

Crash Course

Depreciated Cost Analysis

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Why?

“The three areas of USPAP-related deficiencies in appraisal reports that were most frequently identified by regulators were:

1. Lack of explanations regarding the subject property, market conditions, adjustments, etc., in reports;
2. Lack of support in the report for the reconciliation of the sales comparison approach; and
3. Lack of understanding and disclosure of extraordinary assumptions and hypothetical conditions.”¹

Depreciated Cost is a recognized method of supporting grid adjustments.²

Depreciation

“Depreciation is the difference between the contributory value of an improvement and its cost at the time of appraisal:

$$\text{Cost of Improvement} - \text{Contributory Value of Improvement} = \text{Depreciation}”^3$$

The necessary inference is that:

$$\text{Cost of Improvement} - \text{Depreciation} = \text{Contributory Value of Improvement}$$

Depreciated Cost

The depreciated cost of all improvements (or their contribution to value) and the land value (at its H&BU) are added together to provide an indication of the market value of the property:

$$\text{Depreciated Cost} + \text{Land Value (at its H\&BU)} = \text{Market Value}^4$$

The necessary inference is that:

$$\text{Market Value} - \text{Land Value (at its H\&BU)} = \text{Depreciated Cost}$$

Economic Age-Life Depreciation is the logic that underpins the 1004 and other residential report forms.

“economic age-life method - A method of estimating depreciation in which the ratio between the effective age of a building and its total economic life is applied to the current cost of the improvements to obtain a lump-sum deduction; also known as the age-life method.”⁵

¹ 7-Hour National USPAP Update Course Student Manual © The Appraisal Foundation, p63

² The Appraisal of Real Estate 14th Edition © 2013 The Appraisal Institute p398

³ The Appraisal of Real Estate 14th Edition © 2013 The Appraisal Institute p576

⁴ The Appraisal of Real Estate 14th Edition © 2013 The Appraisal Institute p578

⁵ The Dictionary of Real Estate Appraisal 6th Edition © 2015 The Appraisal Institute

There are three variables included in economic age-life depreciation.

“Economic life - the period over which improvements to real estate contribute to property value.”⁶

Economic life is entered on page 3 of the URAR. In this example, I am using 60 years because the reference I am using for cost

data assumes 60-year economic life for the quality of house I am analyzing. There are other methods you can use to extract economic life from the market, with assumptions about land value.

DEPRECIATION CALCULATION 'SCRATCHPAD'			
Calc. Phys. % using Effective Age of 6 / Lifespan of 60			
(If required, lock fields using toolbar lock icon)			
As:	Physical	Functional	External
% of Cost New	10.00 %	%	%
Lump Sum			

“Effective age - the age of property that is based on the amount of observed deterioration and obsolescence it has sustained, which may be different from its chronological age.”⁷ Effective age is entered on page one of the URAR.

General Description	
Units	<input checked="" type="checkbox"/> One <input type="checkbox"/> One with Accessory Unit
# of Stories	1
Type	<input checked="" type="checkbox"/> Det. <input type="checkbox"/> Att. <input type="checkbox"/> S-Det./End Unit
	<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Proposed <input type="checkbox"/> Under Const.
Design (Style)	Ranch
Year Built	2014
Effective Age (Yrs)	6
Attic	<input type="checkbox"/> None
<input type="checkbox"/> Drop Stair	<input type="checkbox"/> Stairs
<input type="checkbox"/> Floor	<input checked="" type="checkbox"/> Scuttle
<input type="checkbox"/> Finished	<input type="checkbox"/> Heated

“Remaining economic life - the estimated period over which existing improvements are expected to contribute economically to a property; an estimate of the number of years remaining in the economic life of a structure or structural components as of the effective date of the appraisal; used in the economic age-life method of estimating depreciation.”⁸ Remaining economic life is calculated on page 3 as economic life minus effective age.

Estimated Remaining Economic Life (HUD and VA only)	54 Years
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⁶ The Dictionary of Real Estate Appraisal 6th Edition © 2015 The Appraisal Institute

⁷ ibid

⁸ ibid

OPINION OF SITE VALUE				= \$	65,000
DWELLING	1,900	Sq.Ft. @ \$	114.75	= \$ 218,025
		Sq.Ft. @ \$		= \$
Deck,Fireplace				= \$	10,983
Garage/Carport	440	Sq.Ft. @ \$	47.71	= \$ 20,992
Total Estimate of Cost-New				= \$	250,000
Less	Physical	Functional	External		
Depreciation	25,000				= \$(25,000)
Depreciated Cost of Improvements				= \$	225,000
"As-is" Value of Site Improvements				= \$	10,000
INDICATED VALUE BY COST APPROACH				= \$	300,000

In this example of the 1004 Cost Approach, assuming economic life is 60 years, we can see several important relationships.

1. Depreciation is \$25,000 and cost is \$250,000, so depreciation is 10%.
2. The ratio of effective age to economic life is 10%. (6/60)
3. Depreciated Cost is \$225,000 and cost is \$250,000, so the "percent good" is 90%.
4. Remaining economic life is 54 years (previous page) and economic life is 60 years, so the ratio of remaining economic life to economic life is 90% (54/60).
5. Because there is 10% depreciation, the market is paying 90% of cost. The 90% is often called "percent good".

All of this is true *only if market value is \$300,000*. If market value is \$310,000, something is wrong. If cost, depreciation and site improvements are correct, land has to be \$75,000. If land, cost and site improvements are correct, depreciation has to be \$15,000.

"In single family residential real estate, the cost approach has most value as an analytical tool."⁹

⁹ Timothy Andersen, MAI, MSc, MNAA, CDEI

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Cost

Dwelling is calculated by multiplying the square feet of GLA by the published cost of GLA. Deck and Garage are also determined by multiplying published cost per square foot by the square feet of these features. The Fireplace cost is a unit cost. In this example the cost of a fireplace is \$3,290.

The house as a whole has depreciated 10%. The market is paying 90% of cost. If the fireplace has depreciated at the same rate as the house as a whole, the depreciated cost of the fireplace is 90% of \$3290, or \$2961.

Marginal Cost

Published (unbiased, 3rd party) cost is how we get to total cost. 1,900 square feet @ \$114.75 per square foot = \$218,025. Total cost is how we get to depreciated cost of improvements and the percentage of cost being paid in the market. To apply this information to the sales grid, we need to extract marginal cost from average cost data. Marginal cost is the cost of one more. Marginal cost is our basis because we adjust for the contributory value of one more. In this example, the market is paying 90% of cost, so a grid adjustment is 90% of cost.

If a bath costs \$9955, and the market is paying 90% of cost, a market-based adjustment is \$9,000 rounded.

If a 2-stall garage costs \$24,100, and a one stall garage costs \$14,800, the second stall has a *marginal* cost of \$9,300. If the market is paying 90% of cost, the adjustment for a second stall is \$8,400. Notice that the cost for the additional stall is less than half of the cost of a 2-stall garage. We begin with \$9,300, not \$12,000 before we apply the percent good.

The same principles apply to the GLA adjustment. Before this is demonstrated, think about the logic of paired sales. The textbook refers to paired sales as paired data analysis.

“Paired data analysis is based on the premise that when two properties are equivalent in all respects but one, the value of the single difference can be measured by the difference in price between the two properties.”¹⁰

Assume you have two sales that differ only in GLA. One has GLA of 1,800sf and the other has GLA of 2,000sf. Everything else is equal. Equal land value, site improvements, bath count, garage count, age, quality, condition, view, location, school district, adjacent properties and market time. Those are big assumptions, but they demonstrate an important point.

Comparable Sale	Market Value	GLA	GLA Adjustment
1	\$308,100	2,000sf	
2	\$291,900	1,800sf	
Difference	\$16,200	200sf	\$81

The difference in market value divided by the difference in GLA is the GLA adjustment. The logic is sound. But credibility may be compromised.

“An adjustment derived from a single pair of sales is not necessarily indicative, just as a single sale does not necessarily reflect market value.”¹¹

“Paired data analysis should be developed with extreme care to ensure that the properties are truly comparable and that other differences do not exist...”¹²

If there are no pairs that would lead to credible assignment results, we can apply the same logic to cost data. Below is a table that compares depreciated cost of two houses that differ only in GLA. There are no other factors (site and improvements, bath count, garage count, age, quality, condition, view, location, school district, adjacent properties and market time).

GLA Amount	GLA Avg Cost	GLA Total Cost	% Good	Depreciated Cost	GLA Adjustment
2,000	114.00	\$228,000	90%	\$205,200	
1,800	116.60	\$209,880	90%	\$188,992	
200sf				\$16,208	\$81.00

The logic is identical. The difference in depreciated cost divided by the difference in the amount of GLA is the GLA adjustment by depreciated cost. I call this Virtual Matched Pairs. This technique is only as credible as the estimate of depreciation; but that single assumption is often more credible than a single pair of sales, even if they are matched as well as possible in MLS.

¹⁰ The Appraisal of Real Estate 14th Edition © 2013 The Appraisal Institute p398

¹¹ The Appraisal of Real Estate 14th Edition © 2013 The Appraisal Institute p399

¹² The Appraisal of Real Estate 14th Edition © 2013 The Appraisal Institute p398