

Unit Valuation Insights

CONDUCTING THE UNIT VALUATION OF TAXPAYER CORPORATION OPERATING ASSETS

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Conducting a unit valuation of an industrial and commercial property for ad valorem tax purposes involves the application of generally accepted unit valuation approaches and methods. In addition, there are a number of analytical procedures that a valuation analyst will typically perform to verify the existence of the taxpayer corporation operating assets, collect relevant data related to these operating assets, perform the valuation analysis, and reconcile the various value indications to reach a final value conclusion related to the subject taxpayer corporation unit of operating assets.

INTRODUCTION

This discussion focuses on the unit valuation of industrial and commercial properties for ad valorem tax purposes. In particular, this discussion focuses on the application of generally accepted unit valuation approaches, methods, and procedures.

The objective of this discussion is to present the issues that valuation analysts should consider in conducting the unit valuation of taxpayer corporation operating assets.

In the valuation of industrial and manufacturing properties for ad valorem tax purposes, the objective of the analysis is not to value the debt and equity securities of the subject taxpayer corporation. Rather, for ad valorem tax purposes, the objective of the analysis is to value the total operating assets of the subject taxpayer corporation business.

In most unit valuations, the value of the taxpayer corporation operating assets is indirectly estimated. That is, several of the generally accepted unit valuation methods actually estimate the value of the taxpayer corporation debt and equity securities. For these valuation methods, the unit valuation makes a fundamental assumption: the value of the taxpayer corporation debt and equity securities equals the value of the taxpayer corporation operating assets.

Practically, the unit valuation has to make this fundamental assumption. This is because the objective of the ad valorem tax valuation is to value the taxpayer corporation operating assets—and not the taxpayer corporation debt and equity (i.e., invested capital) securities.

Ad valorem tax unit valuations are not based on a historical cost financial statement basis. Rather, ad valorem tax unit valuations are prepared on a current value basis (and

not a historical cost basis). Therefore, the basic accounting identity does not always hold for ad valorem tax valuation purposes. That is, on a current value basis, taxpayer corporation total assets may equal taxpayer corporation total liabilities and owners' equity.

However, the reverse may not be true. That is, the current value of the taxpayer corporation total liabilities and owners' equity does not necessarily equal the current value of the taxpayer corporation total operating assets.

The total operating assets of an industrial or commercial taxpayer corporation business enterprise typically include:

1. financial asset accounts (e.g., cash, receivables, and inventory);
2. owned and leased real estate (e.g., land and buildings);
3. tangible personal property (e.g., machinery and equipment); and
4. intangible personal property (e.g., patents, trademarks, trade secrets, assembled workforce, and goodwill).

THE "UNIT" OF TAXPAYER CORPORATION TOTAL OPERATING ASSETS

For ad valorem tax purposes, the total operating assets of an industrial or commercial taxpayer corporation business is valued using either:

1. summation valuation methods or
2. unitary valuation methods.

If these two sets of valuation methods are applied correctly, both the summation methods and the unitary methods should theoretically achieve the same value conclusion for the subject assemblage (or “unit”) of taxpayer corporation operating assets.

Summation valuation methods are typically used in the valuation of individual real estate parcels and/or tangible personal property. Taxing authorities (and taxpayer corporation property owners) typically apply summation valuation methods to the valuation of locally assessed industrial and commercial taxpayer properties. In contrast, unit valuation methods are effectively financial or business enterprise valuation methods.

In all material respects, the analyses conducted in the unit valuation methods are business enterprise valuation analyses. Taxing authorities (and taxpayer corporation property owners) typically apply unit valuation methods to the appraisal of centrally assessed industrial and commercial taxpayer corporation properties.

For ad valorem tax purposes, the objective of a unit valuation of taxpayer corporation operating assets is fundamentally identical to the objective of a taxpayer corporation business enterprise valuation. Accordingly, the approaches, methods, and procedures generally used in both types of valuations are essentially the same.

However, the unit valuation methods focus primarily on the valuation (albeit collective or aggregate) of the taxpayer corporation business operating assets. Of course, that is fundamentally appropriate in the ad valorem tax valuation of an industrial or commercial taxpayer corporation.

THE UNIT VALUATION METHODS

Unit valuation methods were originally applied in the ad valorem tax valuation of transportation, communications, and utility companies. These categories of industries include: (1) railroads and airlines; (2) local exchange, long distance, and cellular telephone companies; (3) gas, water, wastewater, and electric utilities; and (4) oil and gas pipeline companies.

The common explanations for the historical development of the unit valuation methods in the ad valorem tax valuation of these utility-type taxpayer corporations include the following:

1. The taxpayer corporation assets are located in numerous taxing jurisdictions. The taxpayer corporation operating assets often cross numerous county or state lines.
2. The taxpayer corporation operating assets are fully integrated from a physical, functional, and economic perspective. It may not be practical for the taxing authority

to appraise any one set of assets separately from the overall taxpayer corporation operating assets.

3. The taxpayer corporation individual assets are physically, functionally, technologically, and economically part of one overall system. Most of the systematic and nonsystematic risk factors that affect the one overall system also affect the individual taxpayer corporation operating assets.
4. The value of any of the taxpayer corporation operating assets is a function of the subject assets being part of a total income-producing assemblage of assets. Therefore, the independent values of the individual taxpayer assets are not reflective of the contributory value of the subject assets to the overall unit of taxpayer corporation operating assets.
5. For some taxpayer businesses (e.g., railroads and airlines), the assets may physically move. Therefore, it may be impractical (if not impossible) for the taxing authority to value the individual taxpayer corporation operating assets based on their physical location on any one particular assessment date.

For ad valorem tax purposes, some taxing jurisdictions have expanded the category of taxpayers that are assessed using the unit valuation methods. These taxing jurisdictions include local (i.e., located within one taxing jurisdiction) but functionally integrated business operations.

Examples of such locally assessed taxpayer companies that may be subject to unit valuation methods include: (1) cable television operators; (2) mining and mineral processing operations; (3) racetracks and sporting facilities; (4) hotel and resort properties; and (5) complex, process-type manufacturing facilities.

The taxing jurisdiction explanation for using the unit valuation methods is that such taxpayer businesses involve integrated and functionally interdependent operating assets. However, most of these taxpayer businesses always operated in an unregulated, competitive economic environment.

And, these taxpayer businesses typically compete against other taxpayers that are assessed using the summation valuation methods. Therefore, these “unitary” taxpayers sometimes question the applicability of the unit valuation methods in the ad valorem tax assessment of their operating assets.

Some unit valuation methods essentially equate the value of the subject taxpayer corporation debt and equity securities (sometimes called invested capital) to the value of the subject taxpayer corporation operating assets. Therefore, the basic premise of unit valuation is that the value of total taxpayer corporation debt and equity securities equals the value of the taxpayer corporation total operating assets.

GENERALLY ACCEPTED UNIT VALUATION APPROACHES AND METHODS

The three generally accepted approaches to all tangible property valuation (including an ad valorem tax valuation using the unit valuation methods) are the cost approach, the income approach, and the sales comparison approach.

If the subject operating assets are valued using the unit valuation methods, then these three approaches provide value indications for the total unit of operating assets. The value indications of the three generally accepted valuation approaches are reconciled into a final value conclusion for the total unit of taxpayer corporation operating assets.

Cost Approach Unit Valuation Methods

The three common cost approach unit valuation methods are as follows:

1. the reproduction cost new less depreciation method
2. the replacement cost new less depreciation method
3. the original cost less depreciation method

Reproduction cost represents the total cost associated with acquiring or constructing an asset (tangible or intangible) that is the exact duplicate of the subject taxpayer corporation asset. Replacement cost represents the total cost associated with acquiring or constructing an asset with the same functionality as the subject taxpayer corporation asset.

In all of the cost approach valuation methods, the measurement of total cost should consider: (1) hard (or direct) costs, (2) soft (or indirect) costs, (3) developer's profit, and (4) entrepreneurial incentive.

All cost approach methods also consider the recognition of value decrements associated with all forms of depreciation, including (1) physical deterioration, (2) functional obsolescence (including technological obsolescence), and (3) external obsolescence.

In an ad valorem tax unit valuation, the cost approach procedures are performed in the aggregate—that is, to the total taxpayer corporation operating assets. For that reason, original cost (i.e., the taxpayer corporation gross book value of assets) is sometimes used as a substitute for replacement cost or reproduction cost in the unit valuation.

In addition, a trended original cost measurement is also sometimes used as a substitute for replacement cost or reproduction cost. In the trended original cost analysis, the subject taxpayer corporation's aggregate original asset cost by year of asset acquisition is trended to the valuation date. This trending is usually performed by the use of an appropriate property-type-specific inflation index.

In a unit valuation, both the cost estimation procedures and the depreciation estimation procedures are typically performed on an overall (or aggregate) taxpayer corporation basis, not on an asset-by-asset (or property-by-property) basis.

An important procedure in most cost approach methods is the estimation of entrepreneurial incentive and/or economic obsolescence. Entrepreneurial incentive results in an increment to the current cost estimate. Economic obsolescence results in a decrement to the current cost estimate. These two cost approach procedural components are related economic analyses.

That is, entrepreneurial incentive relates to operating cost—or lost profit—during the property replacement or reproduction period. The economic obsolescence component of external obsolescence is often related to some defined measure of income shortfall associated with the subject property.

In fact, both of these two cost measurement adjustments are sometimes measured using some form of a capitalized excess earnings/income shortfall method. When the subject industrial or commercial property is earning positive excess earnings (compared to some reasonable benchmark), the indicated excess earnings are capitalized. The result of this capitalization procedure is one way to measure entrepreneurial incentive.

When the subject industrial or commercial property is earning negative excess earnings (compared to some reasonable benchmark), the indicated income shortfall is capitalized. The result of this capitalization procedure is one way to measure economic obsolescence.

Income Approach Unit Valuation Methods

There are two principal income approach unit valuation methods:

1. the yield capitalization method
2. the direct capitalization method

For both income approach unit valuation methods, income can be measured in several different ways. For unit valuation purposes, common measures of taxpayer corporation income include: net operating income, operating cash flow, before- or after-tax net income, and before- or after-tax net cash flow. In all income approach unit valuation analyses, there should be consistency between:

1. the measurement of the taxpayer corporation income subject to analysis and
2. the selection of the taxpayer corporation discount rate and/or the capitalization rate.

In the yield capitalization method, the selected measure of income is projected for several years in a discrete projection period. The discrete projection period is often five years, but longer or shorter time periods are not uncommon. A yield capitalization rate (also called a present value discount rate) is estimated.

The yield capitalization rate is often based on the band of investment (also called a weighted average cost of capital) procedure. The yield capitalization rate is applied to the discrete income projection in order to conclude the present value of the projected income stream.

Next, in the yield capitalization method, a residual value (also called a terminal value or a reversionary value) is estimated. The residual value is the estimated value of the subject overall unit (or the taxpayer business enterprise) at the end of the discrete projection period. There are several procedures that may be used to estimate the taxpayer unit residual value. One common procedure to estimate the unit residual value is the direct capitalization method.

The taxpayer corporation income subject to direct capitalization is the “next period” income—that is, the normalized or stabilized level of income for a typical period after the end of the discrete projection period. This projected income is capitalized (as an annuity in perpetuity) by a direct capitalization rate.

The direct capitalization rate is typically calculated as the yield capitalization rate minus an expected long-term growth rate. This residual value is also brought back to a present value. This present value procedure is typically performed using the same present value discount rate as used in the discrete projection period.

The sum of (1) the present value of the projected income stream and (2) the present value of the residual value indicates the value of the subject industrial or commercial unit of total operating assets.

In the direct capitalization method, the selected measure of income is projected for a single future period—that is, for a typical “next period” after the valuation date. This projected income is normalized—or stabilized—in order to represent a typical level of income on a forward-looking basis.

The objectives of this income stabilization procedure are as follows:

1. The effects of business cyclicity are reduced.
2. The impact of an abnormal “last period” projection base are reduced.
3. The effects of nonrecurring or extraordinary income or expense items are eliminated.

The projected taxpayer corporation income is capitalized by (i.e., divided by) a direct capitalization rate. There

are several procedures that may be used for estimating the appropriate direct capitalization rate in a unit valuation. One procedure that is sometimes used by taxing authorities is to directly extract the overall capitalization rate from the marketplace, with the marketplace typically defined as either comparable or guideline publicly traded companies.

Another common procedure is to estimate an overall yield capitalization rate (based on the band of investment analysis mentioned above) and then to subtract an expected long-term growth rate. This yield capitalization rate minus long-term growth rate procedure is more conceptually rigorous than the direct extraction from comparable companies.

In addition, the yield capitalization rate minus long-term growth rate procedure is more appropriate to the valuation of taxpayer corporation operating assets.

The result of dividing the next period stabilized income estimate by the direct capitalization rate is an indication of value of the subject unit of operating assets.

Sales Comparison Approach Unit Valuation Methods

In a unit valuation for ad valorem tax purposes, some valuation analysts (and many taxing authorities) use the stock and debt method as a sales comparison approach method. In the stock and debt method, the first procedure is for the valuation analyst to identify the components of the subject taxpayer corporation debt and equity capital structure. The capital component analysis identifies all of the classes of the subject taxpayer unit outstanding long-term debt, preferred stock, and common stock.

If the subject taxpayer corporation debt instruments are publicly traded, then the market prices of these instruments may be used as a value indication. If the subject taxpayer corporation debt instruments are not publicly traded, then guideline publicly traded debt securities (i.e., debt-instruments in the same risk class as the subject taxpayer corporation) are selected to estimate market-derived interest rates.

The value of the subject taxpayer corporation debt is estimated as a function of:

1. the remaining term of the subject taxpayer corporation debt instruments, and
2. the relationship between the stated interest rates of the subject taxpayer corporation debt instruments and the market-derived interest rate.

A similar procedure applies to the subject taxpayer corporation outstanding preferred stock. The market price of the preferred stock is used as the indication of value if the

subject taxpayer preferred securities are publicly traded. If the subject taxpayer preferred stock is not publicly traded, then guideline publicly traded preferred securities (i.e., preferred stock in the same investment risk class as the subject taxpayer securities) are selected to estimate market-derived preferred stock dividend rates.

The value of the subject taxpayer corporation preferred stock is estimated as a function of:

1. the relationship between the subject taxpayer corporation preferred stock dividend rate, and
2. the market-derived preferred stock dividend rate.

In the event that the subject taxpayer corporation common stock is publicly traded, then the market price of the taxpayer stock is used as a value indication. There are various procedures for normalizing the subject taxpayer corporation common stock value.

It is a common procedure to use an average stock price over some reasonable period of time. Some valuation analysts use a 30-day average stock price. Some valuation analysts use a 90-day average stock price. And, some valuation analysts use the average of the monthly high and low stock prices for the subject stock over the last 12-month period.

All of these procedures are intended to achieve a normal taxpayer corporation common stock value—that is, a taxpayer stock price that is not influenced by short-term or aberrational deviations in market pricing.

If the subject taxpayer corporation common stock is not publicly traded, then comparable or guideline publicly traded common stocks are selected and analyzed. These comparable or guideline stocks should have investment risk and expected return characteristics that are similar to the subject taxpayer securities. From the selected sample of guideline publicly traded common stocks (adjusted to make the selected securities as comparative as possible to the subject security), market-derived valuation pricing multiples are calculated.

The reciprocal of the valuation pricing multiple (e.g., a price-to-earnings pricing multiple) is sometimes used to estimate the direct capitalization rate (e.g., an earnings-to-price rate). This direct capitalization rate is applied against the corresponding level of the subject unit income in order to conclude the taxpayer corporation common stock value.

In the stock and debt unit valuation method, the sum of the subject taxpayer corporation long-term debt, preferred stock, and common stock results in a value indication of the subject total unit of operating assets. If the subject taxpayer corporation includes businesses that are not part of the taxable unit, then the value of the common stock should be allocated between (1) the taxable unit and (2) the

taxpayer corporation's other entities (e.g., entities that are not centrally assessed).

This allocation should be based on the relative expected income return (i.e., expressed as either a rate of return or a dollar amount) and relative investment risk of (1) the subject unit of operating assets to (2) the noncentrally assessed business.

RECONCILIATION OF THE UNIT VALUATION METHOD VALUE INDICATIONS

The value indications of the applicable unit valuation methods are reconciled in order to conclude a final value estimate. This reconciliation typically involves a quantitative or qualitative weighting of the value indications from each applicable unit valuation method applied in the subject ad valorem tax valuation. Among other factors, the weighting is based on the valuation analyst's assessment of the quantity and quality of the data used in each of the applicable unit valuation methods.

THE OPERATING ASSET STRUCTURE ENCOMPASSED IN THE UNIT VALUATION

For ad valorem tax purposes, unit valuation methods are intended to value all of the taxable operating assets of the subject going-concern industrial or commercial taxpayer.

The typical operating asset categories of an industrial or commercial taxpayer corporation include the following:

1. current (financial) assets
2. tangible assets:
 - a. real estate
 - b. tangible personal property
3. intangible assets:
 - a. discrete intangible assets
 - b. intangible value in the nature of goodwill

It should be noted that not all of these categories of taxpayer corporation operating assets may be subject to ad valorem tax in any particular taxing jurisdictions. The statutory authority of some jurisdictions delineates the particular categories of taxpayer corporation operating assets that are subject to ad valorem tax. The statutory authority of some jurisdictions provides for an ad valorem tax on all categories of taxpayer corporation operating assets—except for those categories of assets that are specifically exempt from property taxation. And, the statutory authority of some jurisdictions allows for different assessment

percentages (compared to current market value) and for different tax rates for the different categories of taxpayer operating assets.

The typical industrial or commercial taxpayer corporation current assets include cash, accounts receivables, investment securities, prepaid expenses, and inventory. The typical industrial or commercial taxpayer corporation real estate includes land, site improvements, buildings, and building improvements.

The typical industrial or commercial taxpayer corporation tangible personal property includes machinery and equipment, storage and warehouse equipment, vehicles and transportation equipment, office furniture and fixtures, and computer equipment.

The typical industrial or commercial taxpayer corporation discrete intangible assets include intangible personal property—such as contracts, licenses, permits, trademarks and trade names, patents, copyrights, computer software, employee relationships, supplier relationships, and customer relationships.

Intangible value in the nature of goodwill is sometimes defined as the present value of future income not associated with any of the other taxpayer corporation tangible or intangible assets. That is, intangible value in the nature of goodwill is not associated with any of the taxpayer corporation tangible or intangible assets currently in place as of the valuation date.

Goodwill could relate to the sale of future products that have not yet been developed by the taxpayer corporation as of the valuation date. Goodwill could relate to sales to future customers that are not yet known to the taxpayer corporation as of the valuation date. And, goodwill could relate to future income generated from physical plant and facilities not yet constructed by the taxpayer on the valuation date.

Goodwill could even relate to the future income to be earned from investors' expectations of business mergers and acquisitions that are not yet consummated by the taxpayer on the valuation date. Accordingly, intangible value in the nature of goodwill indicates the value of taxpayer corporation assets (whether tangible or intangible) that are not yet in existence as of the valuation date.

The sum of all of these categories of taxpayer corporation current assets, tangible assets, and intangible assets represents the total operating asset structure encompassed in the unit valuation prepared for ad valorem tax purposes.

THE UNIT OF OPERATING ASSETS SUBJECT TO AD VALOREM TAX

The definition of the unit of operating assets subject to ad valorem tax in each jurisdiction is a matter of statutory

authority, administrative ruling, and judicial precedent. It is a question that should be asked—and answered—on a state-by-state basis.

In some states, the definition of the unit of operating assets subject to ad valorem tax is clear and unambiguous. In other states, however, the statutes, rulings, and precedent related to the definition of the taxable unit of operating assets are unclear and ambiguous.

In some jurisdictions, there is uncertainty on the parts of—and controversy between—the parties in an ad valorem tax dispute as to what exactly is included in (or excluded from) the unit of operating assets subject to ad valorem taxation. In many jurisdictions, only operating assets in place as of the valuation date are included in the bundle of assets subject to ad valorem tax. However, this distinction between assets in place and future assets has not been fully developed—either in practice, in the literature, or in judicial precedent.

This distinction relates to the fact that the operating assets included in the unit valuation include the goodwill of the subject industrial or commercial taxpayer corporation. And, the goodwill of the subject industrial or commercial taxpayer corporation includes the economic value of both the taxpayer tangible assets and intangible assets not yet in existence as of the valuation date.

Accordingly, it is important for valuation analysts, taxpayers, and taxing authorities to understand the total composition of the operating assets that are encompassed in the unit valuation analysis. Those taxpayer corporation assets that should be excluded for legal reasons from the taxable unit should be removed from the total unit value conclusion.

Nontaxable assets (or taxpayer assets exempt from ad valorem tax) are an important element in the reconciliation of:

1. the overall taxpayer corporation unit of operating assets (as estimated by the unit valuation analysis) and
2. the portion of the unit that represents taxable assets in the subject taxing jurisdiction.

PERFORMING THE UNIT VALUATION ANALYSIS

The valuation methods that may be used in the unit valuation of the subject taxpayer corporation will depend on (1) the statutorily determined standard (or definition) of value and (2) the appropriate premise of value (as determined by either the relevant statutory authority or the valuation analyst's highest and best use analysis).

As part of the ad valorem tax valuation analysis in certain taxing jurisdictions, it may be appropriate to value the taxpayer corporation unit under various alternative

standards of value and premises of value. The following discussion summarizes the application of the generally accepted unit valuation methods used in the valuation of the industrial or commercial taxpayer corporation for ad valorem tax purposes.

Several of the unit valuation cost approach methods consider the concept of replacement cost as an indicator of value. A prudent investor would pay no more for a unit of fungible operating assets than the amount for which that investor could replace the assets new, less the value of any betterments.

In the cost approach, an estimation of either replacement cost new or reproduction cost new (collectively RCN) is often made. This RCN estimate is then adjusted for all forms of observed obsolescence in order to provide a value indication of the subject taxpayer corporation operating assets.

In the sales comparison approach methods, recent sales of comparative units of operating assets are gathered. Adjustments are applied to these transactional pricing data in order to account for differences in location, time of sale, physical characteristics, and so on, between the subject taxpayer unit of operating assets and the comparative units of operating assets. The adjusted transactional data are analyzed in order for the valuation analyst to extract market-derived pricing indicators.

In the income approach unit valuation methods, the valuation analyst quantifies the present worth of the expected future economic benefit (e.g., net income or net cash flow) from the ownership of the taxpayer unit of operating assets. The net income or net cash flow is projected over an appropriate period and is then capitalized at an appropriate direct capitalization rate or discount rate.

The direct capitalization rate or discount rate should consider (1) the time value of money, (2) the effect of expected price inflation, and (3) the operational risk inherent in the ownership of the taxpayer unit of operating assets.

When properly applied and documented, these three categories of unit valuation methods provide the basis for the valuation of the industrial or commercial taxpayer corporation operating assets for ad valorem tax purposes.

COST APPROACH UNIT VALUATION METHODS

The cost approach methods measure value by (1) estimating the current cost to replace or reproduce (or, sometimes, the original cost of) the total unit of operating assets and (2) subtracting deductions for various components of depreciation.

The common cost approach valuation methods typically apply the following basic formula:

$$\begin{array}{r}
 \text{Replacement cost, Reproduction cost, or Original cost} \\
 \text{less} \\
 \text{Physical deterioration} \\
 \text{less} \\
 \text{External obsolescence} \\
 \text{less} \\
 \text{Functional obsolescence} \\
 \text{results in a} \\
 \text{Value indication}
 \end{array}$$

The replacement cost new represents the amount of money, in terms of current labor and material, needed to construct or to acquire new assets of similar utility to the subject taxpayer operating unit. Similar utility refers to similar economic satisfaction. That is, the substitute operating assets should be perceived by the taxpayer owner or operator as being equivalent to the subject unit of operating assets.

The measurement of replacement cost new is not the same as the measurement of reproduction cost new. Reproduction cost new is the cost to reproduce the subject taxpayer unit of operating assets in like kind—that is, to obtain a bundle of operating assets that is nearly an exact duplicate of the subject taxpayer corporation bundle of assets. Normally, over time, the subject operating assets will become less than the perfect replacement for themselves.

While reproduction cost new contemplates the construction of an exact replica of the subject operating assets, replacement cost new contemplates the cost to recreate the functionality or utility of the subject operating assets. Therefore, when the valuation analyst estimates the replacement cost new, the form or appearance of the replacement assets may be very different from the subject operating assets. The cost components typically included in any cost approach valuation analysis include all elements of material, labor, overhead, developer's profit, and entrepreneurial incentive.

Adjustments are made to the replacement cost/reproduction cost/original cost estimate in order to account for losses in value resulting from (1) physical deterioration, (2) functional obsolescence, and (3) external obsolescence.

Another procedure in the unit valuation cost approach process involves estimating a remaining useful life (RUL) for the subject operating assets—based on the average existing age, quality, and conditions of the subject taxpayer corporation assets. This operating asset RUL estimate may influence the allowances for each form of obsolescence.

In order to quantify the loss in value due to physical deterioration, the valuation analyst will typically segregate

the two components of this form of depreciation. The first component of physical depreciation is service life. As an operating asset is placed in service and it begins to age, its service life is impaired or reduced.

Therefore, there is a reduction in value due to the fact that the subject operating asset has a decreasing RUL throughout its service. The second component of physical depreciation is serviceability. Serviceability refers to the utility of the subject unit of operating assets.

In quantifying functional obsolescence, a portion of the subject property obsolescence (e.g., excess capital costs and/or excess capacity costs) may be eliminated by using a replacement cost new (versus reproduction cost new) measure. However, other adjustments for functional obsolescence may be necessary in the cost approach unit valuation.

External obsolescence is a loss in value due to external forces unrelated to the taxpayer unit of operating assets. The locational obsolescence component of external obsolescence is usually not a factor in a unit valuation analysis. Rather, locational obsolescence may be a material component of external obsolescence in a summation valuation analysis.

The economic obsolescence component of external obsolescence is often an important component of a unit valuation analysis. Economic obsolescence may exist any time the taxpayer corporation cannot earn a fair rate of return on the subject unit of operating assets. That is, economic obsolescence may exist any time there is an income shortfall associated with the taxpayer unit of operating assets.

It is sometimes difficult to assign an economic income stream to individual operating assets. Therefore, economic obsolescence is typically assigned in aggregate to the total unit of taxpayer corporation operating assets—and is not assigned on an individual asset-by-asset basis.

Accordingly, in a unit valuation, the quantification of economic obsolescence is typically made on a collective basis (i.e., such as is possible in the analysis of the overall taxpayer going-concern business). When economic obsolescence exists in the overall taxpayer unit, all unit operating asset components may be devalued to the level of economic support indicated by the economic obsolescence analysis.

SALES COMPARISON APPROACH UNIT VALUATION METHODS

In the sales comparison approach to unit valuation, the valuation analyst will research recent sales of similar bundles of operating assets in order to arrive at a selling price indication for the subject unit of operating assets. The basic procedures in such an analysis include: gather data, determine the unit of comparison parameters to be compared, and apply the results to the subject taxpayer

unit. Depending on the premise of value appropriate to the unit valuation, the valuation analyst may derive a sales comparison approach value indication by (1) estimating the market price to purchase the subject operating assets in the appropriate secondary market and (2) then adding sales tax, freight, installation, and utility connection costs.

While using the sales comparison approach, it is sometimes possible to arrive at a value indication based on sales of identical operating assets that have exchanged hands in the appropriate secondary marketplace. However, the specific configuration of the subject operating assets often makes it difficult for the valuation analyst to obtain data on the sale of comparable bundles of operating assets.

Therefore, in practice, the valuation analyst may have to consider the sales of similar, or guideline, bundles of operating assets in the appropriate secondary marketplace.

In addition to the configuration of the comparable or guideline bundle of operating assets, the following list presents some of the parameters that the valuation analyst may consider for purposes of assessing the comparability of the subject operating assets to the comparable sale operating assets:

- the average age of the bundle of assets
- the average condition of the bundle of assets
- any upgrades or other deviations from standard model assets
- the location of the subject sale
- the market conditions at the time of the sale
- the seller's motivation for the sale
- the quantity of operating assets sold in the unit
- the time of the sale
- the type and terms of the sale
- the sale price for the comparable bundle of assets

Each comparability parameter may be more or less important in a particular unit valuation. Depending on the standard of value and the premise of value appropriate for the ad valorem tax valuation, factors that add value in use may be identified and included in the value estimate. For many operating assets, such value-in-use factors may include: freight, installation, connections, test-batch loading and debugging, and any other indirect costs required to commission and hand over the subject bundle of operating assets to the willing buyer owner/operator.

INCOME APPROACH UNIT VALUATION METHODS

The income approach unit valuation methods provide a framework for estimating value based on the direct

capitalization or on the present value of future “economic income” to be derived from the use, forbearance, license, or rental of the subject taxpayer corporation operating assets.

In the income approach unit valuation methods, economic income can be alternatively measured as:

1. gross or net rental income,
2. gross or net license income, or
3. gross or net operating cash flow.

In the income approach unit valuation methods, the estimate of the average RUL of the subject taxpayer assets is a common procedure. Typically, the economic income projection should not extend beyond the expected average RUL of the subject operating assets.

The service life of taxpayer operating assets is typically measured as the period of time extending from the date of the installation of the subject property to the retirement from service of the subject property. Many factors affect the useful life of industrial and commercial operating assets. Some of these factors (and the type of RUL measurement that these factors affect) include the following:

1. usage (physical)
2. age when acquired (physical)
3. maintenance and downtime (physical)
4. technological improvements (functional)
5. progress in the subject taxpayer industry state of the art (economic)
6. changes in the taxpayer industry competitive economics (economic)
7. regulatory and other legal changes in the taxpayer industry (economic)
8. other factors

In its simplest form, the income approach is the present worth of the future economic benefit expected from the ownership of the subject unit of operating assets. The different income approach unit valuation methods include (1) methods that rely on direct capitalization and (2) methods that rely on yield capitalization.

In the direct capitalization methods, a normalized measure of economic income is (1) estimated for one typical period (future to the valuation date) and (2) then divided by an appropriate rate of return on that investment. The direct capitalization methods lend themselves to the analysis of operating assets that will generate economic income for an infinite (or, at least, a very long) period of time.

In the yield capitalization methods, first the appropriate measure of economic income is projected for a discrete

time period. Second, the economic income projection is converted to a present value by the use of a present value discount factor—that is, the required rate of return over the expected term of the economic income projection. The yield capitalization methods more readily apply to the valuation of limited life operating assets.

One procedure in the typical yield capitalization method is the estimation of the average RUL of the subject operating assets. Typically, the average RUL is the shortest of the average physical, functional, technological, or economic life for the subject taxpayer corporation operating assets. In other words, the economic income stream would be projected over the shortest of the average RUL of the subject operating assets.

Another procedure in the typical yield capitalization method is the analysis of the amount of economic income expected by the industrial or commercial taxpayer unit owner. This procedure analyzes the amount of economic income related to the ownership of the subject operating assets only.

The amount of economic income expected by the industrial or commercial taxpayer may be measured as the rental income that could be earned from the rental of the subject operating assets in an arm’s-length rental/lease transaction. For leased operating assets, the expected rental income is directly influenced by the amount of rent that the operator of the operating assets (i.e., the lessee) actually pays to the owner of the operating assets (i.e., the lessor).

If the subject operating assets are owner-operated, then the economic income analysis is slightly more complicated. In this case, the valuation analyst would estimate the amount of market-derived rental income that the property owner (i.e., the lessor) would receive from the property user (i.e., the lessee) if the operating assets were to be the subject of an arm’s-length rental/lease transaction.

The economic income analysis includes a search of the marketplace for rental income data with regard to comparative leased operating assets. Of course, the selected comparative rental property may not be identical to the subject taxpayer corporation property. The comparative rental property may be larger/smaller, newer/older, used in a different industry, located in a different geographic area, and so forth.

In order to estimate the prospective economic income associated with owner-operated operating assets, the expected income of the subject unit of operating assets is analyzed. The prospective income and expense of the subject operating assets are estimated.

Another procedure in the typical yield capitalization method is to estimate an appropriate present-value discount rate. That discount rate should provide a fair, risk-adjusted return on the subject operating assets over the average RUL of the taxpayer corporation assets.

The yield capitalization rate may be estimated by adjusting the direct capitalization rate, as follows:

$$\text{Yield capitalization rate} = \text{Direct capitalization rate} + \text{Expected long-term growth rate}$$

VALUATION ANALYST PROCEDURES IN A TYPICAL UNIT VALUATION

Within each unit valuation approach and method, there are individual procedures that the valuation analyst will typically perform. Some of these common unit valuation procedures are summarized below.

The first category of analytical procedures is common to most operating asset unit valuation methods. Some of the analytical procedures in the second category are common to all unit valuation methods. Some of the analytical procedures in the second category are only appropriate to certain unit valuation methods. And, all of the analytical procedures in the third category are only appropriate to the indicated unit valuation methods.

CATEGORY 1: OPERATING ASSET INVENTORY AND INSPECTION PROCEDURES

The first category of analytical procedures in the unit valuation of industrial or commercial operating assets typically includes:

1. obtaining the taxpayer corporation owner/operator listing of the subject operating assets,
2. confirming the existence of the subject operating assets within the physical confines of the subject taxpayer corporation unit,
3. considering the accuracy of the continuing property record data related to the overall unit of operating assets, and
4. considering the overall condition of the average property within each operating asset category.

Procedure 1—Obtain a Taxpayer Corporation Property Accounting Asset Listing

The valuation analyst will start with the industrial or commercial property owner's detailed property accounting asset listing. This property accounting listing should include the entire subject taxpayer corporation operating assets. The valuation analyst will obtain the taxpayer corporation's detailed asset listing that is prepared "as of" a date as close as possible to the statutory valuation date.

Procedure 2—Confirm the Existence of the Taxpayer Corporation Operating Assets

The valuation analyst may perform some tests of inclusion and exclusion with regard to the taxpayer corporation's detailed property listing. Tests of inclusion involve confirming that operating assets physically in place are, in fact, included on taxpayer property listing. Tests of exclusion involve confirming that operating assets on the taxpayer property list are, in fact, physically in place.

Procedure 3—Consider the Accuracy of the Continuing Property Record Data Related to the Overall Unit of Operating Assets

The data on the taxpayer continuing property record listing may be verified through discussions with taxpayer corporation operations, maintenance, engineering, or plant accounting representatives. The valuation analyst may request assurances or representations from the taxpayer corporation operations or accounting management with regard to the types of continuing property records data.

Procedure 4—Consider the Overall Condition of the Average Property Within Each Operating Asset Category

Consider the condition, maintenance, and operating environment of the unit of operating assets through discussions with taxpayer corporation operations, maintenance, engineering, or accounting representatives. In such discussions with taxpayer corporation management, the valuation analyst may consider the subject property condition factors on either (1) an aggregate unit basis or (2) an asset category by category basis.

CATEGORY 2: OPERATING ASSET DATA COLLECTION AND ANALYSIS PROCEDURES

The industrial or commercial taxpayer corporation's continuing property record listing will contain certain such information as the original cost of the assets within the unit, the date each operating asset was placed into service, and the accumulated financial accounting depreciation related to each asset in the unit. The first two procedures in this category are common to most unit valuation methods.

Procedure 1—Discuss the Type of Data Included in the Continuing Property Record Listing with the Taxpayer Corporation Management

The valuation analyst should discuss with the taxpayer corporation operations or accounting management the accuracy of the continuing property records data.

Procedure 2—Discuss the Type of Historical Cost Information that Is Captured in the Continuing Property Record with the Taxpayer Corporation Management

The valuation analyst may discuss with the taxpayer corporation operating, purchasing, maintenance, or accounting management the type of operating asset cost data that are included in the taxpayer's continuing property record cost components.

Procedure 3—Collect the Data Necessary to Perform the Selected Unit Valuation Method Analyses

The valuation analyst may consider these remaining data collection procedures with respect to each selected unit valuation method.

Data Related to the Cost Approach, Replacement Cost New Less Depreciation Method

For each category of operating assets in the taxpayer corporation continuing property record listing, the valuation analyst may research the appropriate price, production, and cost indexes. Common sources of such indexes include, for example, the *Statistical Abstract of the United States* and the *Marshall & Swift Valuation Guide*.

An index—for price, cost, materials, wages, production, and so on—is simply a calculation for reporting the relative changes in the price or cost of specific assets or groups of assets over a period of time.

Data Related to the Sales Comparison Approach, Direct Sales Comparison Method

For the overall bundle of operating assets in the industrial or commercial taxpayer corporation unit, the valuation analyst may research transaction pricing data with regard to actual sales of comparable units of seasoned operating assets.

Data Related to the Income Approach, Yield Capitalization Method

For the overall unit of operating assets of the subject industrial or commercial taxpayer corporation, the valuation analyst may research transactional data with regard to the actual rental or lease of comparable operating assets. If sufficient comparable unit rental transaction data are not available, then the valuation analyst may reconsider the application of the income approach/yield capitalization method in the subject unit valuation.

Procedure 4—Analyze the Data Necessary to Perform Each Selected Unit Valuation Method

The valuation analyst should consider the following cost approach unit valuation analyses.

Analysis Related to the Cost Approach, Replacement Cost New Less Depreciation Method

Using a cost, price, or production index for the subject taxpayer industry, the valuation analyst may use cost “inflation” trending factors for each vintage group within the subject unit of operating assets. The cost new for each operating asset vintage group may be estimated by multiplying (1) the historical cost of the taxpayer corporation operating assets within the vintage group by (2) the appropriate age-dependent cost trending factor.

Analysis Related to the Sales Comparison Approach, Direct Sales Comparison Method

The valuation analyst may consider adjustments to the transactional sale price for any changes from the specifications and information regarding the subject operating assets. The valuation analyst may study the selected sales of comparable units of operating assets in order to adjust each comparable sale transaction price for the differences between (1) the subject taxpayer unit and (2) the comparable sale unit.

Analysis Related to the Income Approach, Yield Capitalization Method

The valuation analyst may estimate the market-derived normalized—or stabilized—annual rental income related to the subject taxpayer unit of operating assets. The valuation analyst may also estimate the maintenance, marketing, and other administrative expenses related to the subject taxpayer unit of operating assets.

If such rental income and operating expense data are available, the valuation analyst will then project the subject unit net operating income. This net operating income projection will relate to the actual or hypothetical rental of the subject taxpayer unit of operating assets. Next, the valuation analyst will project the average RUL of the subject taxpayer operating assets.

Finally, the valuation analyst will develop present value discount factors from the present value discount rate appropriate to the net operating income projection. The present value discount rate should be based on the valuation analyst's consideration of the asset-specific risk factors associated with the subject taxpayer corporation unit of operating assets.

CATEGORY 3: UNIT VALUATION SYNTHESIS AND CONCLUSION PROCEDURES

The valuation analyst may develop a value indication from each applicable unit valuation approach and method. The valuation analyst may then reconcile the various valuation indications and synthesize a final value conclusion related to the subject taxpayer unit of operating assets.

Value Indication for the Cost Approach, Reproduction Cost New Less Depreciation Method

A value indication for the subject taxpayer operating assets may be developed based on the following reproduction cost new less depreciation method procedures:

Historical cost
times
Trend factor
equals
Reproduction cost new
less
Physical depreciation
equals
Reproduction cost new less depreciation
less
Functional obsolescence
less
External obsolescence
equals
Indication for subject unit

Value Indication for the Income Approach, Yield Capitalization Method

A value indication of the subject taxpayer operating assets may be developed based on the following yield capitalization method procedures:

Normalized economic income
times
Corresponding present value discount factor
equals
Discounted economic income

Sum of discounted economic income
over
Average remaining useful life of subject assets
equals
Value indication for subject unit

UNIT OF OPERATING ASSETS VALUATION SYNTHESIS AND CONCLUSION

If more than one unit valuation approach is applicable to the subject ad valorem tax valuation, then the valuation analyst should give appropriate weight to the various value indications in order to arrive at a final unit value conclusion.

This appropriate weight assigned to each value indication should be based on:

1. the quantity and quality of data analyzed in each applicable valuation method,
2. the valuation analyst's confidence in the developed variables and projections, and
3. the valuation analyst's personal experience with the subject taxpayer industry.

The valuation analyst typically assigns appropriate weights to the various value indications in order to arrive at a final value estimate. This final value estimate is then rounded (up or down) in order to conclude the value of the subject taxpayer corporation unit of operating assets.

SUMMARY AND CONCLUSION

This article summarized several issues and the application of the generally accepted approaches, methods, and procedures to the typical unit valuation of an industrial or commercial taxpayer operating asset. Within each unit valuation approach, several unit valuation methods were discussed. And, within each unit valuation method, the application of individual unit valuation procedures was described.

This is the typical process that valuation analysts may perform in the unit valuation of industrial or commercial taxpayer operating assets. After all of the unit valuation approaches and methods are performed, the valuation analyst reconciles the various value indications into a final unit value conclusion.

This final value conclusion is a function of the quantity and quality of available data, the experience and judgment of the valuation analyst, the purpose and objective of the ad valorem tax valuation, the appropriate standard (or definition) of value, and the appropriate premise of value (indicating the highest and best use of the subject taxpayer unit of operating assets).

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