Functional Obsolescence and Economic Obsolescence Considerations in the Property Tax Valuation

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Rapid technological changes have caused many industrial and commercial properties to experience functional obsolescence. The prolonged weak economy has caused many industrial and commercial properties to experience economic obsolescence. Taxpayer property owners should recognize such obsolescence in the valuation of their complex, special purpose properties and, if appropriate, appeal their ad valorem property tax assessments. This discussion summarizes considerations for the taxpayer property owner (and for the valuation analyst) with regard to both the identification and the quantification of obsolescence at large scale industrial and commercial properties.

Introduction

As the national economy continues in the doldrums of a prolonged and slow recovery from recession, state and local governments typically look to ad valorem property tax receipts as a major source of revenue. This is because both the income tax receipts and sales tax receipts of state and local governments have been negatively affected by the prolonged recession.

In addition, other than for specific economic stimulus projects, transfer payments from the federal government to state and local governments were substantially decreased in recent years.

In order to raise tax receipts, state and local property tax assessors have an incentive to assign the highest values that they can support to taxpayer industrial and commercial properties. High industrial and commercial property assessments result in increased state and local property tax receipts.

Given a choice, municipalities generally prefer to increase the assessments for industrial and commercial property owners rather than for residential property owners. There are two reasons for this conclusion regarding property assessments.

First, residential property owners are voters who react negatively at local election time to property tax increases. In contrast, industrial and commercial property owners are typically corporations (and, often, out-of-state corporations) that are not voters.

Second, property assessors often believe that industrial and commercial property owners can afford to absorb the property tax increase. That is, property assessors often believe that industrial/commercial property owners can just pass the property tax increase along to their customers. However, this assessor belief is often erroneous, particularly during a recessionary economic period.

On the other hand, taxpayer corporations have an incentive to report the lowest industrial and commercial property values that they can support. This statement is true for several reasons.

First, across the board, industrial and commercial property values have generally decreased during the recent economic recession. In fact, the recession is often the principal explanation for the existence of external obsolescence. And, external obsolescence is the cause of many industrial and commercial property value decreases.

Second, for many taxpayer corporations, property tax expense has become greater than income tax expense during this period of low (or no) taxable profits. Therefore, taxpayer corporation managements are taking notice of the apparently overstated property tax expense.

And, third, many taxpayer corporations can barely afford to pay the appropriate amount of property tax expense, let alone an overstated amount of property tax expense. For these taxpayers, the appeal of overstated property values is not just an appropriate corporate governance procedure. It may be a matter of business survival, at least for the local business unit.

First, this discussion summarizes:

1. the cost approach to the property tax valuation of industrial and commercial property and
2. the various types of industrial and commercial property obsolescence that are recognized in a cost approach analysis.

Second, this discussion summarizes the practical valuation procedures that either a taxpayer corporation or a taxing authority assessor can use to recognize the existence of taxpayer property obsolescence.

Third, this discussion lists some of the reasons that assessors often give to explain why they will not recognize obsolescence at the subject industrial or commercial property. In response, this discussion summarizes responses that the taxpayer—or the taxpayer's valuation analyst—can present in order to convince the assessor to recognize the obsolescence that exists at the subject industrial or commercial property.

And, fourth, this discussion suggests practical procedures to categorize the various types of industrial and commercial property obsolescence.

The Cost Approach Valuation of Industrial and Commercial Property

Valuation analysts (including taxing authority assessors) typically attempt to apply market (sales comparison) approach, income approach, and cost approach valuation methods in the property tax valuation of a complex industrial or commercial property. This statement is true for valuations prepared for property tax assessment, appeal, or litigation purposes. And, this statement is also true for valuations prepared for other (i.e., nontaxation) purposes. However, for many complex, large-scale, and special purpose properties, valuation analysts often have to rely principally (if not exclusively) on cost approach valuation methods.

The income approach is often difficult to apply in the valuation of such special purpose properties. This is because it is very difficult to allocate the total amount of income generated at the subject special purpose facility between:

1. the property rental income related only to the subject facility land, buildings, and equipment and
2. the business enterprise income generated by the taxpayer corporation intangible assets.

The market (or sales comparison) approach is also difficult to apply to the valuation of such special purpose properties. This is because there may be very few recent sales of truly comparable industrial or commercial properties available for the valuation analyst's consideration. In addition, even when there are comparable property sales, the valuation analyst still has to address the issue of allocating the comparable property sale price between:

1. the comparable property land, buildings, and equipment and
2. the business enterprise intangible assets operating at the comparable property.

For these reasons, valuation analysts often rely principally on the cost approach in the valuation of complex, special purpose, or operationally integrated industrial and commercial facilities. The identification and quantification of all forms of obsolescence is also a fundamental procedure in the cost approach valuation of an industrial or commercial property.

While the necessity of performing this obsolescence analysis procedure is rarely disputed, the specific quantification of obsolescence is often the source of controversy in the ad valorem property tax valuation. Of course, the cost approach involves a comprehensive measure of a current cost metric (however defined) of the subject property.

Other than the physical deterioration component of obsolescence, it is often difficult for the assessor to physically inspect the various forms of property obsolescence. In other words, it may be difficult for an assessor to visually identify the results of functional obsolescence or external obsolescence. In fact, with regard to external obsolescence, the causes of such obsolescence are, by definition, physically external to the taxpayer industrial or commercial property.

The data needed to quantify some forms of property obsolescence are often taxpayer-specific. That is, these data have to be supplied to the valuation analyst (or to the assessor) by the taxpayer/property owner. In addition, these data often cannot be verified or compared in the industrial or commercial real estate marketplace. And, some taxpayer corporations may want to keep these facility-specific data confidential, for both strategic and competitive reasons.

The analyses of some forms of property obsolescence are often comparative in nature. That is, the obsolescence analysis often compares (1) the subject taxpayer facility (i.e., with the obsolescence in place) that actually does exist to (2) a hypothetical replacement facility (i.e., without obsolescence) that doesn't exist.

For example, a property obsolescence analysis could compare (1) the subject facility (with its actual obsolescence) that experiences excess operating costs to (2) a hypothetical replacement facility (without any obsolescence) that experiences reduced operating costs.

Since the hypothetical replacement facility does not actually exist, there may be uncertainty about the hypothetical (and reduced) operating costs of that replacement facility.

The taxpayer/property owner typically does not measure the amount of—or even realize the existence of—property obsolescence. For example, other than the subject property's original cost accumulated depreciation, there is no provision in the taxpayer corporation financial statements for the recognition of either functional or economic obsolescence.

The taxpayer management may be aware that competitive industrial/commercial facilities are more productive or more cost effective than the subject facility. However, the taxpayer management may not even associate such indicia of functional or economic obsolescence with the subject facility's property valuation. In addition, the procedures for the financial accounting test of long-lived asset impairment are fundamentally different from the procedures related to the measurement of functional or economic obsolescence.

Cost Approach Summary Description

Cost approach valuation methods are based on the basic economics principle of substitution. That is, the value of the industrial or commercial property is influenced by the cost to create a new substitute

property. All cost approach methods apply a comprehensive definition of cost, including consideration of an opportunity cost during the property design and construction stage. And, the cost of the new substitute property should be reduced (or depreciated) in order to make the hypothetical new property comparable to the actual "old" property.

Cost approach methods are particularly applicable to the valuation of a special purpose industrial or commercial property. Also, in the case of a relatively new property, the taxpayer may have available recent construction cost data available and accurate "as built" construction plans and drawings.

In addition, cost approach methods are also applicable to the valuation of a functionally integrated or process type facility, where it is difficult to segregate tangible property rental income from intangible property (i.e., business enterprise) operating income. Also, the cost approach is particularly applicable to functionally unique properties for which there are few comparable property sales.

The valuation analyst (and the taxpayer) understands that the property value is not derived from the current cost measure alone. Rather, the property value is derived from the current cost measure (however defined) less appropriate allowances for all forms of depreciation and obsolescence.

In applying the cost approach, there should be sufficient reliable data available to estimate both:

1. the subject property's current cost (e.g., replacement cost new or reproduction cost new) and
2. all forms of property obsolescence (including any economic obsolescence).

There are several common cost approach valuation methods. Each valuation method uses a

particular definition (or measurement metric) of cost. Two common cost definitions are:

1. reproduction cost new and
2. replacement cost new.

Reproduction cost new measures the total cost, in current prices, to develop an exact duplicate of the subject taxpayer property. Replacement cost new measures the total cost, in current prices, to develop a new property having the same functionality or utility as the taxpayer property.

Functionality is an engineering concept that means the ability of the property to perform the task for which it was designed. Utility is an economics concept that means the ability of the property to provide an equivalent amount of satisfaction to the owner/operator.

Regardless of the specific cost definition that is used in the cost analysis, all cost measurement methods (including reproduction cost new, replacement cost new, or some other cost measurement) should consider a comprehensive cost analysis.

Any current cost measurement should consider the following four cost components: (1) direct costs (e.g., materials and supplies), (2) indirect costs (e.g., engineering and design expenses, legal fees), (3) developer's profit (e.g., a profit margin percent applied to the direct cost and indirect cost investment), and (4) an opportunity cost/entrepreneurial incentive (e.g., a measure of lost income opportunity cost during the property development period).

Typically, the property construction material, labor, and overhead costs are easy to identify and quantify. The developer's profit cost component can be estimated using several procedures. This cost component is often estimated as a percentage rate of return (or profit margin) on the developer's investment in the material, labor, and overhead costs. The entrepreneurial incentive component is often measured as the lost income that the property owner/operator would experience during the property development period.

The lost income concept of entrepreneurial incentive may be considered in the context of a "make versus buy" decision. For example, let's consider a hypothetical willing buyer and a hypothetical willing seller (i.e., the current owner) of a special purpose plant. Let's assume that it would require a two-year period for a hypothetical willing buyer to construct a replacement plant.

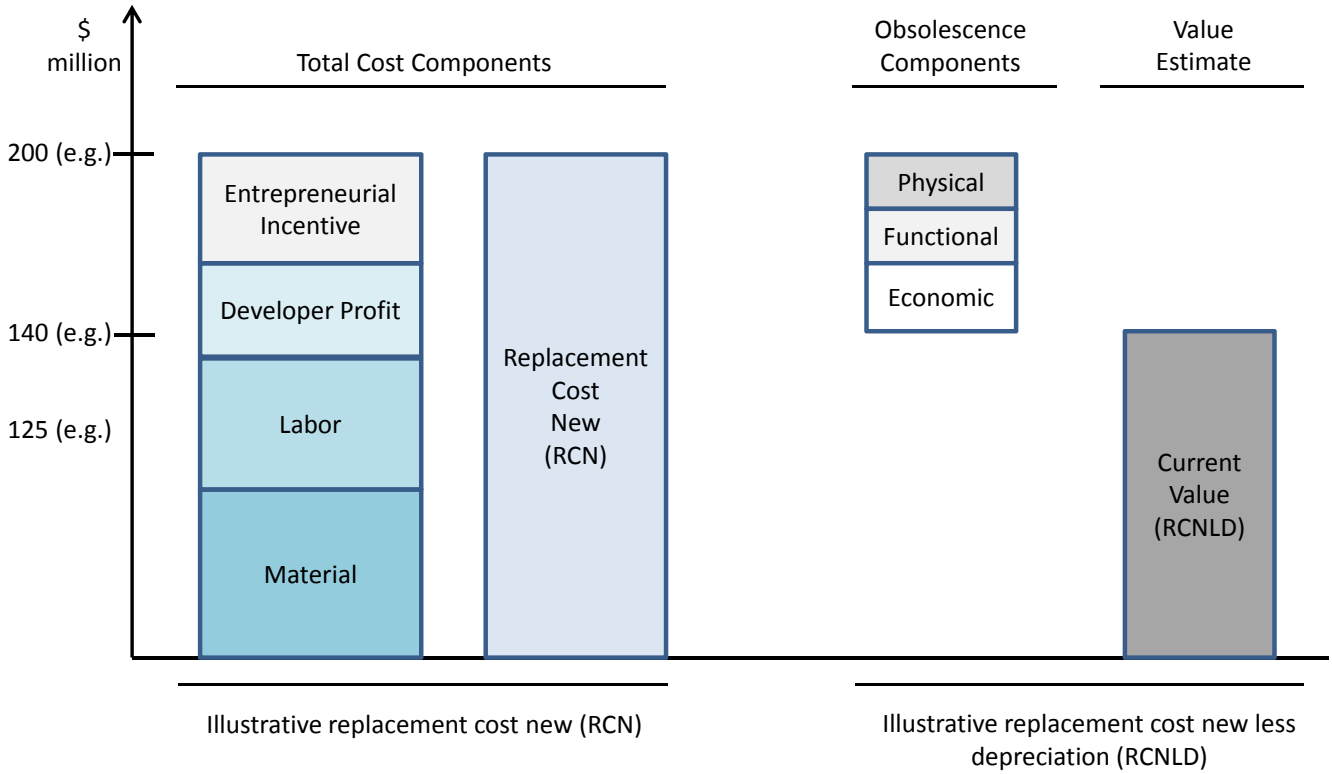
If the buyer "buys" the seller's actual plant, then the buyer can start earning income from the plant operations immediately. In contrast, if the buyer builds its own replacement plant, then the buyer will not earn any income from the plant operations during the two-year construction period. The two years of lost income during the hypothetical plant development period represents the opportunity cost of "making" (i.e., building) a de novo replacement plant—compared to "buying" the actual plant.

All cost components—that is, direct costs, indirect costs, developer's profit, and entrepreneurial incentive—should be considered in the cost approach valuation. In addition, the subject property's cost new (however measured) should be adjusted for any decreases in property value due to (1) physical deterioration, (2) functional obsolescence, and (3) economic obsolescence.

Physical deterioration is the reduction in property value due to physical wear and tear. Functional obsolescence is the reduction in property value due to the inability of the property to perform the function (or yield the periodic utility) for which it was originally designed. The technological component of functional obsolescence is a decrease in value due to improvements in technology that make the property less than the ideal replacement for itself.

External obsolescence is a reduction in property value due to the effects, events, or conditions that are external to—and not controlled by—the property's current use or condition. The impact of external obsolescence is typically beyond the taxpayer's control.

Figure 1
Cost Approach
Illustrative Industrial Property
Cost and Obsolescence Components



There are two types of external obsolescence: (1) locational obsolescence and (2) economic obsolescence. Locational obsolescence is a decrease in the value due to changes in the neighborhood conditions. Economic obsolescence relates to the inability of the subject property operations to generate a fair rate of return on investment.

Obsolescence of any type is considered curable if it would cost the taxpayer less to "cure" the inefficiency than the decrease in value caused by the inefficiency. Obsolescence of any type is considered incurable if it would cost the taxpayer more to "cure" the inefficiency than the decrease in value caused by the inefficiency.

Figure 1 illustrates the relationship between the cost components and the obsolescence components in a typical cost approach valuation analysis.

A common formula for quantifying the property's replacement cost new is: reproduction cost new – curable functional obsolescence = replacement cost new.

To estimate the property value, the following formula is commonly used:

Replacement cost new
– Physical deterioration
– Economic obsolescence
– Incurable functional obsolescence
= Property value

Summary Description of the Three Types of Property Obsolescence

For purposes of this discussion, obsolescence may be defined as any cause for a decrease in the value of an industrial or commercial property.

All of the various property obsolescence components are typically categorized into three obsolescence types:

1. Physical deterioration
2. Functional obsolescence
3. External obsolescence

Physical deterioration results in a decrease in value due to the property's physical condition. There are two common components to physical deterioration: (1) the decrease in value due to the property's age and (2) the decrease in value due to the property's physical wear and tear.

For any particular taxpayer property, both of these physical deterioration components may be measured either individually or collectively. In other words, the physical depreciation for each property component can be measured individually. Or, the physical depreciation can be measured in the aggregate for the major taxpayer asset categories.

There are several methods that the valuation analyst can use to measure physical deterioration. The most common methods are (1) the age/life method and (2) the observed depreciation method.

Functional obsolescence results in a decrease in value due to the property's inability to perform the function for which it was originally designed or intended. There are two common components to functional obsolescence: (1) the functional component and (2) the technological component.

In the functional component, the taxpayer property's intended function remains the same over time, but the subject property no longer performs that intended function as well as it did when the property was new. In the technological component, the taxpayer property may work as well as it did when it was new. However, the property's intended function itself has become obsolete over time.

Some of the common indications of functional obsolescence include the following:

1. Excess operating/maintenance costs
2. Excess capacity/excess capital costs
3. Structural/capacity superadequacies or inadequacies

Typically, functional obsolescence is measured by the following procedures:

1. Capitalizing the property's excess operating costs over the subject property's expected remaining useful life (RUL)
2. Reducing the property's superadequacy cost measurement (however defined) by the amount of capital costs related to the excess capacity
3. Estimating the amount of capital costs required to cure the functional deficiency or structural/capacity inadequacy

For example, let's consider the Taxpayer Manufacturing Company ("Taxpayer") plant. The Alpha plant is a two-story special purpose facility. However, given the process flow of the current Taxpayer manufacturing operations, Taxpayer can only use one story of the two-story plant. The second story of the two-story plant remains idle.

Taxpayer management estimates that it costs $2,000,000 per year to maintain, insure, secure, and otherwise maintain the unused second story of the subject special purpose manufacturing plant. The valuation analyst concludes that the subject plant RUL is at least 20 years. And, the valuation analyst concludes that the appropriate direct capitalization rate is 10 percent.

The valuation analyst estimated the RCNLD (before consideration of functional obsolescence) of the taxpayer property to be $120,000,000. Exhibit 1 presents the valuation analyst's consideration of functional obsolescence using the capitalized excess operating cost method.

In Exhibit 1, the 8.5136 times present value annuity factor is based on a 20-year property RUL and a 10 percent direct capitalization rate.

Based on the Exhibit 1 analysis of the capitalized excess operating cost, the Taxpayer property functional obsolescence is $17,000,000 (rounded) and the Taxpayer property value conclusion is $103,000,000 (rounded).

External obsolescence relates to a decrease in the value of an industrial or commercial property due to influences that are external to (or outside of) the subject property. There are two common components of external obsolescence:

1. Locational obsolescence
2. Economic obsolescence

Locational obsolescence occurs when the location of the facility results in either (1) a decrease in the facility income or (2) an increase in the facility operating costs. Locational obsolescence often relates to changes in neighborhood conditions related to the subject property site. For example, locational obsolescence may occur related to the construction of a landfill facility or a wastewater treatment plant next to the subject taxpayer property.

Economic obsolescence occurs when the property owner can no longer earn a fair rate of return on the operation of—or the investment in—the subject facility. Economic obsolescence often relates to the business enterprise that operates at the special purpose property. A change in industry conditions could cause the property owner to generate decreased revenue, profit margin, or return on investment metrics.

Three common methods for quantifying external obsolescence are as follows:

1. The capitalization of income shortfall method
2. The paired sales comparison method
3. The market extraction method

Let's consider the use of the capitalization of income shortfall method to test (and then measure) economic obsolescence at the Taxpayer Refinery Company special purpose facility.

Exhibit 1
Taxpayer Manufacturing Company
Subject Manufacturing Plant
Cost Approach Analysis
As of January 1, 2012

Cost Approach Analysis Component		$
Site and improvements RCNLD		120,000,000
Less: Functional obsolescence	$	
annual excess operating cost	2,000,000	
× present value of annuity factor	8.5136	
= capitalized excess operating costs	17,027,200	17,027,200
Equals: RCNLD less functional obsolescence		102,972,800
Cost approach value indication (rounded)		103,000,000

Let's assume that the subject taxpayer market-derived cost of capital is 12.5 percent. Let's assume that the business operation at the subject special purpose property is actually earning (i.e., based on current net operating income) a 10 percent return on investment (i.e., a yield rate).

Based on this comparative economic performance metric (i.e., the actual property ROI versus the property required rate of return), this special purpose property economic obsolescence may be measured as presented in Exhibit 2.

Now let's apply this economic obsolescence indication to the cost approach valuation analysis of the Taxpayer Refinery Company special purpose property. Let's assume the subject taxpayer property RCNLD (before consideration of economic obsolescence) is $600,000,000. This cost approach valuation analysis and conclusion are presented in Exhibit 3.

It should be noted that, at this $480,000,000 cost approach value indication, the Taxpayer Refinery Company should actually generate a sufficient level of economic support for the subject property value. That is, at the $480,000,000 property value indication, the Taxpayer Refinery Company should earn exactly a 12.5 percent ROI on the operation of the subject special purpose property, (while the Taxpayer Refinery cost of capital is also 12.5 percent).

Valuation analysts sometimes distinguish between (1) curable obsolescence and (2) incurable obsolescence. With regard to curable obsolescence, the cost to cure the cause of the subject obsolescence is less than the decrease in property value resulting from that obsolescence. With regard to incurable obsolescence, the cost to cure the cause of the subject obsolescence is greater than the decrease in property value resulting from that obsolescence.

In the case of curable obsolescence, the rational property owner would (1) incur the capital costs to cure the subject obsolescence and (2) thereby eliminate the cause—and the effect—of any future obsolescence. Therefore, for curable causes of obsolescence, the "cost to cure" often sets an upward limit on the property obsolescence measurement.

Some valuation analysts may be particularly concerned about the correct classification of the type of obsolescence. In other words, should a particular value decrement be classified as functional obsolescence or as external obsolescence? In practice, the correct classification of obsolescence is not as important as the correct quantification of the subject property obsolescence.

Exhibit 2
Taxpayer Refinery Company
Special Purpose Property
Comparative Financial Performance Metrics
Cost Approach Economic Obsolescence Indication

Taxpayer Manufacturing Company property RCNLD (before economic obsolescence)	$600,000,000
Minus: Economic obsolescence at 20% (i.e., $60,000,000 RCNLD times 20% economic obsolescence)	120,000,000
Equals: Taxpayer Manufacturing Company property cost approach value	$480,000,000

Exhibit 3
Taxpayer Refinery Company
Special Purpose Property
Cost Approach Analysis and Value
As of January 1, 2012

Taxpayer Refinery Company property RCNLD (before economic obsolescence)	$600,000,000
Minus: Economic obsolescence at 20% (i.e., $600,000,000 RCNLD times 20% economic obsolescence)	120,000,000
Equals: Taxpayer Refinery Company property cost approach value	$480,000,000

As long as the cause and effect of the value decrement are correctly identified, the classification of a particular value decrement among the three types of property obsolescence should not affect the final property value conclusion.

Procedures to Identify Industrial and Commercial Property Obsolescence

Some obsolescence types are easier to identify than others. For example, the existence of physical deterioration is often recognized through a property physical inspection. A physical inspection of the subject facility should allow the valuation analyst to identify the effects of wear and tear. And, a physical inspection of the taxpayer's accounting records should allow the valuation analyst to identify the subject facility's age and original date placed in service.

A physical inspection may also allow the valuation analyst to identify some types of functional obsolescence. For example, the valuation analyst may be able to identify excess capacity related to either (1) unused facility space or (2) unused facility equipment.

A physical inspection may also allow the valuation analyst to identify an inefficient (1) facility design or layout or (2) equipment production/process line. And, a physical inspection may also allow the valuation analyst to identify any (1) real estate structural deficiencies and (2) personal property material flow/process flow deficiencies.

As mentioned above, many of the causes of functional obsolescence or external obsolescence are quantified on a comparative basis. The comparative basis may be: (1) the taxpayer property actual operating results "with" the obsolescence effect compared to (2) the taxpayer property hypothetical (e.g., historical or projected) operating results "without" the obsolescence effect.

Alternatively, the comparative basis may be: (1) the taxpayer property actual operating results "with" the obsolescence effect compared to (2) the operating results of one or more comparable (taxpayer or otherwise) properties "without" the obsolescence effect. Given the comparative nature of these types of obsolescence analyses, a physical inspection alone may not be adequate to identify these causes of obsolescence.

A valuation analyst may have to review property-specific financial documents or operational reports in order to identify many types of functional and external obsolescence. These types of taxpayer/property owner documents may include the following:

1. Taxpayer property financial statements or financial results of operations
2. Taxpayer property financial budgets, plans, projections, or forecasts
3. Taxpayer production statements, production cost analyses, or operating cost variance analyses
4. Material, labor, and overhead cost of goods sold analyses related to the taxpayer property business operations
5. Fixed versus variable expense operating statements related to the property business operations
6. Cost/volume/profit analyses related to the taxpayer property business operations
7. Unit/dollar sales analyses or average selling price analyses

The valuation analyst may consider the above-listed data and documents on various comparative bases, including the following:

1. Actual (current) taxpayer results versus historical taxpayer results
2. Actual (current) taxpayer results versus budgeted taxpayer results
3. Actual taxpayer results versus specific comparative property results
4. Actual taxpayer results versus specific competitor results

5. Actual taxpayer results versus industry average/benchmark results
6. Actual taxpayer results versus the subject property practical/normal production capacity results

The valuation analyst may compare the taxpayer property's historical and projected results of operations to financial benchmarks derived from selected guideline public companies. In addition, the analyst may also compare the taxpayer property results of operations to benchmarks derived from published industry data sources.

Exhibit 4 presents some of the common published industry data sources that the valuation analyst may use for these benchmark comparison obsolescence analyses. The data sources included in Exhibit 4 allow the valuation analyst to compare the taxpayer property financial results to benchmark industry expense ratios, profit margins, returns on investment, and so forth.

In addition to identifying the existence of any property obsolescence, such a comparison can assist the valuation analyst to assess the reasonableness of the taxpayer's own financial projections. Such taxpayer financial projections can provide another benchmark comparison for quantifying the taxpayer property obsolescence.

If the valuation analyst is familiar with competitive or comparative properties, then a physical inspection of the subject property may reveal some types of property obsolescence. However, the valuation analyst will often perform these physical inspections from a comparative basis.

For example, the valuation analyst may note that the subject property production/process line requires four employee operators while a comparative property production/process line only requires two employee operators.

The valuation analyst may note that the subject property production/process line produces four product units per operation while a comparable property production/process line produces eight product units per operation. Or, the valuation analyst may note that the subject production/process line produces considerably more scrap/waste material than a comparative property production/process line produces.

The valuation analyst may be able to identify the causes of certain types of obsolescence through a physical inspection. However, the valuation analyst will typically rely on comparative taxpayer property-related financial and/or operational data in order to measure the observed obsolescence.

With regard to locational obsolescence, the valuation analyst may be able to identify some causes of obsolescence through a physical inspection of the subject property neighborhood. For example, the valuation analyst may observe new construction that is physically between the subject apartment or office tower and a scenic view (such as a lakefront or ocean). The valuation analyst could observe if the neighborhood around a shopping mall or a resort property is deteriorating.

More likely, though, the valuation analyst will identify locational obsolescence by performing a comparative analysis of market rents, particularly for an income-producing property. This comparative analysis could contrast (1) the taxpayer property current rental rates with the taxpayer property historical rental rates or (2) the taxpayer property current rental rates with comparable (but different location) property rental rates.

With regard to economic obsolescence, the valuation analyst may analyze property-specific

Exhibit 4
Industry Financial Ratio Data Sources
Commonly Used in the Obsolescence Analysis Due Diligence

- The Risk Management Association—Annual Statement Studies: Financial Ratio Benchmarks
- BizMiner (The Brandow Company)—Industry Financial Profiles
- CCH, Inc.—Almanac of Business and Industrial Ratios
- Fintel, LLC—Fintel Industry Metrics Reports
- MicroBilt Corporation (formerly IntegraInfo)—Integra Financial Benchmarking Data
- ValueSource—IRS Corporate Ratios
- Schonfeld & Associates, Inc.—IRS Corporate Financial Ratios

Exhibit 5
Taxpayer Property Conditions That May Indicate the Existence of Economic Obsolescence

1. The subject property income approach value indication is less than the subject property cost approach value indication.
2. The subject property market approach value indication is less than the subject property cost approach value indication.
3. Taxpayer revenue has been decreasing in recent years.
4. Taxpayer profitability has been decreasing in recent years.
5. Taxpayer cash flow has been decreasing in recent years.
6. Taxpayer product pricing has been decreasing in recent years.
7. Taxpayer/industry revenue has been decreasing in recent years.
8. Taxpayer/industry profitability has been decreasing in recent years.
9. Taxpayer/industry cash flow has been decreasing in recent years.
10. Taxpayer/industry product pricing has been decreasing in recent years.
11. Taxpayer profit margins have been decreasing in recent years.
12. Taxpayer returns on investment have been decreasing in recent years.
13. Taxpayer/industry profit margins have been decreasing in recent years.
14. Taxpayer/industry returns on investment have been decreasing in recent years.
15. Taxpayer/industry competition has been increasing in recent years.

financial data in order to identify the causes of the obsolescence. Particularly with regard to a complex, special purpose property, the valuation analyst may analyze:

1. business enterprise profit margins,
2. business enterprise returns on investment,
3. industrial/commercial product unit average selling price,
4. industrial/commercial product unit cost of goods sold, or
5. industrial/commercial product unit sales volume.

Each of these various economic obsolescence analyses would typically be performed on a comparative basis, such as:

1. current taxpayer results versus historical taxpayer results,
2. current taxpayer results versus planned or budgeted taxpayer results,
3. current taxpayer results versus specific comparative properties, or
4. current taxpayer results versus industry average results.

In each case, the valuation analyst will look for some external factor affecting the subject facility that may cause the property owner to not earn a fair rate of return on the subject property investment.

Exhibit 5 presents a list of some of the many conditions that the valuation analyst will look for to consider the existence of economic obsolescence at the taxpayer property.

While none of these factors specifically measures the amount of economic obsolescence, the existence of one or more of these factors may indicate the existence of economic obsolescence at the taxpayer property. In order to measure economic obsolescence, the valuation analyst will consider taxpayer-specific factors and/or property-specific factors.

Independence of the Economic Obsolescence Analysis from the Income Approach Valuation

Tax authority assessors often assert that the subject property economic obsolescence analysis is based on just another application of the taxpayer's income approach valuation. Therefore, the taxpayer has converted its cost approach valuation analysis into a clone of its income approach valuation analysis.

Whatever the replacement cost new/reproduction cost new starting point is for the taxpayer's cost approach analysis, the cost approach value conclusion after the economic obsolescence adjustment is exactly the same as the taxpayer's income approach value indication.

The above statement may be absolutely true (and the assessor's objection may be absolutely correct) if the taxpayer (or the taxpayer's valuation analyst) has not correctly performed the economic obsolescence analysis. A cost approach economic obsolescence analysis should be independent of the subject property income approach valuation analysis.

Both the cost approach and the income approach may rely on common valuation variables—for example, a property-specific discount rate or a direct capitalization rate. However, the economic obsolescence analysis should not be influenced at all by the value conclusion of the subject property income approach analysis.

Some valuation analysts incorrectly quantify economic obsolescence as a "plug number" or a residual calculation. That is, first, the valuation analyst quantifies replacement/reproduction cost new less physical depreciation (RCNLD). Second, the valuation analyst quantifies the income approach value (IAV) indication. Third, the valuation analyst subtracts the IAV from the RCNLD in order to measure any property economic obsolescence. Last, the valuation analyst subtracts economic obsolescence from RCNLD in order to arrive at the cost approach value (CAV) indication.

In other words, let's assume that the subject taxpayer property RCNLD is $400 million. Let's assume that the subject taxpayer property income approach value indication is $300 million. Some valuation analysts subtract the income approach value (i.e., $300 million) from the RCNLD (i.e., $400 million) to conclude economic obsolescence of $100 million. The cost approach value conclusion then becomes the $400 million RCNLD less the $100 million economic obsolescence, for a cost approach value conclusion of $300 million.

This residual from income approach value procedure is an entirely inappropriate economic obsolescence measurement procedure.

Using this inappropriate procedure, the subject taxpayer property IAV will always be exactly equal to the subject taxpayer property CAV. Using this inappropriate procedure, the cost approach is not independent of the income approach. In fact, the value conclusion of the cost approach is entirely influenced by the income approach value conclusion. Accordingly, this "plug" or residual calculation procedure for measuring property economic obsolescence is fundamentally flawed.

"A correctly prepared economic obsolescence analysis can—and should—stand on its own analytical merits."

Property economic obsolescence is usually calculated on a comparative basis. Some of the common comparisons include the following:

1. Actual margins, returns, units, or prices versus historical margins, returns, units, or prices
2. Actual margins, returns, units, or prices versus budgeted margins, returns, units, or prices
3. Actual rates of return versus required rates of return (i.e., costs of capital)
4. Actual results versus benchmark (comparable property or industry average) results

These comparative economic obsolescence analyses may involve some of the same data points used in the income approach analysis (e.g., unit volume, average selling price, NOI margin).

However, the results of these comparative economic obsolescence analyses should be totally independent of the results of (and the value indication derived from) the income approach valuation. And, the one economic obsolescence comparative analysis that is simply not appropriate is: cost approach value indication (before the recognition of economic obsolescence) minus the income approach value indication = property economic obsolescence.

A correctly prepared economic obsolescence analysis can—and should—stand on its own analytical merits. It should (and can) be independent of the income approach valuation analysis. With an economic obsolescence analysis based on

Exhibit 6
Taxpayer Corporation
Subject Property Valuation
Cost Approach
Economic Obsolescence Analysis
As of January 1, 2012

Taxpayer Corporation Subject Property Financial and Operational Metrics	Average of 2007-2010	LTM 2011	Percent Difference
EBIT profit margin	24%	20%	-16.7%
Net cash flow margin	12%	10%	-16.7%
Pretax net income margin	15%	12%	-20.0%
EBIT return on total assets	16%	14%	-12.5%
EBIT return on net assets	20%	16%	-20.0%
5-year compound revenue growth rate	6.5%	4.5%	-30.8%
5-year compound net cash flow growth rate	7.5%	5.5%	-26.7%
Average sales price per unit sold	$1,200	$1,050	-12.5%
Mean percent decline in metrics			-19.5%
Median percent decline in metrics			-18.4%
Trimmed mean percent decline in metrics			-18.8%
Selected economic obsolescence indication			-19%

comparative financial or operational variables, the cost approach can—and should—provide a totally independent value indication from the income approach valuation.

Let's consider the illustrative economic obsolescence analysis presented in Exhibit 6. The hypothetical taxpayer is Taxpayer Corporation ("Corporation"). Corporation operates a special purpose manufacturing facility that may be subject to economic obsolescence. The assessment date is January 1, 2012.

Exhibit 6 presents the valuation analyst's conclusion of 19 percent economic obsolescence. It is noteworthy that this economic obsolescence calculation is totally independent of an income approach value conclusion. In fact, in this example, the valuation analyst never performed an income approach valuation analysis.

Based on the analysis of the Taxpayer Corporation facility financial and operational metrics presented in Exhibit 6, the valuation analyst selected 19 percent as the appropriate economic obsolescence adjustment for the Corporation property RCNLD value indication.

Distinguishing the Various Obsolescence Influences

The identification and quantification of all types of obsolescence is a necessary procedure in any cost approach valuation analysis. However, the classification of the property-specific influences between each type of obsolescence is a much less important procedure.

In other words, the taxpayer and the assessor should be concerned that they both (1) recognize all types of obsolescence at the subject property and (2) don't double count the effect of any type of obsolescence at the subject property. However, the categorization of any particular obsolescence influence as either functional obsolescence or economic obsolescence is not important to the final value conclusion.

Nonetheless, there are several guidelines that a valuation analyst may consider to help classify the various types of obsolescence influences at the subject industrial or commercial property.

First, the valuation analyst should be careful not to double count the same obsolescence influence. It is possible to double count property obsolescence when two related data sources are used to quantify two (allegedly) different obsolescence influences.

For example, the valuation analyst may capitalize higher-than-planned operating costs and call that analysis conclusion "functional obsolescence." Then, the valuation analyst may capitalize lower-than-planned operating profit and call that analysis conclusion "economic obsolescence." Those two obsolescence analyses (both based on related taxpayer financial data sources) may result in double counting the taxpayer property obsolescence.

Second, when categorizing the various obsolescence influences, the valuation analyst should consider the basic descriptions of the three types of obsolescence. These basic descriptions were presented earlier in this discussion. Going back to

the basics in terms of descriptions should help the valuation analyst to properly categorize the various obsolescence influences.

Third, it is usually helpful for the valuation analyst to identify and quantify obsolescence influences in the order or sequence in which they are discussed in most property valuation textbooks: first, physical deterioration; second, functional obsolescence; and last, external obsolescence. This sequence allows the valuation analyst to investigate and classify the obsolescence influences in an organized manner.

Fourth, to the extent practical, the valuation analyst should separately explain and quantify each property obsolescence influence. Such separate explanations may help the assessor (and any other party relying on the property valuation report) to better understand and classify the various property obsolescence influences. The separate quantification also helps the valuation report reader to understand the different obsolescence influences. It may also help the valuation analyst to identify—and therefore avoid—the use of the same taxpayer data in multiple obsolescence analyses.

Fifth, obsolescence influences can be quantified as either (1) a percent amount value adjustment or (2) an absolute dollar amount value adjustment. Depending on how the various obsolescence influences are quantified, the application order (or sequence) of the obsolescence influences can be important. The application sequence is not important if all forms of obsolescence are expressed as a percentage adjustment.

For example, let's assume that the subject taxpayer property replacement cost new less depreciation (RCNLD) is $100,000,000. Let's assume that the obsolescence influence A adjustment is 10 percent and the obsolescence influence adjustment B is 20 percent. In this case, the order of applying the two obsolescence adjustments does not matter. In this example, the cost approach value indication is $72,000,000, regardless of which obsolescence adjustment is applied first and which obsolescence adjustment is applied second.

Likewise, the application sequence is not important if all forms of obsolescence are expressed as an absolute dollar amount. For example, let's assume again that the subject taxpayer property RCNLD is $100,000,000. Let's assume that the obsolescence influence A adjustment is $10,000,000 and the obsolescence B adjustment is $20,000,000. In this case, the order of applying obsolescence adjustment does not matter. In this example, the cost approach value indication is $70,000,000, regardless of which obsolescence adjustment is applied first and which obsolescence adjustment is applied second.

However, the application sequence is important if some obsolescence influences are expressed as a percentage amount adjustment and other obsolescence influences are expressed as an absolute dollar amount adjustment.

For example, let's assume that the subject property RCNLD is again $100,000,000. Let's assume that the obsolescence influence A adjustment is $10,000,000 and the obsolescence influence B adjustment is 20 percent. As illustrated in Exhibit 7, the application sequence of these two obsolescence adjustments will directly influence the final value indication.

As indicated above, when the different obsolescence influences are expressed as both (1) a percentage amount adjustment and (2) an absolute dollar amount adjustment, then the adjustment application sequence does directly affect the final value indication. In this situation, the valuation analyst should (1) conclude the most appropriate application sequence of the various obsolescence adjustments and (2) explain the rationale for the obsolescence application sequence selection in the property valuation report.

Exhibit 7
Application of Multiple Property Obsolescence Influences

Obsolescence Application Sequence—Alternative Sequence 1 Applying Obsolescence Influence A before Obsolescence Influence B	
Subject taxpayer property RCNLD	$100,000,000
less: Obsolescence influence A (fixed $ amount)	10,000,000
Subtotal	90,000,000
less: Obsolescence influence B (@ 20%)	18,000,000
equals: Taxpayer property value indication	$ 72,000,000
Obsolescence Application Sequence—Alternative Sequence 2 Applying Obsolescence Influence B before Obsolescence Influence B	
Subject taxpayer property RCNLD	$100,000,000
less: Obsolescence influence B (@ 20%)	20,000,000
Subtotal	80,000,000
less: Obsolescence influence A (fixed $ amount)	10,000,000
equals: Taxpayer property value indication	$ 70,000,000

Summary and Conclusion

During the current prolonged economic recession, taxpayer corporations will try to reduce the state and local property tax assessment on their industrial or commercial property. As with all operating expenses, taxpayer managements will try to manage their ad valorem property tax expense. Many taxpayer managements (correctly) believe that the market values of the taxpayer facilities have actually decreased in recent years.

"Many taxpayer managements (correctly) believe that the market values of the taxpayer facilities have actually decreased in recent years."

These market value decreases are typically due to industry-wide or general economic factors. These factors are typically quantified as functional obsolescence or economic obsolescence in the cost approach valuation of the taxpayer industrial or commercial property.

In contrast, taxing authority assessors have an incentive to increase industrial and commercial property assessments during this recessionary environment. State and local governments have experienced decreased revenues from most other sources, and these government units need the ad valorem taxation receipts. Accordingly, state and local property assessors are often skeptical when they receive a taxpayer claim of functional obsolescence or economic obsolescence related to an industrial or commercial property.

This discussion presented summary descriptions of (1) the three generally accepted property valuation approaches and (2) the three generally accepted types of property obsolescence. This discussion also explained the procedures that both taxpayers and tax authority assessors can use to identify the existence of obsolescence at an industrial or commercial property. This discussion focused on the cost approach valuation of complex, special purpose, and large scale industrial and commercial properties.

This discussion illustrated how the property analysis of economic obsolescence can be totally independent from the subject property income approach property valuation. Finally, this discussion summarized procedures for categorizing the different types of taxpayer property obsolescence influences.

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