluctuations in depreciation expense each year, especially when the majority of the acquired assets have relatively short depreciable lives. In situations such as this, it is often helpful for the valuation analyst to have a firm understanding of the annual depreciation run-out associated with the assets in place as of the valuation date. These data, when coupled with projected depreciation expense on projected capital expenditures, can give the valuation analyst a longer-term view of how total depreciation expense may be expected to change in the future. As

previously mentioned, various research has concluded that, in a growing entity, there tends to be a lag in the level of annual depreciation expense relative to the level of annual capital expenditures over the long term. The valuation analyst may use this information to evaluate whether a normalized level of depreciation expense appears reasonable relative to a normalized level of capital expenditures in a single-period net cash flow estimate.

2. Acquiring assets with different depreciable lives

An entity's annual capital expenditure budget may comprise primarily short- to medium-life assets that are routinely replaced. These assets may include computers and software, certain office equipment, tooling, vehicles, and machinery. If these short- to medium-life assets constitute nearly all of the entity's capital spending each year, one would expect to see consistency in annual depreciation expense. However, many businesses periodically complete large capital projects that may temporarily inflate capital spending. The large projects may include longer life assets such as manufacturing and distribution facilities. The longer depreciable life of these assets is meant to spread depreciation expense over a relatively long period. Nevertheless, a noticeable increase in depreciation expense may occur immediately after completing a large capital project. The valuation analyst should be aware of the size and frequency of large projects to quantify how the projects may impact long-term depreciation expense.

3. Different depreciation methods and whether depreciation is reported on a GAAP/book value basis or an income tax basis

It is not uncommon for many businesses to have two sets of financial statements. The financial statements commonly used by valuation analysts, banks, and other interested parties are usually prepared in accordance with GAAP. In these statements, depreciation is generally calculated over the asset's expected useful life on either a straight-line or accelerated basis. With long-life assets such as building improvements, a straight line method allows for a relatively low amount of annual depreciation expense over a relatively long period of time. However, the entity may depreciate that same asset for income tax purposes under a different method that would allow for accelerated depreciation deductions. Under an accelerated method, the entity will realize higher depreciation expense in the years immediately following the purchase of the asset but lower depreciation expense in the later years of the asset's life. When analyzing the historical financial statements of an entity, the valuation analyst should recognize whether

depreciation expense is being calculated on a GAAP/book basis or on an income tax basis. Recognizing which method is being used will allow the valuation analyst to assess whether depreciation is being expensed uniformly over the asset's expected useful life. In selecting stabilized depreciation expense for use in a single-period net cash flow estimate, the valuation analyst may evaluate whether GAAP basis depreciation expense or income tax basis depreciation expense provides the best guidance for estimating long-term, stabilized depreciation expense.¹⁰

4. The effect of bonus depreciation and other depreciation adjustments

In various years, the U.S. Congress enacted temporary depreciation allowances that were designed to entice business capital spending and stimulate economic activity. Bonus depreciation was one of the changes that allowed businesses to immediately depreciate and expense 50% to 100% of qualifying property expenditures.¹¹ To some extent, bonus depreciation skewed the level of depreciation expense reported by many entities. The valuation analyst should be aware of special allowances—such as bonus depreciation—that were intended to be temporary because these allowances may affect a valuation analyst's estimate of a normalized level of depreciation expense.

5. Inclusion of amortization expense with depreciation expense

Many financial statements report depreciation expense and amortization expense on a combined basis because both are noncash expenses. For purposes of estimating a single-period net cash flow estimate, the valuation analyst may consider analyzing depreciation expense separately from amortization expense. On a GAAP basis, amortization expense primarily relates to the recovery of the cost of certain acquired intangible assets. The amortization period is related to the acquired intangible asset's useful life. In general, amortization will continue to be expensed for accounting purposes until the asset is fully amortized. As such, an entity that makes only occasional acquisitions of finite life intangible assets may have periods of relatively high amortization expense and then other periods with virtually no amortization expense. The valuation analysis may also consider whether amortization expense is expressed on a GAAP basis or an income

tax basis. While GAAP basis amortization expense may relate to a discrete number of finite life intangible assets, income tax basis amortization expense may relate to a much larger pool of acquired intangible assets that are amortized over a 15-year period.¹² Separating depreciation expense from amortization expense often provides the valuation analyst with a clearer picture of how both depreciation expense and amortization expense has varied over time. The valuation analyst can then estimate each expense separately in the net cash flow estimate.

Summary and Conclusion

Whether using a single-period capitalization method or a discounted cash flow method that incorporates a terminal period net cash flow estimate, it is inevitable that the valuation analyst will need to estimate a stabilized level of net cash flow. Two primary components of this net cash flow estimate are normalized depreciation expense and normalized capital expenditures. Given the nature of a single-period capitalization method, any discrepancy between the depreciation expense estimate and the capital expenditure estimate may have a significant impact on the value conclusion.

Various research has concluded that, for a business that is expected to grow at a constant rate, it is reasonable to expect that capital expenditures will generally exceed depreciation expense in the stabilized net cash flow estimate. This same research has suggested that the degree by which capital expenditures exceeds depreciation expense is influenced by variables such as the expected rate of growth of capital spending, the industry in which the entity operates, and the depreciable life of the assets. Likewise, it is possible to have a situation where long-term depreciation expense exceeds capital expenditures. This situation may arise in a declining business where capital spending is expected to decrease, but the entity continues to depreciate its past asset acquisitions. While this situation may occur over a discrete projection period, it should not occur in the terminal value net cash flow estimate.

As discussed in this technical paper, the valuation analyst has many factors to consider when estimating the depreciation and the capital expenditure components of a net cash flow estimate. Consideration of these factors should allow the valuation analyst to arrive at a supportable level of normalized net cash flow to use in a capitalization method.

¹⁰It should be noted that differences in how depreciation expense is calculated, whether on a GAAP basis or a tax basis, can have a significant impact on the cash flow of the company.

¹¹David S. Logan, "Tax Foundation Fiscal Fact No. 277—Three Differences between Tax and Book Accounting That Legislators Need to Know," *Tax Foundation* (July 27, 2011).

¹²See Internal Revenue Code Section 197.