



How to Calculate External Obsolescence in Cost Approach

(Income Approach Perspective)

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Definition of Economic Obsolescence (EO)

- **American Society of Appraisers - Machinery and Equipment** "Economic obsolescence, sometimes called "external obsolescence," is the loss in value or usefulness of a property caused by factors or economic forces external and unrelated to the property itself. Examples of this form of obsolescence are increased cost of raw materials, labor, or utilities (without an offsetting increase in product prices); reduced demand for the product; increased competition; legal, environmental, or other regulations; inflation or high interest rates; or similar factors."¹
- **Appraisal Institute - Real Property** "External Obsolescence is caused by conditions outside the property such as a lack of demand, changing property uses in the area, or national economic conditions."²
- **International Valuation Standards (IVS)** "External or economic obsolescence: Any loss of utility caused by economic or locational factors external to the asset. This type of obsolescence can be temporary or permanent"³.

Source:

- 1) Valuing Machinery and Equipment, the Fundamentals of Appraising Machinery and Technical Assets, 4th edition American Society of Appraisers, 2020, page 49.
- 2) The Appraisal of Real Estate, The Appraisal Institute, 15th edition, 2020, page 593
- 3) International Valuation Standards, IVSC, 2022, p 52

EO for PM Asset that can be valued with IA



- Power Plants
- Chemical Plants
- Oil Refineries
- Steel Mills
- Gas Processing Plants
- Paper Mills
- Pipelines

Factors that valuer need to know :

- ❖ These are often stand-alone facilities;
- ❖ They are capital intensive – i.e., fixed assets comprise the majority of total assets;
- ❖ These assets have been assembled to produce products with the expectation of making a profit
- ❖ Operations are recorded in financial statements and/or profit and loss statements.

Economic Obsolescence - Premise

- EO is a market condition that exists when there is insufficient economic income relative to the value (investment) in an asset.
 - ✓ Applied in the context of the Cost Approach for fixed assets.
 - ✓ EO is specifically addressed in the Market Approach (price) and Income Approach (value).
- Quantification of **EO applies only to an "in-use" premise of value**. Would not be applied to an "in-exchange" premise of value.
 - In-Use: Assumes that each of the assets will continue to be used as is and as part of the ongoing business in connection with other assets. Includes installation costs and other "soft costs".
 - In Exchange: Stand-alone value of the asset (often market approach value or some type of liquidation value).

EO and the Three Approaches to Value for FA

Valuation Approach

Market Approach – Economic obsolescence, if any, is captured in the market price derived from the arms length negotiations of buyers and sellers in the market place.

Income Approach – Economic obsolescence is captured in the cash flows generated by an asset.

Cost Approach – Economic obsolescence is included as a separate adjustment to replacement cost along with physical and functional obsolescence adjustments which are also required.

Causes of EO—Overview (I)

- EO in fixed assets can be caused by a wide variety of factors including:
 - ✓ Economic factors
 - ✓ Industry factors
 - ✓ Factors impacting a specific element of firm operations.
 - External - Increase in price of input
 - Internal - Bad management?
- An understanding of the factors leading to EO can help determine:
 - ✓ Form of model to use to value
 - ✓ Which assets are impacted by EO
- EO can impact financial results in several ways including:
 - ✓ Revenue reductions
 - ✓ Increase in cost of goods sold (as % of revenues)
 - ✓ Increase in overhead / indirect costs

Causes of EO - Partial Listing

Factors Contributing to Economic Obsolescence				
Likely Impact of Different Factors on Key Income Statement Metrics				
	Income Statement Metric			
	Revenues	COGS	Operating Expenses	
Economy / External factors				
- Decline in Economy	Yes	Unlikely	Unlikely	Economic decline often results in reduced cost of inputs. Revenue declines often exceed decline in cost of inputs
- Legislative changes	Yes	Yes	Yes	Legislation can directly impact operations. Legislation can also impact overhead costs.
- Changes in required returns – debt and/or equity	Possible	Possible	Possible	Increased return requirement(s) could reduce value of subject company. Increased return requirements at customers could lead to reduced prices. Increased returns at suppliers could lead to
Industry factors - increased competition				
- New entrants	Yes	Possible	Possible	COGS and operating expenses could increase as % of revenues
- Change in existing competitors	Yes	Possible	Possible	COGS and operating expenses could increase as % of revenues
- Changes in use	Yes	Possible	Possible	COGS and operating expenses could increase as % of revenues
- Changes in customer preferences	Yes	Possible	Possible	COGS and operating expenses could increase as % of revenues
Factors impacting firm operations				
- Reduction in revenues				
Demand decrease ("Q" or quantity)	Yes	N/A	N/A	COGS and operating expenses could increase as % of revenues
Price decrease ("P" or price)	Yes	N/A	N/A	COGS and operating expenses could increase as % of revenues
- Expense increase – changes in				
Labor	N/A	Yes	Possible	Greatest impact expected in COGS. Possible impact to OPEX.
Materials	N/A	Yes	Possible	Greatest impact expected in COGS. Possible impact to OPEX.
Overhead	N/A	Yes	Possible	Greatest impact expected in COGS. Possible impact to OPEX.
Notes				
External factors will directly impact revenues, COGS and/or operating expenses				
Changes in these factors will lead to changes in income and cash flows.				
Source: Raymond Rath, ASA, CFA, Economic Obsolescence in Fixed Assets – Business Valuation Perspective, 2013				

Methods to Quantify EO for Fixed Assets

- Inutility:
 - EO is a function of plant not operating at capacity. Used for process plants.
- Profit Based EO Calculations
 - a) Supply / Demand - Increase in supply or reduction in demand is causing a reduction in units produced and a decline in profits. Value economic obsolescence based on a With and Without Method.
 - b) Income Shortfall - Show margins are declining because the product price is stable, while the raw material prices are increasing, resulting in a decline in earnings.
 - c) Gross Margin - EO is a function of revenue shortfalls or expense increases impacting cost of goods sold. EO is measured based on differences in gross profit.
 - d) Return on Capital - EO is captured by comparing historical returns on invested capital to those for a period near the valuation date

Methods to Quantify EO for Fixed Assets (3)

➤ Sales Transactions:

- calculate the magnitude of economic obsolescence for a similar property acquired in the market by comparing the cost indicator of value prior to deducting economic obsolescence to the actual sales price. The difference is economic obsolescence.

➤ With and Without Method (WWM):

- A means of valuation whereby two sets of cash flow forecasts are developed. One set reflects the expected cash flows without the factors that could lead to EO. The second set of cash flows includes these adverse, external factors. The difference in the values from the two sets of cash flows represents the amount of EO.

Steps in a WWM Method (for EO)

1. Identification source of economic obsolescence and appropriateness of using a WWM analysis.
2. DCF Without EO:
 - a) Estimate future cash flows (base no EO).
 - b) Estimate capital expenditures and working capital needs.
 - c) Estimate discount rate appropriate for calculation of the present value of cash flows.
 - d) Calculate the present value of future cash flows to determine the value of the subject business without EO.
3. DCF With EO:
 - a) Estimate future cash flows (base no EO).
 - b) Estimate capital expenditures and working capital needs
 - c) Estimate discount rate appropriate for calculation of the present value of cash flows.
 - d) Calculate present value of future cash flows to determine the value of the business with the EO.
4. Deduct the value of the business for the EO scenario from the value of the business (DCF Without) for the base case scenario (DCF With). **Difference presumably represents EO.**
5. Assess whether EO is specific to a specific asset or a group of assets.

WWM – Case (EO vs COGS)

Illustration

With and Without Method

External Factors Impacting COGS Only

Comparison of Value Indications:

Value without Economic Obsolescence

USD 358

Value with Economic Obsolescence

USD 314

(1) Total Economic Obsolescence

USD 44

12,2%

Comparison of Key Financial Metrics	Fiscal Year ending December 31,			
	2022	2023	2024	2025
Revenues:				
- Without EO	USD 1.300	1.400	1.500	1.600
- With EO	USD 1.300	1.400	1.500	1.600
EBIT :				
- Without EO	USD 65	70	75	80
- With EO	USD 52	56	60	64
EBIT Margin:				
- Without EO	5,0%	5,0%	5,0%	5,0%
- With EO	4,0%	4,0%	4,0%	4,0%

Notes (s):

(1) Total economic obsolescence presumably only impacts fixed assets

(2) Assume no or minimal impact on values of other assets of the business (customers).

Although profit available to customers is now lower, a lower value for fixed assets would lead to a lower contributory charge for fixed assets and presumably same residual income for customers

Summary

1. Use of an income approach is an important component in testing for economic obsolescence (EO).
2. In the Cost Approach – Economic obsolescence is included as a separate adjustment to replacement cost along with physical and functional obsolescence adjustments which are also required.
3. American Society of Appraisers - Machinery and Equipment: “Economic obsolescence, sometimes called “external obsolescence,” is the loss in value or usefulness of a property caused by factors or economic forces external and unrelated to the property itself.
4. EO in fixed assets can be caused by a wide variety of factors including economic factors, Industry factors or factors impacting a specific element of firm operations.
5. To determine of EO we can use With and Without Method (WWM). WWM a means of valuation whereby two sets of cash flow forecasts are developed. One set reflects the expected cash flows without the factors that could lead to EO. The second set of cash flows includes these adverse, external factors. The difference in the values from the two sets of cash flows represents the amount of Economic obsolescence (EO).



QA

THANKS



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