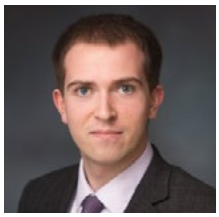
WHAT TAX LAWYERS NEED TO KNOW ABOUT THE MEASUREMENT OF FUNCTIONAL AND ECONOMIC OBSOLESCENCE IN THE INDUSTRIAL OR COMMERCIAL PROPERTY VALUATION (PART 2)



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Industrial and commercial property cost approach value indication

By this point in the cost approach valuation analysis, the analyst should have performed each of the following procedures:

- Concluded that the application of the cost approach is appropriate for the property;
- Confirmed that adequate current cost information is available to perform a cost measurement (e.g., replacement cost new or reproduction cost new) analysis;
- Selected the appropriate current cost measure for the property;
- Included all appropriate cost components in the current cost measurement;
- Identified and quantified any necessary allowance for physical deterioration;
- Identified and quantified any necessary allowance for functional obsolescence; and
- Identified and quantified any necessary allowance for economic obsolescence.

The only remaining procedure is to subtract all of the depreciation and obsolescence allowances from the cost metric in order to indicate the property value based on the cost approach. Ideally, the analyst will also have developed income approach and sales comparison approach value indications. In that case, the final value conclusion for the property can be based on a synthesis and reconciliation of all of the property valuation approaches.

Illustrative example of an intangible personal property cost approach valuation

As an example, let's consider the application of the cost approach to value the intangible personal property of an industrial taxpayer. The industrial taxpayer is the Client Railway Company ("Client"), a class I railroad. Let's assume that the taxpayer's property is assessed based on the unit principle of valuation in this particular taxing jurisdiction. Let's also assume that intangible personal property is exempt from property taxation in that taxing jurisdiction. Let's further assume that the statutory definition of value for state and local tax (SALT) purposes in this taxing jurisdiction is fair market value.

Let's assume that tax counsel asks the analyst to value certain intangible personal property that is exempt from property taxation. The valuation date is January 1, 2021. Tax counsel requests the valuation of the Client's internally developed software in order to extract that intangible personal property value from the Client's total unit value for SALT purposes.

Let's assume that Client owns and operates 10,000 software applications. These applications control all of the operations of the railroad. The analyst is retained to estimate the fair market value of the Client's internally developed software. The analyst decides to apply the cost approach and the replacement cost new less depreciation (RCNLD) method to estimate the fair market value of this intangible personal property.

The analyst begins the RCNLD analysis by estimating the replacement cost new (RCN) for the Client's internally developed software. The total RCN measurement will indicate the cost for Client to replace all 10,000 software applications with new applications of comparable functionality and utility. The cost metric (however measured) will typically include four cost components: (i) direct costs; (ii) indirect costs; (iii) developer's profit; and (iv) entrepreneurial incentive.

The direct cost component of the RCN can be estimated based on the total amount of compensation paid to Client's software engineers who would replace the subject software.

The RCN would consider all of the other expenses that Client would incur related to these software engineers. Those costs are typically considered to be indirect costs. Those indirect costs can include the following employer-paid expenses: (i) payroll taxes; (ii) employee benefits; (iii) continuing professional education; and (iv) other company-related perquisites.

The total of the direct and indirect costs that Client pays for an employee is often referred to as the full absorption cost. This full absorption cost typically includes the following: (i) the compensation paid by the employer to the employee; and (ii) the expenses paid by the employer to others so that the employee can perform his or her job.

The direct costs and indirect costs that the employer would incur to replace the existing software with new software can include the following: (i) expenses related to the use of any third-party contractors that would be used to replace the software; (ii) training, supplies, and travel expenses of internal software engineers; and (iii) facilities and other overhead expenses related to the development of Client's replacement software.

In addition to the direct cost and indirect cost components related to replacing the internally developed software, there are two other cost components to be considered in the RCN analysis: (i) developer's profit; and (ii) entrepreneurial incentive.

The analyst should consider developer's profit in the RCN analysis. In this example, the developer's profit can be measured as the profit margin that an independent software development company would earn if Client retained such a company to replace the software.

Such an independent software development company would incur out-of-pocket (i.e., direct and indirect) costs to develop the replacement software. Of course, that development company would expect the willing buyer of the software to reimburse it for such out-of-pocket costs. In addition, the software development company would also expect to earn a profit margin on top of its direct and indirect

cost investment. Otherwise, the software company would never accept the assignment to replace the Client's software.

The analyst should also consider entrepreneurial incentive in the RCN analysis. This cost component would be required to motivate Client to develop the intangible property—instead of pursuing some other investment opportunity.

There are alternative analysis procedures for measuring entrepreneurial incentive. One procedure is for the analyst to estimate the opportunity cost that the taxpayer would experience during the intangible property replacement period. This opportunity cost relates to the profits that would be lost by the taxpayer because it would not operate the to-be-developed software. When applying this procedure, the analyst should be careful to appropriately allocate the lost profits opportunity cost to all of the Client's intangible property.

Another entrepreneurial profit measurement procedure is to calculate a fair rate of return on the subtotal of the intangible property cost components (i.e., direct costs, indirect costs, and developer's profit). The principle of this entrepreneurial profit measurement procedure is that Client would not develop the replacement intangible property if it did not expect to earn a fair rate of return on its development investment—during the development period.

After summing up the direct costs, indirect costs, developer's profit, and entrepreneurial incentive cost components, the analyst next estimates the amount of depreciation (including obsolescence) related to the software. In other words, as in any cost approach analysis, the analyst has to consider if there is any deterioration or obsolescence related to this intangible property.

In this illustrative example, intangible personal property is not subject to property taxation in the taxing jurisdiction, and Client is subject to the unit principle of property valuation in this taxing jurisdiction. Therefore, tax counsel has to identify and value any intangible personal property included in the taxpayer's total unit value.

Related to the application of the cost approach and the RCNLD method, the analyst might request a fair amount of taxpayer-specific data related to the software. These data can include the estimated period of time until the actual software will be retired (i.e., replaced) and any indications of the software's inability to perform the functions for which it was designed. These two RCN adjustments relate to the software's age (and its expected retirement date) and the software's inability to perform the function for which it was intended (i.e., the software's inutility). These two RCN adjustments are considered in the analyst's measurement of depreciation and obsolescence. These depreciation and obsolescence adjustments are appropriate because a willing buyer would not pay the willing seller (i.e., the taxpayer) for the RCN of software that is nearing the end of its useful economic life (UEL) and is expected to be replaced soon or software that can no longer perform the function for which it was developed.

In this illustrative example, the RCNLD indicates the price that a hypothetical willing buyer would pay to a hypothetical willing seller for Client's software. That price estimate is based on the current cost to replace the functional utility of the Client's software. That current cost is adjusted for physical deterioration (if any) and for functional obsolescence. In addition, the analyst still has to consider economic obsolescence (before reaching a final value estimate).

To illustrate the functional obsolescence measurement, let's assume that Client operates a particular software application that was written in COBOL (a third-generation programming language). All of its other customer records software and administrative systems software are written in JAVA or C++ (or other fourth– and fifth-generation programming languages).

Client's management plans to replace the software application (let's say it's the billing and receivables application) with a new customized software application. However, the Client's information technology department does not have the resources to complete that new software development project for the next five years. In the meantime, Client has

to employ a COBOL programmer solely to maintain the billing and receivables application that is written in an obsolete programming language. When a new billing and receivables application is installed, this COBOL programmer position will be eliminated. The full absorption cost of the COBOL programmer is $100,000 per year.

Let's assume that the analyst estimated the RCN for the billing and receivables application to be $1.2 million. Let's also assume that the analyst has concluded that there is no physical deterioration associated with the billing and receivables software. Let's assume as well that there is no other functional obsolescence related to the current billing and receivables software.

By capitalizing the excess operating costs associated with the identified functional obsolescence, the analyst estimated the RCNLD of the actual (COBOL language) billing and receivables application as summarized in Exhibit 1.

EXHIBIT 1

Client Railway Company billing and receivables software

Cost approach valuation: replacement cost new less depreciation method (preliminary analysis as of January 1, 2021)

1. Cost approach component (software application replacement cost new—$1,200,000)
2. Less: functional obsolescence (annual excess operating cost $100,000 × present value of annuity factor of 2.99) = capitalized excess operating costs—$299,000
3. Equals: preliminary replacement cost new less depreciation—$901,000
4. Preliminary value of subject (COBOL) software application (rounded; before analysis of economic obsolescence, if any)—$900,000

The 2.99 times present value of an annuity factor in the example is based on a five-year estimated UEL for the billing and receivables software and an assumed 20 percent (pretax) present value discount rate. In theory, if consistent valuation variables are used, the analyst should conclude the same value for the software regardless of which functional obsolescence measurement method is used. That is, the software RCNLD should be approximately the same whether the analyst considers excess capital costs to measure functional obsolescence or excess operating costs to measure functional obsolescence.

In the above example, the preliminary value conclusion is presented before the analyst's consideration of economic obsolescence. However, the analysis of economic obsolescence is an integral procedure in every cost approach valuation analysis. The application of the cost approach to property valuation is not complete until the analyst considers the existence (if any) of external (typically economic) obsolescence.

Let's continue with the Client intangible personal property example. Let's assume that the analyst estimated the RCN less physical depreciation and functional obsolescence indication for the billing and receivables software. In order to conclude the final value for the intangible property, the analyst has to consider economic obsolescence.

Since Client is assessed based on the unit principle of property valuation, the analyst decided to measure economic obsolescence based on financial and operational data for the Client's total unit. So let's assume that the analyst accumulated comparative financial and operational data regarding the Client's total unit as of December 31, 2020. After considering these comparative data, the analyst decided to apply the capitalization of income loss method (CILM) to measure any economic obsolescence affecting the Client's intangible personal property value.

Exhibit 2 summarizes the illustrative economic obsolescence measurement based on CILM comparison of Client's financial and operational data.

EXHIBIT 2

Client Railway Company billing and receivables software

Cost approach valuation: economic obsolescence analysis

Illustrative capitalization of income loss method comparison (as of January 1, 2021)

1. Item: Intangible property financial or operational performance metric actual LTM ended 12/31/20 (benchmark measure)
2. Income loss to capitalize: Actual LTM compared to benchmark percent loss (benchmark comparison reference source)
3. Average salary per software development engineer: $125,000, $100,000, $25,000 (25 percent of 2020 Class I railroad industry average)
4. Number of software applications managed per development engineer: 100, 125, 25 (20 percentof 2020 Class I railroad industry average)
5. Client's return on total gross assets—based on financial accounting data: 5.5 percent, 7.0 percent, 1.5 percent (21 percent Client actual average (2014–2020))
6. Client's return on tangible net assets—based on financial accounting data: 6.0 percent, 7.8 percent, 1.8 percent (23 percent Client actual average (2014–2020))
7. Client's operating profit margin—based on financial accounting data: 10.0 percent, 12.0 percent, 2.0 percent (17 percent Client actual average (2014–2020)
8. Client's return on replacement cost new investment in tangible assets: 5.0 percent, 6.0 percent, 1.0 percent, (17 percent Client Annual Property Appraisals (2014–2020))
9. Economic obsolescence percentage indication (rounded): 20 percent

Based on the comparative financial and operational data, the analyst concluded that Client's total unit is experiencing economic obsolescence of about 20 percent. The analyst's measurement of economic obsolescence for the software as of January 1, 2021, is calculated as: (i) the RCNLD indication (before economic obsolescence) for the software; multiplied by (ii) the 20 percent selected economic obsolescence percentage; equals (iii) the economic obsolescence allowance indication for the software.

Exhibit 3 summarizes the final cost approach RCNLD analysis related to the illustrative billing and receivables software. Based on this cost approach valuation analysis, the analyst concluded that the fair market value of this Client's software intangible personal property, as of January 1, 2021, is $720.000.

EXHIBIT 3

Client Railway Company billing and receivables software

Cost approach replacement cost new less depreciation method

Fair market value as of January 1, 2021

Cost approach component: $ (Exhibit 1)

Replacement cost new: $1,200,000 (Exhibit 1)

Less: physical depreciation: (discussed in text)

Less: functional obsolescence: $299,000 (Exhibit 1)

Subtotal: ($901,000)

Less: economic obsolescence at 20 percent: 180,000 (Exhibit 2)

Equals: fair market value of billing and receivables software: ($721,000)

Fair market value of billing and receivables software (rounded) ($720,000)

TAX COUNSEL CAVEATS FOR THE IDENTIFICATION AND MEASUREMENT OF OBSOLESCENCE

Do not rely on a residual method

An inexperienced analyst might believe that it is appropriate to measure economic obsolescence by reference to the property's income approach value

indication. In other words, an inexperienced analyst might measure economic obsolescence by applying a residual procedure—that is, by measuring the difference between the income approach value indication and the cost approach value indication. This residual procedure for economic obsolescence measurement is often referred to as the income shortfall method.

The inexperienced analyst might not understand why this residual calculation—or the income shortfall method—is inappropriate and fundamentally flawed.

As an example, let's consider the valuation of a unit of special-purpose property. Let's assume the inexperienced analyst applies a cost approach RCNLD method analysis. Then, the inexperienced analyst applies an income approach discounted cash flow (DCF) method analysis to estimate the total unit value of the special-purpose property.

From this income approach unit value conclusion, in order to conclude the value of the property, the inexperienced analyst subtracts the value of working capital and exempt intangible property. If the value of the property concluded by the DCF method is lower than the value of the property concluded by the RCNLD method, the inexperienced analyst concludes that there is economic obsolescence. The inexperienced analyst concludes that the amount of economic obsolescence is equal to the difference between the property value indications provided by the two property valuation methods (i.e., the DCF method and the RCNLD method).

The explanation that the inexperienced analyst might provide for such an economic obsolescence measurement procedure is that a willing buyer would not buy the property for the value indicated by the RCNLD method unless the property generated sufficient income to provide a fair rate of return on the investment (i.e., RCNLD) in the property.

At the same time, when the value indicated by applying the DCF method is higher than the value indicated by applying the RCNLD method, the inexperienced analyst will accept the RCNLD value indication for the industrial property. In that case, the inexperienced analyst concludes that there is no economic obsolescence.

The following discussion summarizes some of the reasons why it is inappropriate to use an income approach value indication as a benchmark by which to measure the economic obsolescence component in a cost approach valuation of the property.

Using this residual procedure or income shortfall method, the cost approach loses its analytical independence from the income approach. In an industrial or commercial property valuation, all generally accepted property valuation approaches might consider the same set of market-derived or property-specific data. However, each property valuation approach should be analytically independent of each other approach.

If the cost approach value indication is adjusted to equal the income approach value indication, why should the analyst even apply the time and effort to perform the cost approach analysis? Why doesn't the analyst just consider the income approach value indication twice in the property value reconciliation procedure? When there is any evidence of economic obsolescence related to the property, why bother to apply the cost approach at all?

If the cost approach value indication is adjusted to equal the income approach value indication, why not also adjust the sales comparison approach value indication to equal the income approach value indication? When the unadjusted sales comparison approach value indication is greater than the income approach value indication, why doesn't the analyst just adjust that sales comparison approach value indication to equal the income approach value indication? In that case, the analyst can simply consider the income approach value indication three times in the property value reconciliation procedure.

If the cost approach value indication is adjusted to equal the income approach value indication, then none of the following cost approach components will actually affect the property value: (i) property original cost; (ii) property age; (iii) property

condition, property location; (iv) property replacement cost new; (v) property reproduction cost new; (vi) property operating efficiency; (vii) property maintenance history; (viii) property type; (ix) property description (or even property existence).

Applying the income shortfall method, an old property might have the same value as a new property. That value will be determined by the conclusion of the income approach. Applying the income shortfall method, a well-maintained property might have the same value as a poorly maintained property. That value will be determined by the conclusion of the income approach.

Applying this income shortfall method of economic obsolescence measurement, the property's RCN is irrelevant to the cost approach value indication. This is because the amount of economic obsolescence automatically adjusts the cost approach value indication to equal the income approach value indication.

This income shortfall method is counterintuitive to the fundamental economic principle (e.g., the principle of substitution) of the cost approach. That is because, by applying this income shortfall method to measure economic obsolescence, the property's cost metric becomes irrelevant in the cost approach property valuation.

Apply the unit-level economic obsolescence percentage to the property

For property tax purposes, some clients' industrial or commercial properties are valued based on the unit principle of property valuation rather than based on the summation principle of property valuation. That is, the property is valued as a single "total unit" for property tax purposes. Examples of types of clients that are often assessed based on the unit valuation principle include railroads, airlines, other transportation companies, pipelines, television providers, electric generation and distribution companies, and other utility-type companies—such as local gas transmission companies, water companies, and wastewater companies.

In a unit principle valuation, the economic obsolescence measurement is typically performed on a total unit (or aggregate) basis, and not on a summation (or property-by-property) basis. For this reason, when estimating the value of property in the context of the total unit, the total unit-level economic obsolescence percentage is typically applied to estimate the property value.

For example, in our illustrative example of Client Railway Company, the economic obsolescence estimate of 20 percent would be applicable to all of Client's property—including the software intangible personal property.

TAX COUNSEL RESPONSES TO TAXING AUTHORITY OBJECTIONS REGARDING OBSOLESCENCE MEASUREMENTS

The CILM is not the income shortfall method

One generally accepted method for measuring economic obsolescence is the CILM. Inexperienced analysts sometimes confuse the CILM with the income shortfall method. As discussed previously, the income shortfall method is not a generally accepted method for measuring economic obsolescence.

The CILM "is applied in two steps. First, the market is analyzed to quantify the income loss. Next, the income loss is capitalized to obtain the value loss affecting the property as a whole."[1]

To apply this economic obsolescence measurement method in a unit principle valuation, the analyst can compare the property's profitability from operations during a recent period to a benchmark measure of profitability from operations. That benchmark measure of profitability from operations might be:

- The level of profitability/return on investment earned by the property when there was no identified economic obsolescence;
- The level of profitability/return on investment earned by guideline companies or another industry benchmark measure; or

- The level of profitability/return on investment based on the client's financial projections. The analyst might also consider alternate measures of profitability/return on investment.

In a unit principle valuation, an analyst typically measures economic obsolescence for the total unit of operating property. Then the analyst applies the concluded economic obsolescence (typically on a percentage basis) to all of the client's property valued by the cost approach. Measuring economic obsolescence total unit level (rather than at the individual property level within the total unit) is a generally accepted unit principle valuation procedure.

According to the textbook Valuing Machinery and Equipment, "economic obsolescence is usually a function of outside influences that affect an entire business (i.e., all tangible and intangible assets) rather than individual assets or isolated groups of assets, it is sometimes measured using the income approach or by using the income approach to help identify the existence of economic influences on value."[2]

One procedure that analysts often perform in the application of the CILM is to compare the property's actual rate of return measure (e.g., the actual return on investment earned on the property) with a required rate of return measure (e.g., the client's weighted average cost of capital, or WACC). The analyst might calculate the difference between the property's actual rate of return on investment and the property's required rate of return as a measure of the property's income loss. This income loss can then be converted into an economic obsolescence measurement percentage for the property.

Returning to our Client Railway Company illustrative example, the analyst could apply this procedure of comparing the actual return on investment to the required return on investment in order to measure the Client's economic obsolescence. For example, the analyst could compare the Client's actual net operating income (NOI) return on the Client's total unit to the Client's yield capitalization rate (or WACC). In calculating the actual return on investment, the analyst could rely on the average NOI over a multi-year period or on the latest 12 months of NOI. NOI is typically calculated as an after-tax income measure. Therefore, the taxpayer after-tax NOI return on investment is typically compared to the taxpayer's after-tax WACC (as a measure of the required rate of return on investment).

The analyst might estimate the property's NOI rate of return on investment based on various investment measures. Then, the analyst might apply the same yield capitalization rate—or WACC—as the required rate of return on investment. That yield capitalization represents the required rate of return for all of the property included in the total unit.

If the property's actual return on investment (however measured) indicates a lower rate of return than the property's yield capitalization rate (or WACC), that comparison would indicate that economic obsolescence exists in the taxpayer's property.

For example, if the Client's actual rate of return on investment is 6.0 percent and the Client's yield capitalization rate (the required rate of return on investment) is 9.0 percent that comparison would indicate economic obsolescence of 33 percent (i.e. (9.0 percent – 6.0 percent) ÷ 9.0 percent) based on this application of the CILM.

Obsolescence measurements typically consider some type of client income data

Some inexperienced analysts suggest that many of the generally accepted economic obsolescence measurement methods (such as the CILM) are inappropriate to apply in the cost approach. That is because these measurement methods rely on the client's income data. That same client income data can also be a component in either (or both) the income approach and/or the sales comparison approach. For example, the CILM might include consideration of the client's WACC to measure economic obsolescence. However, this inexperienced analyst's concern is misguided.

In the case of valuing industrial or commercial property, an analyst might apply a cost approach valuation method such as the RCNLD method. In the application of the RCNLD method, the analyst might

compare the property's actual rate of return on investment to the property's required rate of return on investment (often measured as the client's WACC). This comparison is often considered in the application of the CILM to measure the property's economic obsolescence (if any). The client's WACC is a valuation variable that can be considered in the application of the income approach. Nevertheless, the cost approach RCNLD method value indication is independent of the income approach value indication.

All property valuation approaches (and all property valuation methods) can rely on the same or similar underlying data, such as the property's financial and operational data. The reliance on the same or similar underlying data does not preclude an analyst from applying multiple valuation approaches and multiple valuation methods to value the property.

However, each property value indication should be derived from a complete and independent valuation analysis of the client's property. Each property valuation method—and each property value indication—should be able to stand alone. As a fundamental property appraisal principle, no value indication should depend on another value indication.

CONCLUSION

The identification and measurement of obsolescence is a fundamental issue in the cost approach valuation of industrial or commercial property for ad valorem property tax appeal, compliance, or litigation purposes. The various forms of obsolescence (including functional obsolescence and external obsolescence) should be considered in the cost approach valuation of the client's property. This consideration is particularly relevant in cost approach valuations of special-purpose property. This consideration of obsolescence in the application of the cost approach is generally relevant to both unit principle valuations and summation principle valuations.

Tax counsel should ensure that both the taxpayer property owner and the analyst consider the measurement of obsolescence in the cost approach valuation of industrial and commercial property for tax planning, compliance, and appeal purposes. Tax counsel should ensure that the tax assessment authority considers obsolescence in the assessments of the client's industrial and commercial property. In particular, the assessment authority should consider the effect of current market conditions (and, thus, the effect of economic obsolescence) in the cost approach valuation of the client's property.

- First, this article summarized what tax counsel needs to know about the various forms of obsolescence typically considered in the cost approach valuation of industrial and commercial property for SALT purposes.
- Second, this article presented what tax counsel needs to know about the practical procedures that either the client property owner or the taxing authority can apply to recognize the existence of property obsolescence and measure the amount of property obsolescence.
- Third, this article considered various tax counsel caveats with regard to the measurement of obsolescence in the cost approach valuation of the client's property.
- Fourth, this article suggested tax counsel responses to taxing authority objections with regard to the measurement of any obsolescence related to the client's property.

Notes

1 The Appraisal of Real Estate, (The Appraisal Institute, 15th ed. 2020), at 595.

2 Valuing Machinery and Equipment: The Fundamentals of Appraising Machinery and Technical Assets, (American Society of Appraisers, 4th ed. 2020), at 68.