**Value Curves**

## Appraising Equipment for Structured Finance Transactions
## Creating Residual Value Curves to Reflect
## Physical Depreciation, Obsolescence and Useful Life

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If one were to ask an equipment appraiser involved in a structured finance valuation assignment what the biggest challenge he or she would face, you'd likely hear comments related to the ability to support residual values in a highly competitive lease structure environment with lengthening terms and slower amortization. In today's economy, with interest rates at historic lows, single investor and leveraged lease financing markets are facing new challenges to maintain respectable levels of returns. With this comes the heightened challenge of the appraiser to develop residual value curves that assist the project and reflect supportable values.

### Variables Comprising the Structure of a Residual Value Curve

There are several factors that need consideration when constructing an equipment depreciation curve. The most important of these are:

- Economic Useful Life
- Replacement Cost
- Physical Depreciation
- Future Obsolescence (Functional/Technological, Economic)
- Inflation Rate
- Salvage Value

Changes to any of these variables will have an impact on future value estimates, therefore, each category should be separately analyzed and independently determined to facilitate the development of the curve.

Economic Useful Life is defined as the estimated period of time over which it is anticipated an asset may be profitably used for the purpose intended. The determination of useful life is the first major step to creating a residual curve. Much can be said on this subject, however, for the purpose of this discussion, the key issues to keep in mind are;

a) every asset has a reasonable range of useful life that can be supported (e.g. 20-25 years for machine-tools).

b) the treatment of a group of assets as an integrated facility, when applicable, can create an extended life based on the expected ongoing improvement and development of the facility and its asset components.

Through discussions with OEM's, used equipment dealers, independent third parties, as well as a review of previous transactions and updated market and industry research, an appraiser can establish a supportable economic useful life for virtually any asset. In situations when a facility approach is more appropriate to a transaction (e.g. Qualified Technical Equipment (QTE) structures), the discussion and support of this approach should be included in the useful life section of the appraisal report.

Salvage Value is a relatively basic concept defined as the recoverable value of an asset at the end of its useful life. There are rules of thumb that appraisers have developed over time based on experience and trends within many equipment markets. Most assets commonly seen in structured finance transactions will have a scrap value assumption of 5-10% of original cost. This estimate creates an "endpoint" to which a residual value curve can be constructed.

Replacement Cost is a critical component when dealing with used equipment, as this figure will determine the curve's starting point; or, as is more commonly used in the appraisal business, the "Day One" value. When the equipment is new, this figure will represent the total acquisition cost, however, when the assets are used, it is important to determine a reasonable replacement cost figure that best represents current equipment pricing. This analysis will drive the size of the transaction and in some cases, the economics of the lease, based on deal size pricing variations with many investors.

Future Inflation Rate estimates are determined to support a "real dollar" curve that correlates to the un-inflated, constant dollar foundation curve. Typically, appraisers will supply data tied to the specific asset, industry or economy as a whole, which supports a reasonable annual inflationary adjustment. This percentage is then applied to the original curve to create the real dollar depreciation. This inflation based curve will commonly be a key component supporting the economics of a lease transaction.

Once these variables have been determined, the appraiser has a framework with which to develop the curve (You thought we were done?!). A starting and end point, inflationary factor and curve length are now set. What remains is perhaps the most critical component of all. Imagine you've created the crust of a pie and now you need to decide the best filling to use.

**Depreciation Factors**

All residual value curves, regardless of asset type, are comprised of two variables: physical depreciation (wear and tear), and obsolescence, which can be in the form of functional/technological (internal to the property), or economic (external conditions effecting the property). Determining the amount of annual depreciation that applies to the equipment for each category over the asset's economic useful life is typically derived from cost approach methodologies combined with market data. Cost approach methods are generally created as a base line starting point while market data is used to "fine tune" the curve, thus creating a realistic, supportable valuation methodology.

**Physical Depreciation**

Once useful life, replacement cost and salvage value have been determined, the next step in furthering the curve is the development of physical depreciation. The most basic form of this is a straight line method, which is a simple calculation of total depreciation divided by the total economic useful life. This methodology is also considered a baseline starting point to which additional current market data can be supplemented to further define the curve.

To illustrate an example, let's use a new commercial railcar that we've determined the following data on:

Estimated economic useful life: 40 years
Replacement Cost New: $250,000.00
Salvage value: 5% of replacement cost
The straight line physical depreciation calculation is as follows:

$$\frac{(\$250{,}000 \text{ (or 100\% of replacement cost)} - \$12{,}500 \text{ (or 5\% salvage value)})}{40 \text{ Years (useful life)}}$$

**Equals: $237,500/40 = $5,937.50/yr or restated as 2.375% of the $250,000 replacement cost figure.**

If no additional data were available on expected usage over time, the appraiser would likely assume the asset to be utilized in a consistent fashion, on an annual basis, thus, reasonably determining a straight line method as a final conclusion of physical wear and tear. If, however, it was found that the equipment would be used more frequently in certain years than others, based, for example, on a documented business forecast detailing specific demand for product production and shipping each year, the depreciation would then be adjusted accordingly.

As a rule of thumb, physical depreciation is typically the variable that experiences the least amount of adjustment from standard straight line methodology; given most equipment usage forecasts are not specific enough to warrant a varied depreciation schedule year to year.

**Functional/Technological and Economic Obsolescence**

This area of depreciation is regarded as the "market driven" factor when finalizing residual value curves for structured finance transactions. It takes into account anticipated changes in the economic environment and to the efficiency of the equipment compared to newer technology over the subject asset's life.

The most reliable sources used in assisting in this estimation are:

- previous used equipment sales

- discussions with OEMs, vendors and independent dealers on past and future pricing trends
- recent valuations of related equipment
- access to historical industry data and market forecasts

All of the information compiled from this research will give the appraiser a more specific sense of how the equipment will depreciate over time and create a residual curve more indicative of the market, past, present, and future.

Estimating obsolescence is the most challenging part of the valuation process, especially when creating a complete residual curve over an asset's useful life. An appraiser will generally assign an annual obsolescence factor for each year, which best represents expected changes in the marketplace, and trend this percentage up or down over the life of the asset. This will create a more consistent, smoother curve, which still accounts for the anticipated total obsolescence over the life of the equipment.

In some cases, there will be only minor adjustments to future value. For example, with equipment that has not experienced major advances in technology over a period of time (e.g. certain areas of transportation, rolling stock, many facility based assets), while other, more technology based markets will be greater effected. In addition, if it is known to the appraiser that the equipment will be upgraded and refurbished over the term of its life, these obsolescence factors can be adjusted and reduced to reflect this assumption.

In conclusion, the sum of physical depreciation and obsolescence, will equal the total reduction of the asset's value, on an annual basis, over its economic useful life. This is the essence of a residual value curve.

**The Finished Product**

Once all these factors have been determined, you will have created a residual value curve that best represents anticipated future values on a constant, un-inflated dollar basis. A second real dollar curve can then be created by applying the previously estimated annual inflation rate discussed earlier. These curves will become the foundation of the appraisal report ultimately supporting the economics of the lease transaction.

Depending on the specific asset type and industry volatility, these curves should be reviewed and updated when necessary. Once the initial curve is developed, however, the appraiser will find it a much simpler task to update them, than to start from scratch, as long as this task is completed on a regular basis.

Relating this back to the pie example, it will be like purchasing a pre-made crust at the market and deciding which filling will taste the best.

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