



Globalview Advisors

Financial Valuation and Advisory Services

Economic Obsolescence in Fixed Assets – Business Valuation Perspective

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Presenter's Contact Information



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Objectives

- Understand what Economic Obsolescence (“EO”) is
- Identify causes of EO
- Understand assets impacted by EO
- Recognize situations where economic obsolescence is important
- **Understand the implications of not properly identifying EO and which conclusions of value will be affected**
- Understand methods used to quantify EO
- Understand the application of the With and Without Method

Agenda

- Introduction to Economic Obsolescence
- Causes of Economic Obsolescence
- Alternative Means of Measuring EO
- The With and Without Method
- Case Studies
- Summary
- Questions



Introduction

Other Resources on Economic Obsolescence

- *Measuring Economic Obsolescence*, American Society of Appraisers - 2013 Current Topics In Fair Value Conference, PricewaterhouseCoopers LLP, Curt Monday, Leslie Vitale, January 2013. (Available on Internet.)
- *Economic Obsolescence: The Investigation and Quantification of External Factors that Impact Value*, Kevin S. Reilly, ASA, American Society of Appraisers, Economic Obsolescence Webinar, December 4, 2012.
- *Valuing Machinery and Equipment: the Fundamentals of Appraising Machinery and Technical Assets*, 3rd edition, American Society of Appraisers, 2011.

Definition of Economic Obsolescence

- **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

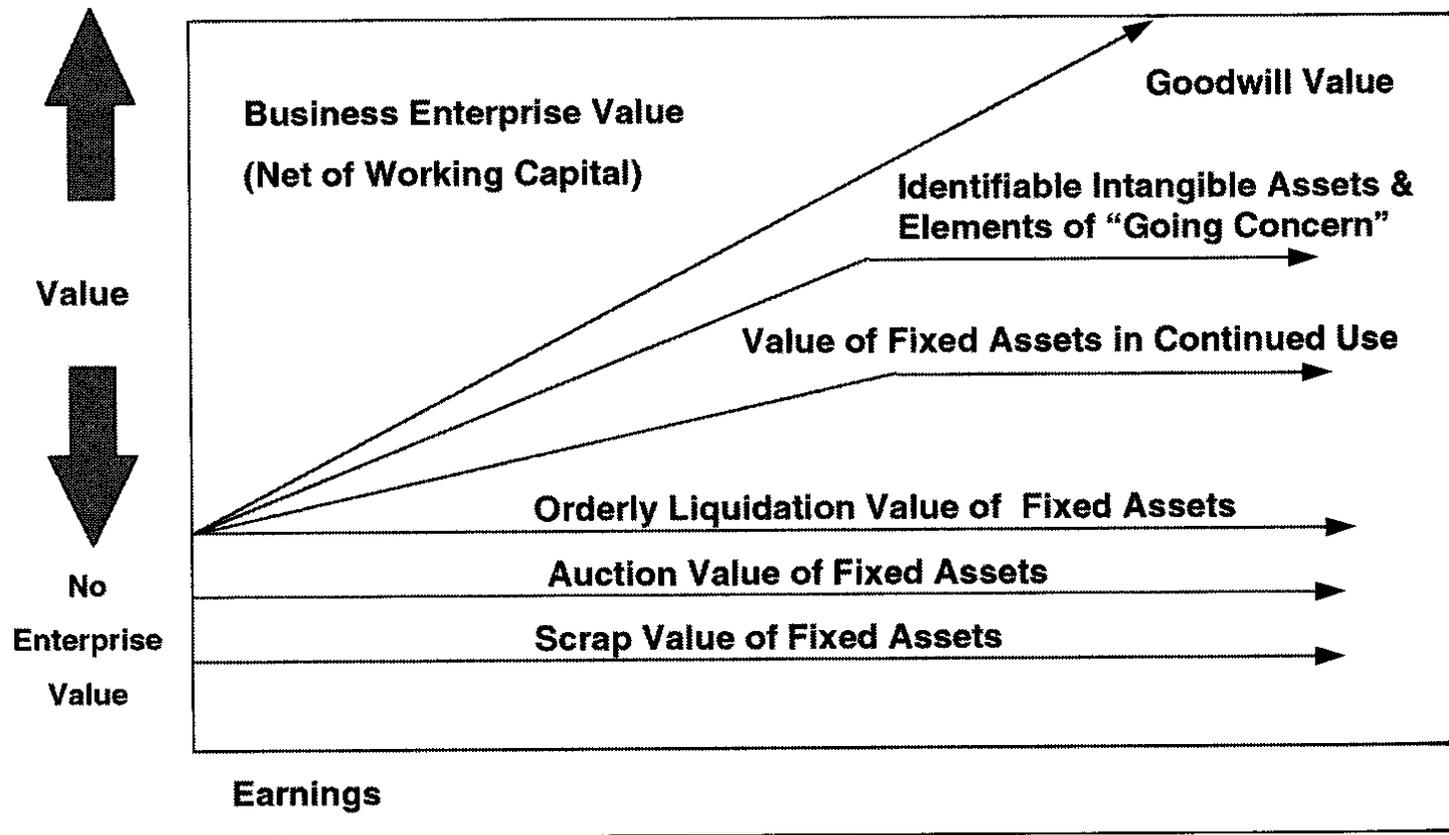
¹ Source: *Valuing Machinery and Equipment: the Fundamentals of Appraising Machinery and Technical Assets*, 3rd edition American Society of Appraisers, 2011, page 522.

² *The Appraisal of Real Estate*, The Appraisal Institute, 12th edition.

What is Economic Obsolescence?

- 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).

Standard of Value for Fixed Assets Relative to Earnings and Enterprise Value



Source: *Financial Valuation Applications and Models, 3rd Edition*, James R. Hitchner, 2011.

Situations Where EO is Important

- Financial reporting
 - Purchase price allocations
 - Impairment
- Property Tax Assessments
- Utility Rate Setting
- Other

Implications of Overvaluation of Fixed Assets— Purchase Price Allocation for Financial Reporting

- **Failure to adjust for EO can lead to overvaluation of fixed asset and impacts on other elements of a company's financial statements**
 - Excluding EO results in over-valuation of fixed assets. For a PPA, this leads to overstating depreciation expense and understating future earnings.
 - May result in unexpected impairment of fixed assets when they are tested for impairment under IFRS 36 or ASC 360.
 - Impacts the value of intangible assets valued using EEM. Fixed asset values impact key elements of MPEEM calculations:
 - Calculation of residual income
 - Reconciliation of discount rate estimates for individual assets (Weighted average return on assets or WARA)
 - Results in understatement of goodwill. Could lead to “bargain purchase” conclusion when transaction is not really a bargain purchase.



Causes of Economic Obsolescence

Causes of EO—Cases Where EO Identified

1. **Deepwater Horizon Oil Spill** (Unexpected Event)—U.S. government restricts use of oil drilling rigs after the BP drilling rig. This temporarily suspends their ability to generate revenues and cash flows. Regulatory changes can impact economic returns to fixed asset investments.
2. **Auto Parts Manufacturer** (Severe Economic Decline)—Due to the Financial Crisis of 2008/2009, demand for cars declined leading to a 50% drop in shipments by the auto parts manufacturer. The production line can continue to operate but is barely profitable. Impairment testing with economic obsolescence considered indicates a Fair Value greater than liquidation value but less than RCNLD.
3. **Acquisition of Quick Service Restaurants** (Varying Financial Performance)—A quick service restaurant chain is acquired with many company owned restaurants. Company generates positive cash flows and overall returns suggest value well in excess of tangible asset investment. Certain restaurants are performing poorly with losses or very small levels of profit. It is necessary to identify and quantify EO for these poor performing restaurants. (EO likely driven by revenue shortfalls that do not allow adequate return to underlying capital investment.)

Possible Impairment Triggers per IAS 36

External Sources of Information

1. During the period, an asset's market value has declined significantly more than would be expected as a result of the passage of time or normal use.
2. **Significant changes with an adverse effect** on the entity have taken place during the period, or will take place in the near future, in the **technological, market, economic or legal environment** in which the entity operates or in the market to which an asset is dedicated.
3. Market interest rates or other market rates of return on investments have increased during the period, and those increases are likely to affect the discount rate used in calculating an asset's value in use and decrease the asset's recoverable amount materially.
4. The carrying amount of the net assets of the entity is more than its market capitalization.

Possible Impairment Triggers per IAS 36

Internal Sources of Information

1. Evidence is available of obsolescence or physical damage of an asset.
2. **Significant changes with an adverse effect on the entity** have taken place during the period, or are expected to take place in the near future, in the extent to which, or manner in which, an asset is used or is expected to be used. These changes include the asset becoming idle, plans to discontinue or restructure the operation to which an asset belongs, plans to dispose of an asset before the previously expected date, and reassessing the useful life of an asset as finite rather than indefinite.
3. Evidence is available from internal reporting that indicates that the **economic performance of an asset is, or will be, worse than expected.**

Possible Impairment Triggers per IAS 36

Evidence from Internal Reporting

1. Cash flows for acquiring the asset, or subsequent cash needs for operating or maintaining it, that are significantly higher than those originally budgeted;
2. Actual net cash flows or operating profit or loss flowing from the asset that are significantly worse than those budgeted;
3. A significant decline in budgeted net cash flows or operating profit, or a significant increase in budgeted loss, flowing from the asset; or
4. Operating losses or net cash outflows for the asset, when current period amounts are aggregated with budgeted amounts for the future.

Other Factors

1. Supply chain disruption
2. Violation of debt covenants
3. Debt rating downgrade
4. Unfavorable change in cost of debt
5. Unfavorable change in cost of equity

Possible Impairment Triggers per ASC 360

1. A significant **decrease in the market price of a long-lived asset** (asset group) (*Possible EO*)
2. A significant **adverse change in the extent or manner in which a long-lived asset (asset group) is being used** or in its physical condition (*Possible EO or physical obsolescence*)
3. A significant adverse change in **legal factors** or in the **business climate** that could affect the value of a long-lived asset (asset group), including an adverse action or assessment by a regulator (*Possible EO*)
4. An accumulation of **costs significantly in excess of the amount originally expected for the acquisition** or construction of a long lived asset (asset group)
5. A current-period **operating or cash flow loss** combined with a history of operating or cash flow losses or a **projection or forecast that demonstrates continuing losses** associated with the use of a long-lived asset (asset group) (*Possible EO*)
6. A current expectation that, more likely than not, a long-lived asset (asset group) will be **sold or otherwise disposed of significantly before the end of its previously estimated useful life** (*Possible EO*)

Causes of EO—Introduction

- EO in fixed assets can be caused by a wide variety of factors. These include:
 - Economic factors
 - Industry factors
 - Factor(s) 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 asset(s) are impacted by EO

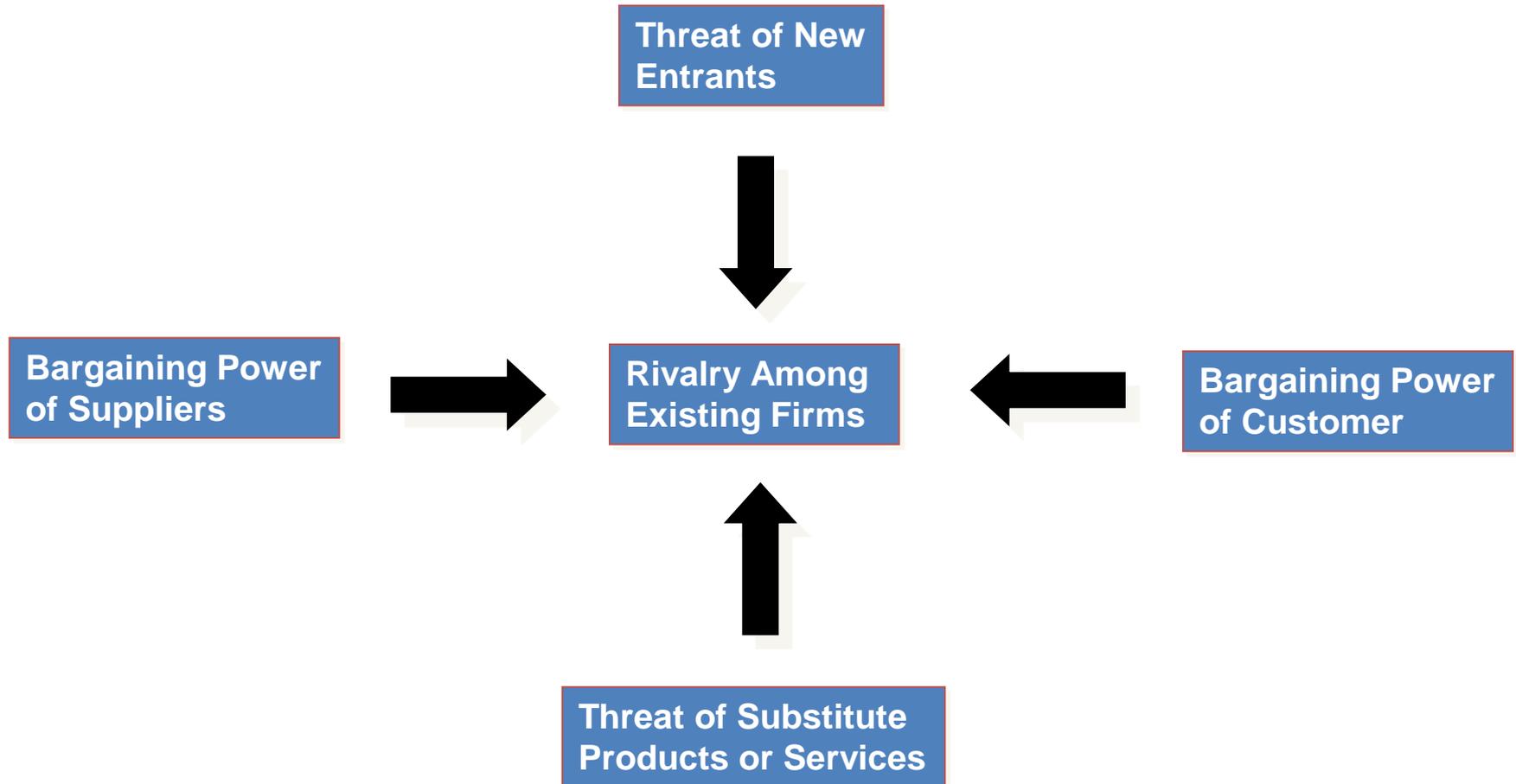
Causes of EO—Introduction

- Factors leading to EO can impact financial results in several ways
 - Revenue reductions
 - Increase in cost of goods sold (as % of revenues)
 - Increase in overhead / indirect costs
- Impact(s) on financial results can help determine which assets of the business are adversely impacted.
- Different factors can impact different mixes of business assets – tangible and intangible assets
 - Fixed assets
 - Intangibles
 - Customers
 - Trade name
 - Technology
 - Other intangibles (work force, others)

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	Comments
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 increased cost of inputs.
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.				

Causes of EO— Industry Competition—Porter's Five Factors



Source: *Competitive Strategy*, Michael E. Porter, Simon & Schuster, 1980.

Factors Impacting Competition—Barriers to Entry

- Barriers to entry may impact potential for economic obsolescence. Key barriers include:
 - Economies of scale
 - Product differentiation
 - Capital requirements
 - Switching costs to customers
 - Access to distribution channels
 - Other cost advantages
 - Government policies
 - Incumbent's defense of market share
 - Industry growth rate

Factors Impacting Competition—Customer Bargaining Power

- Factors affecting impact of customer bargaining power:
 - Number of customers relative to suppliers
 - Product differentiation
 - Switching costs to use other product
 - Customer's profit margins
 - Customer's use of multiple sources
 - Customer's threat of backward integration
 - Supplier's threat of forward integration
 - Importance of product to supplier
 - Customer volume

Factors Impacting Competition—Competitive Rivalry

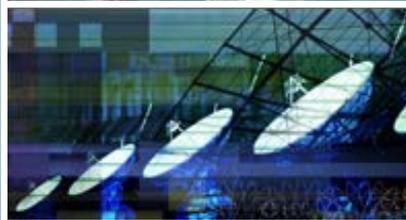
- Factors that affect competitive rivalry:
 - Number of competitors (concentration)
 - Relative size of competitors (balance)
 - Industry growth rate
 - Fixed costs vs. variable costs
 - Product differentiation
 - Capacity augmented in large increments
 - Customer's switching costs
 - Diversity of competitors
 - Exit barriers
 - Strategic stakes

Factors Impacting Competition—Substitutes

- Factors affecting impact of possible substitutes:
 - Relative price of substitutes
 - Relative quality of substitutes
 - Switching costs to customers

Factors Impacting Competition—Bargaining Power of Suppliers

- Factors affecting impact of supplier bargaining power:
 - Supplier integration
 - Availability of substitute products
 - **Importance of supplier's input to customer**
 - Supplier's product differentiation
 - Importance of industry to suppliers
 - Customer's switching costs to other input
 - **Supplier's threat of forward integration**
 - Customer's threat of backward integration



Determining if EO is Present

Determining if EO is Present—Introduction

- Determining if EO is present should reflect availability of sufficient income to support investment in FA.
- Elements of the Excess Earnings Method to valuing a business can be used for this determination.
- Once total income of the business is determined, the availability of income to support investment in fixed assets can be determined.
- Working capital is generally not subject to economic obsolescence. Land is valued based on market approach, so, EO is captured.
- These concepts may be particularly helpful for fixed asset intensive companies and less relevant for intangible intensive entities.
- Key area of concern is development of discount rates for different asset classes. While direct measurement is not available, techniques to estimate these discount rates are improving.

Determining if EO is Present—Steps in the Process

- **Steps for employing EEM concepts to determine if EO is present include:**
 1. Segregate any non-operating assets from the operating assets of the business enterprise
 2. Determine normalized operating earnings for the operating business enterprise
 3. Determine whether an income metric or cash flow metric such as debt free net cash flow should be used (debt free benefit streams are preferred)
 4. Determine values of working capital and land (fair values / fair market values are preferred over book values)
 5. Determine reasonable rates of return for WC and land (individually or jointly) (Key Issue)
 6. Calculate required return on working capital and land by multiplying each rate of return by the fair value of each group of assets

Steps in the Process (cont.)

7. Subtract required returns on working capital and land from operating earnings of the business enterprise to develop “excess earnings” (residual income) available to fixed assets and intangibles
8. Determine FV of fixed assets prior to EO
9. Determine a required rate of return for FA and estimate a return requirement
10. Compare the income available to fixed assets (and intangible assets) to the required return on intangible assets.
 - a. If negative, income from business is not sufficient to support investment in FA and EO is present
 - b. If positive, there is still some uncertainty on whether there is EO on fixed assets.

Note: Roles of intangible assets should be considered. The business will have a work force. This could be valued and a charge deducted. Adjustments for other intangible assets are possible. This is an area of divergence in practice.

Balance Sheet

Historical and Adjusted Balance Sheets			
	Reported	Adjustment	As Adjusted
Current Assets			
Cash	\$ 100,000		\$ 100,000
Account Receivable	400,000		400,000
Inventory	300,000		300,000
Other	100,000		100,000
Total Current Assets	900,000	-	900,000
Land	50,000	450,000	500,000
Net PP&E	1,000,000	1,000,000	2,000,000
Other Assets	-		-
Total Assets	\$ 1,950,000	\$1,450,000	\$ 3,400,000
Current Liabilities			
Accounts Payable	\$ 200,000		\$ 200,000
Accrued Expenses	200,000		200,000
Current Portion of Long-term Debt	-		-
Other	-		-
Total Current Liabilities	400,000	-	400,000
Total Long-Term Liabilities	-	-	-
Total Liabilities	400,000	-	400,000
Shareholders' Equity	1,550,000	1,450,000	3,000,000
Total Assets and Current Liabilities	\$ 1,950,000	\$1,450,000	\$ 3,400,000
Notes:			
Does not include adjustment to include value of intangible assets.			

Income and Cash Flow Statements

Prior and Current Income Statements:		Prior		Current	
	Revenue		\$ 10,000,000		\$ 10,000,000
(1)	Cost of Goods Sold	70.0%	7,000,000	75.0%	7,500,000
	Gross Profit		3,000,000		2,500,000
	SG&A Expenses	20.0%	2,000,000	20.0%	2,000,000
	EBITDA	10.0%	1,000,000	5.0%	500,000
(2)	Depreciation		200,000		200,000
	Operating Income (EBIT)	8.0%	800,000	3.0%	300,000
	Tax Expense	40.0%	320,000	40.0%	120,000
	Net Income	4.8%	\$ 480,000	1.8%	\$ 180,000
Calculation of Debt Free Net Cash Flow:					
	Net Income		\$ 480,000		\$ 180,000
	Adjustment for Working Capital		-		-
	Plus: Depreciation		200,000		200,000
	Less: Capital Expenditures		(200,000)		(200,000)
	Debt Free Net Cash Flow		\$ 480,000		\$ 180,000
Notes:					
(1)	Prior reflects original expected income statement. Due to adverse factors impacting input costs, COGS increased dramatically from 70 to 75% of revenues. As subsequent calculations indicate, investor would not have invested in FA based on current financial performance.				
(2)	Depreciation based on assumed ten year life.				

Estimated Return Requirements by Asset Type

Return Requirements by Asset Class				
	<u>Asset Class</u>			
	<u>Working</u>		<u>Fixed</u>	<u>Intangibles</u>
	<u>Capital</u>	<u>Land</u>	<u>Assets</u>	<u>& Goodwill</u>
Weighted Average Cost of Capital:				
Debt to Total Capital	80.0%	70.0%	60.0%	0.0%
Cost of Debt (After-tax)	3.6%	3.6%	3.6%	3.6%
Weighted Cost of Debt	2.9%	2.5%	2.2%	0.0%
Equity to Total Capital	20.0%	30.0%	40.0%	100.0%
Cost of Equity	18.0%	18.0%	18.0%	18.0%
Weighted Cost of Equity	3.6%	5.4%	7.2%	18.0%
Weighted Average Cost of Capital	6.5%	7.9%	9.4%	18.0%
Rounded	6.5%	8.0%	9.5%	18.0%

Testing for Economic Obsolescence

Testing for Economic Obsolescence for Fixed Assets				
Calculation of Income Available to Fixed Assets and Intangibles:				
	Prior		Current	
Debt Free Net Cash Flow		\$480,000		\$ 180,000
Required Working Capital Balance	\$ 500,000		\$ 500,000	
WC Rate of Return	6.5%		6.5%	
Return Attributable to Working Capital		32,500		32,500
Land Value	\$ 500,000		\$ 500,000	
WC Rate of Return	8.0%		8.0%	
Return Attributable to Working Capital		40,000		40,000
Income Available to Fixed Assets and Intangibles		<u>\$407,500</u>		<u>\$ 107,500</u>
Calculation of Income Required for Fixed Assets				
Required Fixed Asset Balance	\$ 2,000,000		\$ 2,000,000	
Fixed Asset Rate of Return	9.5%		9.5%	
Return Required for Fixed Assets		<u>\$190,000</u>		<u>\$ 190,000</u>
Comparison of Available Income to Required Return for Fixed Assets				
Income Available to Fixed Assets and Intangibles		\$407,500		\$ 107,500
Return Required for Fixed Assets		190,000		190,000
Excess / (Shortfall) of Income		<u>\$217,500</u>		<u>\$ (82,500)</u>
Conclusion	Current income indicates EO in fixed assets			
Notes:				
Prior income expectation supports value of fixed assets and intangible value.				
Current depressed income is indicative of EO unless adverse change is temporary and of short duration.				



Alternative Means of Measuring EO

EO and Different Value Methodologies—Business Valuation

- For a business, the earnings / cash flow should capture the impacts of any factors leading to economic obsolescence.
 - **Income Approach**
 - **Discount Cash Flow Method**—Economic obsolescence should be captured in revenue, profit and cash flow assumptions.
 - **Capitalized Income Method**—Economic obsolescence should be captured in revenue, profit and cash flow assumptions. This method is far simpler than the DCF Method and lacks flexibility to deal with temporary factors with precision.
 - **Market Approach**—Theoretically, market approach would capture economic obsolescence. Market prices reflect values in exchange.
 - **Cost Approach**—Rarely used for the valuation of a business enterprise valued as a going concern.

EO and Different Value Methodologies—Intangible Asset Valuation

- Allocation of economic obsolescence will vary depending on the nature of assets and how they are valued.
 - **Income Approach**
 - **Excess Earnings Method**—Economic obsolescence already captured in revenue and profit margin assumptions. Fixed asset mis-valuation can lead to mis-valued intangibles.
 - **Relief from Royalty Method**—Economic obsolescence partially captured in revenue estimate. Estimated royalty rates may be out of date and reflect economic factors at a different point in the industry or business cycle or not reflect changes in the industry environment
 - **Market Approach**—Theoretically, market approach would capture economic obsolescence. Market prices may reflect values in exchange. Use of values in exchange for assets that are in use may not be appropriate for assets valued with an in-use premise.
 - **Cost Approach**—Cost Approach does not directly capture economic obsolescence.

EO and Different Value Methodologies—Real Estate Valuation

- Similar in many ways to valuation of a business.
 - **Income Approach**
 - **DCF Method**—Forecast income would presumably capture economic obsolescence
 - **Capitalized Income Method**—Theoretically captured in income figure capitalized into a value indication. Capitalization models may not address temporary factors accurately.
 - **Market Approach**—Theoretically, market approach would capture economic obsolescence. Market prices should reflect same overall factors impacting subject.
 - **Cost Approach**—Infrequently used for real estate.

EO and Different Value Methodologies—Fixed Asset Valuation

- Cost approach is most likely means of addressing economic obsolescence.
 - **Income Approach**
 - **Excess Earnings Method**—Infrequently applied for fixed assets.
 - **Relief from Royalty Method**— Rarely applied for fixed assets.
 - **Market Approach**
 - For complex groups of fixed assets, can market sales that involve primarily fixed assets be relied upon? Transactions are often very limited. Is one transaction sufficient? Are other assets involved? Are adjustments for difference substantial and qualitative in nature?
 - Use of values in exchange for assets that are being valued on an in-use premise may not be appropriate.
 - **Cost Approach**—Cost Approach typically applied for fixed asset does not directly capture economic obsolescence.

Methods to Quantify EO for Fixed Assets—Income

- Income Approach—(Direct Application to the asset)
 - Can be used when a set of cash flows can be attributed to the enterprise or asset.
 - At the plant level or enterprise level for commodity goods manufacturing when no or minimal intangible assets can be identified.
 - Often an entire plant, production line, or real estate location.
 - Business valuation issues:
 - Contributions of working capital and intangibles
 - Appropriate discount rate
 - Forecast period equal to the estimated useful life of the asset
 - Terminal value comprised of salvage value and net working capital
 - Capital expenditures should exclude expansion, only maintenance attributable to that particular asset/asset group

Methods to Quantify EO for Fixed Assets—Market

- Market Approach—(Direct application to the asset)
 - For assets with active, identifiable and verifiable secondary markets.
 - Assets are roughly homogeneous in utility and have elements of comparability.
 - Computing equipment, vehicles, real property, ships, planes, rail cars, other.

Methods to Quantify EO for Fixed Assets—Cost

■ Cost Approach

- Generally required when valuing many individual assets.
- Orderly Liquidation value is the lowest level (floor) of the fixed assets. This represents a cash value that can be realized.
- EO adjustment to cost approach conclusions using:
 - Inutility Calculation
 - Income approach estimates
 - Market comparisons
- After accounting for EO, the Fair Value is typically below RCNLD and above Orderly Liquidation value.

Methods to Quantify EO—Listing

- **Inutility**—EO is a function of plant not operating at capacity. Used for process plants.
- **Profit Based EO Calculations**
 - **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.
 - **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.
 - **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.
 - **Return on Capital**—EO is captured by comparing historical returns on invested capital to those for a period near the valuation date
- **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**—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.

The Inutility Penalty

- If a plant is operating below its rated or designed capacity and it is expected to do so for some time, it may be less valuable than it otherwise would be.
- Under the cost approach, an investor will only pay for the comparable utility of a similar new property.
- The cost to capacity method is based on plant and equipment cost engineering studies which found an exponential relationship between cost and capacity.
- Using a cost to capacity formula an Inutility Penalty can be calculated as a percent. This method measures the loss in value by reducing the overall capital investment estimate from rated output capacity to actual capacity (measuring the comparable utility the investor would be willing to pay for.)

Methods to Quantify EO—Inutility

- Developing the Inutility Penalty starting with the cost to capacity method:

Cost A = cost of equipment A

Cost B = cost of equipment B

Capacity A = rated capacity of equipment A

Capacity B = rated capacity of equipment B

$$\frac{\text{Cost A}}{\text{Cost B}} = \left(\frac{\text{Capacity A}}{\text{Capacity B}} \right)^x$$

X = exponent or scale factor

- If any 4 inputs are known the remaining input can be solved for.
- By relating known costs and capacities a scale factor can be developed.
- If a scale factor is known we can estimate an unknown cost or capacity.
- Exponential relationship between cost and capacity originally identified by C.H. Chilton in a study of 35 complete process plants.

The Inutility Penalty

- $\text{Inutility \%} = [1 - (\text{Capacity B} / \text{Capacity A})^X] \times 100$
- Calculated using the cost to capacity method in a different form.
- Scale factor (x) = 0.7 (range of 0.6 to 0.8 with 0.7 being average). Use of .7 known as the 7/10's rule developed for complete process plants (Remer and Chai).
- Scale factor development based on studies of plant size to capital cost relationships.
- Use of 7/10 rule says that a 1 percent decrease in output capacity would yield only a .7 percent decrease in capital costs. Other scale factors can be estimated if all four inputs of cost and capacity are known.

Methods to Quantify EO—Inutility—Challenges

- **Limited application**—Inutility estimates are generally only applied to process plants. Examples of process line manufacturing: petrochemicals (refinery), chemicals (pharmaceuticals), liquids, dry bulk, crushing, mixing, other. Production output is often measured as a rate, such as units per time (tons /day)
- **Capacity measurement**—Compare “actual” capacity to “rated capacity” and not to “theoretical” overall capacity. Process plants (those operating continuously 24/7) are typically designed to operate at or near 100% of their design capacity and "non-process" plants typically operate with some reserve capacity. When designed, the slack allows for some growth in output and it makes sure the plant is not subject to diminishing returns due to unanticipated functional obsolescence or bottlenecks.
- **Improper application**—An inutility penalty would not be appropriate for all fixed asset groupings (mobile phone network as example). Mobile phone network costs increase in a linear way as a function of the total count of base stations and switches.

Methods to Quantify EO—Gross Margin Approach

- Gross margin approach quantifies EO by comparing gross margins over time.
 - Useful method to calculate EO when margins and profitability are the direct cause of value reductions
 - $\text{Gross margin} = \text{Revenues} - \text{cost of goods sold}$
 - Compare gross margins, at appraisal date, to a benchmark in time where gross margins were at “normal” levels
 - Future levels of gross margin should also be considered
- Steps include:
 1. Determine the revenue at valuation date and also the revenue over history (make sure the historical period provides enough data to determine an appropriate benchmark)
 2. Determine the cost of goods sold
 3. Calculate the gross margin for each data point

Methods to Quantify EO—Gross Margin Approach

- Gross margin penalty (EO) calculated by comparing the gross margin at appraisal date to a “benchmark” gross margin:

Calculation example:

Current Gross Margin: \$55 per unit

Benchmark Gross Margin: \$75 per unit (Level of profitability in normal market conditions)

$$EO = \frac{(\text{Benchmark Gross Margin} - \text{Current Gross Margin})}{\text{Benchmark Gross Margin}}$$

$$EO = \frac{(\$75.00 - \$55.00)}{\$75.00} = \frac{\$20.00}{\$75.00}$$

$$EO = .27 \text{ or } 27\%$$

Methods to Quantify EO—Gross Margin Approach - Challenges

- Confirm consistency in revenue and expense reporting
 - Allocation of expenses between COGS and operating expenses can vary
- Measurement period uncertainty
 - Selection of “current” period
 - Selection of “benchmark” periods
- Future levels of gross margin must be considered
 - The simplified example presented assumes a constant gross margin difference. (With and Without Method allows for more robust modeling.)

Methods to Quantify EO—Market Approach

- The market approach quantifies EO from sales of similar properties.
 - Market comparables of similar properties must be available
 - Sufficient information on the sales must be available (infrequent)
- Steps include:
 1. Deduct values of other acquired assets from the sale price. Land is a typical example but working capital and intangible assets (work force at a minimum) might be present as well
 2. Calculate the replacement cost new of fixed assets (“RCN”)
 3. Calculate and deduct all forms of depreciation from the RCN, except for EO
 4. Subtract the adjusted sale price (Step 1) from the RCN less depreciation (prior to EO deduction) (Step 3)
- The result is EO based on market transactions

Methods to Quantify EO—Market Approach—Example

Step 1 (Deduct Land Value from Sales Price):

Sale Price of Comparable Property	\$10,000,000
Less Land Value (and WC and intangibles)	<u>2,000,000</u>
Equals Sales Price Less Land	\$8,000,000

Step 2 (Develop RCN):

RCN	\$15,000,000
-----	--------------

Step 3 (Calculate Cost Indicator before EO):

RCN	\$15,000,000
Less Physical Depreciation	<u>4,000,000</u>
Equals RCNLD	\$11,000,000
Less Functional Obsolescence	<u>1,000,000</u>
Equals Cost Indicator of Value Before EO	\$10,000,000

Step 4 (Calculate EO):

Cost Indicator of Value Before EO	\$10,000,000
Sales Price Less Land and WC and intangibles	<u>8,000,000</u>
Economic Obsolescence	\$ 2,000,000

18% of RCNLD ($\$2,000,000 \div \$11,000,000 = .18$, or 18%)

Methods to Quantify EO—Market Approach— Challenges

- Availability of transactions
- Comparability of transactions
 - Date
 - Other specific factors
- Is a limited number of transactions valid market evidence?
- Does the transaction price reflect unique factors of a given situation (distressed seller) that can vary widely or may not be relevant?
- Is there adequate disclosure?
- Costs required to estimate fair value of land
- Identification and valuation of other acquired assets
 - Working capital
 - Intangibles

Methods to Quantify EO—Return on Total Capital Approach

- Return on total capital approach quantifies EO by comparing earnings to the investment used to generate those earnings.
 - This approach is a measure of profitability
 - It measures the return an investment generates to those who contribute capital (debt and equity investors)
 - Financial databases provide return on capital indicators
 - Useful when publicly traded company information is available

Steps include:

1. Determine the historical level of return on total capital of publicly traded companies within the same industry
2. Determine the current level of return on total capital of publicly traded companies within the same industry
3. Conclude a historical level of the return on total capital
4. Conclude a current level of the return on total capital
5. Calculate EO

Methods to Quantify EO—Return on Total Capital Approach—Example

- Return on capital for industry
 - Five year average return on capital – 9%
 - Current return on capital – 6%
- Calculation of economic obsolescence
 - Return on capital shortfall – 3%
 - Base return on capital – 9%
 - Economic obsolescence = $3\% / 9\% = 33\%$

Methods to Quantify EO—Return on Total Capital Approach— Challenges

- Accuracy of ROIC Metrics—return on capital is an extremely high level measure of financial performance. Other methods (WWM) may better address EO
 - Accuracy of reported earnings—are adjustments required to obtain true operating income
 - Challenges in valuation of total invested capital
 - Values of equity can be volatile
 - Debt is typically valued at face value rather than fair value
 - Impact of differing capital structures on measured ROIC
 - Other

EO Measurement Challenges

- Applying EO models without first confirming that EO exists could produce erroneous results.
 - A 25% penalty is calculated using one of the models (an EO assessment of the business has not been performed). This does not necessarily imply a 25% reduction to the fixed assets. A fair return on assets may still be generated.
 - There could be “excess earnings” at the lower performance level that would still imply full value for the fixed assets (i.e., CRNLD) with some additional intangible asset value.
 - Real numbers and actual profits should be analyzed.



The With and Without Method

With and Without Method (“WWM”)—Introduction

- The With and Without Method (“WWM”) is a method that is known for its use to value intangible assets.
- The method is discussed in several documents that provide guidance on the valuation of intangible assets. These include:
 - The Identification of Contributory Assets and Calculation of Economic Rents, May 31, 2010, The Appraisal Foundation.
 - The Valuation of Customer-Related Assets, discussion draft issued June 5, 2012. The Appraisal Foundation.
- While the term WWM may not be well recognized, the method is actually a fairly straightforward process for capturing value when two different “states” of operation can be compared.

With and Without Method (“WWM”) —Introduction

- Using WWM, the impact of economic obsolescence can be measured as the difference between the value of the business when estimated under two sets of cash flow projections:
 1. The value of the business (plant, other) **without the adverse factor** leading to economic obsolescence (base or original case)
 2. The value of the business (plant, other) **with the adverse factor** leading to economic obsolescence

WWM—Steps in a WWM Analysis

1. **Confirm** source of economic obsolescence and appropriateness of using a With and Without Method analysis.
2. **Estimate** future revenues and cash flows for the base case (no EO).
3. **Estimate** future revenues and cash flows for the actual case (EO scenario).
4. **Estimate** capital expenditures and working capital needs required for each scenario. (Revenue and other changes in a business can lead to potential changes in CAPEX and WC needs.
5. ***Estimate discount rate appropriate for calculation of the present value of cash flows. (Key Issue)***
6. **Calculate** the present value of future cash flows to determine the value of the subject business without EO.

WWM—Steps in a WWM Analysis (*cont'd*)

- 7. Calculate** present value of future cash flows to determine the value of the business with the EO.
- 8. Deduct** the value of the business for the EO scenario from the value of the business for the base case scenario. Difference presumably represents EO.
- 9. Assess** whether EO is specific to a specific asset or a group of assets.

WWM—Key Assumptions of the WWM Analysis

- Impact on Revenues as a result of the factor(s) leading to EO
 - Magnitude of impact
 - Duration of impact
- Impact on Expenses as a result of the factor(s) leading to EO
 - Magnitude of impact
 - Duration of impact
- Impact on Working Capital Requirements and Capital Expenditures as a result of changes in financial projections as a result of factor(s) leading to EO

WWM—Key Considerations—Impact Period

- A key assumption of the WWM is the period of time over which the subject business can “return to normal”
- For the determination of EO for existing fixed assets, cash flow period
 - A finite life no longer than the remaining physical life should be used.
 - The period could be shorter if external factors are expected to go away
- Estimating the period over which a business would be impacted by external factors is often very subjective

WWM—Case 1

Expense Impact Only—Summary

Income Approach						
With and Without Method						
Comparison of Value Indications - External Factors Impacting COGS Only						
Comparison of Value Indications:						
	Value without Economic Obsolescence	\$	314			
	Value with Economic Obsolescence		288			
(1)	Total Economic Obsolescence	\$	26	8.2%		
Fiscal Year ending December 31,						
Comparison of Key Financial Metrics			2013	2014	2015	2016
	Revenues					
	- Without EO	\$	1,300	\$ 1,400	\$ 1,500	\$ 1,600
	- With EO		1,300	1,400	1,500	1,600
	EBIT					
	- Without EO		65	70	75	80
	- With EO		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%
Note(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.					

WWM—Case 1

Expense Impact Only—Base Case

Income Approach							
With and Without Method							
Estimated Cash Flows - No Unanticipated External Factors							
			Fiscal Year ending December 31,				
			2013	2014	2015	2016	
(1)	Net revenue		\$ 1,300	\$ 1,400	\$ 1,500	\$ 1,600	
	Cost of goods sold	70.0%	910	980	1,050	1,120	
	Gross profit		390	420	450	480	
	Operating expenses before D&A (EBITDA)	20.0%	260	280	300	320	
	EBITDA		130	140	150	160	
	Depreciation	5.0%	65	70	75	80	
	Operating income (EBIT)		65	70	75	80	
	Tax expense	40.0%	26	28	30	32	
	Operating income, after-tax		39	42	45	48	
	Plus: Depreciation and amortization		65	70	75	80	
(2)	Less: Capital expenditures		-	-	-	-	
	Less: Changes in net working capital	10.0%	(10)	(10)	(10)	(10)	
	Unlevered free cash flow		94	102	110	118	
	Present value factor	12.0%	0.9673	0.8842	0.7894	0.7049	
	Present value of cash flow		\$ 53	\$ 90	\$ 87	\$ 83	\$ 314
Key Financial Performance Metrics:							
	<i>Growth, year-over-year</i>			7.7%	7.1%	6.7%	
	<i>Gross margin</i>		30.0%	30.0%	30.0%	30.0%	
	<i>EBITDA margin</i>		10.0%	10.0%	10.0%	10.0%	
	<i>EBIT margin</i>		5.0%	5.0%	5.0%	5.0%	
	<i>Free cash flow/revenue</i>		7.2%	7.3%	7.3%	7.4%	
Note(s):							
	(1) Projections over life of subject fixed assets.						
	(2) As valuation is of existing fixed assets, no provision for capital expenditures was included						

WWM—Case 1—Alternative Case

Income Approach								
With and Without Method								
Estimated Cash Flows - Adverse External Factors Lead to Increased COGS								
			Fiscal Year ending December 31,					
			2013	2014	2015	2016		
(1)	Net revenue		\$ 1,300	\$ 1,400	\$ 1,500	\$ 1,600		
(2)	Impact to revenue		0.0%	0.0%	0.0%	0.0%		
	Total revenue		1,300	1,400	1,500	1,600		
(3)	Cost of goods sold	71.0%	923	994	1,065	1,136		
	Gross profit		377	406	435	464		
	Operating expenses before D&A (EBITDA)	20.0%	260	280	300	320		
	EBITDA		117	126	135	144		
	Depreciation		65	70	75	80		
	Operating income (EBIT)		52	56	60	64		
	Tax expense	40.0%	21	22	24	26		
	Operating income, after-tax		31	34	36	38		
	Plus: Depreciation and amortization		65	70	75	80		
(4)	Less: Capital expenditures		-	-	-	-		
(5)	Less: Changes in net working capital	10.0%	(10)	(10)	(10)	(10)		
	Unlevered free cash flow		86	94	101	108		
	Present value factor	12.0%	0.9673	0.8842	0.7894	0.7049		
	Present value of cash flow		<u>\$ 49</u>	<u>\$ 83</u>	<u>\$ 80</u>	<u>\$ 76</u>		<u>\$ 288</u>
Key Financial Performance Metrics:								
	<i>Growth, year-over-year</i>		N/A	7.7%	7.1%	6.7%		
	<i>Gross margin</i>		29.0%	29.0%	29.0%	29.0%		
	<i>EBITDA margin</i>		9.0%	9.0%	9.0%	9.0%		
	<i>EBIT margin</i>		4.0%	4.0%	4.0%	4.0%		
	<i>Free cash flow/ revenue</i>		6.6%	6.7%	6.7%	6.8%		
Note(s):								
(1)	In this case, base revenue projections are not impacted by external factors							
(2)	Only impact of external factors is on COGS.							
(3)	Estimated increase in COGS due to external factors							
(4)	As valuation is of existing fixed assets, no provision for capital expenditures was included							
(5)	No change in working capital requirement as revenues have not changed.							

WWM—Case 2—Base Case

Income Approach

With and Without Method

Estimated Cash Flows - No Unanticipated External Factors

		Fiscal Year ending December 31,				
		2013	2014	2015	2016	
(1) Net revenue		\$1,300	\$1,400	\$1,500	\$1,600	
Cost of goods sold	70.0%	910	980	1,050	1,120	
Gross profit		390	420	450	480	
Operating expenses before D&A (EBITDA)	20.0%	260	280	300	320	
EBITDA		130	140	150	160	
Depreciation	5.0%	65	70	75	80	
Operating income (EBIT)		65	70	75	80	
Tax expense	40.0%	26	28	30	32	
Operating income, after-tax		39	42	45	48	
Plus: Depreciation and amortization		65	70	75	80	
(2) Less: Capital expenditures		-	-	-	-	
Less: Changes in net working capital	10.0%	(10)	(10)	(10)	(10)	
Unlevered free cash flow		94	102	110	118	
Present value factor	12.0%	0.9673	0.8842	0.7894	0.7049	
Present value of cash flow		\$ 53	\$ 90	\$ 87	\$ 83	\$ 314

Key Financial Performance Metrics:

<i>Growth, year-over-year</i>		7.7%	7.1%	6.7%
<i>Gross margin</i>	30.0%	30.0%	30.0%	30.0%
<i>EBITDA margin</i>	10.0%	10.0%	10.0%	10.0%
<i>EBIT margin</i>	5.0%	5.0%	5.0%	5.0%
<i>Free cash flow/ revenue</i>		7.2%	7.3%	7.4%

Note(s):

(1) Projections over life of subject fixed assets.

(2) As valuation is of existing fixed assets, no provision for capital expenditures was included

WWM—Case 2—Alternative Case

Income Approach

With and Without Method

Estimated Cash Flows - External Factors Reduce Revenues and Increase COGS

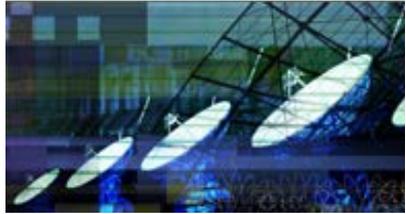
	Fiscal Year ending December 31,			
	2013	2014	2015	2016
(1) Net revenue	\$ 1,300	\$ 1,400	\$ 1,500	\$ 1,600
(2) Impact to revenue	10.0%	10.0%	10.0%	10.0%
Total revenue	1,170	1,260	1,350	1,440
Cost of goods sold	71.0%	831	895	1,022
Gross profit		339	365	418
Operating expenses before D&A (EBITDA)	20.0%	234	252	288
EBITDA		105	113	122
Depreciation		65	70	75
Operating income (EBIT)		40	43	50
Tax expense	40.0%	16	17	19
Operating income, after-tax		24	26	30
Plus: Depreciation and amortization		65	70	75
(4) Less: Capital expenditures		-	-	-
(5) Less: Changes in net working capital	10.0%	3	(9)	(9)
Unlevered free cash flow		92	87	94
Present value factor	12.0%	0.9673	0.8842	0.7894
Present value of cash flow		\$ 52	\$ 77	\$ 74
				\$ 274

Key Financial Performance Metrics:

<i>Growth, year-over-year</i>	N/A	7.7%	7.1%	6.7%
<i>Gross margin</i>	29.0%	29.0%	29.0%	29.0%
<i>EBITDA margin</i>	9.0%	9.0%	9.0%	9.0%
<i>EBIT margin</i>	3.4%	3.4%	3.4%	3.4%
<i>Free cash flow/ revenue</i>	7.1%	6.2%	6.3%	6.3%

Note(s):

- (1) Base revenue projections before impact of external factors
- (2) Estimated impact on revenues of factors adverse external factors
- (3) Estimated impact to COGS of external factors
- (4) As valuation is of existing fixed assets, no provision for capital expenditures was included
- (5) Changes in working capital based on lower revenues forecast due to external factors



Case Studies

Case Study—Quick Service Restaurants (“QSR”)

■ **Background**

- A quick service restaurant (“QSR”) chain is acquired. The Company has historically been profitable and is expected to remain profitable.

■ **Indications of EO**

- Initial valuation from the cost approach indicated a very high fixed asset value relative to the overall purchase price. As a result, there is modest value available for an acquired trade name that was expected to have significant value.
- Review of financial results by restaurant indicate a number of poor performing restaurants with below average revenue/EBITDA or negative EBITDA.

Case Study—QSR – cont'd

- **Effects if EO isn't captured in fixed asset values.**
 - Goodwill would be understated
 - Depreciation of PPE would be overstated
 - Potential future impairment issues (long-lived impairment testing performed at individual restaurant level).

- **Method used to quantify**
 - Market approach employed to estimate the value of the each restaurant (e.g. multiple was applied to store-level EBITDA metrics).
 - EO applied to the extent that the RCNLD of the real property was greater than the estimated value indicated by an income approach.

Case Study—QSR: Detailed Calculation

- Land was valued using market approach. Building, site improvements, and restaurant equipment and furniture valued using cost approach
- Value of each restaurant estimated by applying EBITDA multiple to adjusted store level LTM EBITDA
 - Adjusted EBITDA - adjusted by
 - Off-market lease expense, if any, to estimate normalized restaurant profit and
 - Royalty charge for use of trade name (brand) to remove the value associated with this intangible asset.
 - Selected multiple based on multiples paid when company sold restaurants or purchased restaurants from franchisees.
 - Land value is subtracted from the restaurant value to determine value available for the remaining assets. (Similar adjustment for working capital.)

Case Study—QSR: Detailed Calculation

- Restaurant value less land value sets the maximum value available for remaining restaurant assets.
- Maximum supportable value is compared to estimated value of fixed assets (excluding land) to determine if EO is indicated.
 - EO exists when RCNLD of assets (before EO) > maximum supportable value.
- Where EO is observed, EO is applied to the fixed asset values
 - Floor value is the orderly liquidation value of the fixed assets (establishes maximum EO penalty applied)
 - In the following example some stores have an indicated maximum supportable value which is lower than “Orderly Liquidation Value”. Orderly Liquidation represents a realizable value, which is the floor.

Case Study—QSR: Detailed Calculation

	Revenue	Restaurant EBITDA	Off-Market Rent	Brand Royalty (1)	Adjusted EBITDA	Selected Multiple	Restaurant Value	Fair Value of Land	Max Supportable Value
Restaurant 1	800	40	5	16	19	5.0	95	30	65
Restaurant 2	200	(20)	(5)	4	(19)	5.0	(95)	20	0
Restaurant 3	1,100	100	(20)	22	98	5.0	490	40	450
Restaurant 4	900	80	10	18	52	5.0	260	20	240

	Max Supportable Value	Fixed Assets - RCNLD (2)	Indication of EO (3)	OLV (4)	Concluded Fixed Asset Value	Indicated EO	
Restaurant 1	65	250	Yes	38	65	185	apply EO to not exceed max supportable value
Restaurant 2	0	150	Yes	23	23	128	value at OLV as restaurant value less than OLV
Restaurant 3	450	200	No	30	200	0	no indication of EO
Restaurant 4	240	230	No	35	230	0	no indication of EO
Total	755	830		125	518	313	

(1) Based on a royalty rate of 2.0% of store level revenue.

(2) Determined via cost approach - excludes land.

(3) Compare restaurant value to fixed asset value (RCNLD).

(4) Estimated at 15% of RCNLD before EO (for illustration only).

- Firm tested long-lived assets for impairment at the individual restaurant level (e.g., each restaurant is considered to be the lowest level for which cash flows can be identified)
 - If EO was not properly identified and quantified, client would take unnecessary impairment when the first impairment test performed after the acquisition (client was required by auditor to perform annual long-lived impairment test)
 - Firm validated EO calculations by performing impairment test and confirming no unexpected impairment



Summary

Consideration of EO— Quantifying EO is Complex Process

- Properly quantifying EO is complex process and requires consideration of alternative approaches and development of correct assumptions:
 - Work closely with management to assist in identifying EO and obtaining necessary information to quantify it.
 - Close coordination between the business valuation and fixed asset teams.
- Appraisers apply generalizations or simplified approaches to quantify EO (e.g., “cram down” or pro-rata application to all assets)
 - Result is that EO may be applied to assets that do not have EO condition (e.g., apply EO to all assets of company that has multiple plants without assessing economics affecting each plant)



Questions

Presenter's Bio—Raymond Rath

Area of Focus

Managing Director at Globalview Advisors LLC. Independent valuation firm with offices in Irvine, Boston and London.

Recognized leader in the valuation of businesses, securities interests and intangible assets. Performs valuation projects for financial and tax reporting, transactions and litigation projects.

Extremely active in enhancing the quality of valuation practice both domestically and internationally. Organize and moderate eight annual one-day conferences for the American Society of Appraisers on fair value issues including presentations by staff of the SEC, PCAOB, FASB and IASB. Led the development of two three-day valuation courses for the American Society of Appraisers (ASA) - *Valuation of Intangible Assets* and *Special Topics in the Valuation of Intangible Assets*. Led efforts resulting in an education and certification program for an Intangible Assets valuation specialty designation.

Presenter's Bio—Raymond Rath

Professional Experience

- Managing Director, Globalview Advisors, LLC, November 2012 to present.
- Director, Transaction Services, Valuation Services Practice, PricewaterhouseCoopers LLP, April 2002 to October 2012.
- Senior Manager, Valuation Services Practice, KPMG LLP and KPMG Consulting, Inc. 1994 to April 2002.
- Experienced Manager, Arthur Andersen & Co., 1987 to 1994, Senior Consultant, 1984 to 1987.

Presenter's Bio—Raymond Rath

Professional Affiliations

- Member, AICPA Investment Companies Task Force for AICPA Accounting and Valuation Guide, *Determining Fair Value of Portfolio Company Investments of Venture Capital and Private Equity Firms and other Investment Companies*. Guide is presently in development.
- Treasurer, Business Valuation Committee of the American Society of Appraisers.
- Past Secretary and Member, Business Valuation Committee of the ASA. Elected by ASA international business valuation membership twice (maximum allowed).
- Past President, Los Angeles Chapter of ASA (2004-2005).
- Accredited Senior Appraiser (“ASA”), American Society of Appraisers. Accredited in Business, Intangible Asset valuation & Appraisal Review & Management.
- Chartered Financial Analyst (“CFA”), CFA Institute.
- Member, Appraisal Issues Task Force.

Presenter's Bio—Raymond Rath

Course Development and Instruction

- Lead Developer and Instructor, ASA courses *Valuation of Intangible Assets* (BV 301) and *Special Topics in the Valuation of Intangible Assets* (BV 302).
- Organize and moderate eight one day annual fair value conferences (May 2006 - 2013) for the ASA BVC. Presenters include SEC, PCAOB, FASB and IFRS.
- Instructor, ASC courses BV 201, 202, 203 and 204.
- Course Developer and Instructor, IIBV 301, *Valuation of Intangible Assets*, in Sao Paulo, Brazil. June 2012.
- Instructor, *Current Developments in Valuation*, Beijing, China, December 2010.

Presenter's Bio—Raymond Rath

Presentations

- Presenter, Valuation Developments in the United States, 2nd International Forum on New Developments in Valuation, WuHan, China, November 2012.
- Lecturer, Valuation of Intangible Assets, Zhongnan University of Economics and Law, WuHan, China, November 2012.
- Moderator, Fair Value Auditor Panel, ASA Conference, Chicago, IL 2011.
- Panelist, IPR&D Toolkit Update Panel, ASA Conference, Chicago, IL 2011.
- Presenter, Valuation of Debt, ASA, Miami, FL 2010.
- Presenter, Valuation of Intangible Assets, 25th Pan Pacific Conference, Bali, Indonesia, September 2010.
- Presenter, Attrition Measurement and Estimation, ASA Conference, Boston, MA, Oct 2009.

Presenter's Bio—Raymond Rath

Publications

- Author, Private Company Valuation chapter in the CFA Institute text Equity Asset Valuation. Chapter is a required reading for CFA level 2 candidates globally.
- Author, Intangible Asset Valuation: The Distributor Method, Financial Valuation and Litigation Expert, FVLE Issue 41, February/March 2013.

Education

- M.B.A., University of Southern California.
- B.S., Business Administration, University of Kansas, Cum Laude.

END