

ASSESSING DEPRECIATION FOR VALUATION PURPOSES – A DECOMPOSITIONAL APPROACH

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INTRODUCTION

- The value of real estate arrived through a number of methods
- These include the following;
 - Market comparison method
 - Income capitalisation method
 - Cost Method
 - Residual method
 - Profit method

INTRODUCTION

- In situations where evidence of market transaction is non-existent or scanty, the cost method presents perhaps the only option.
- The use of the cost method involves estimating the Replacement cost as new and deducting an amount representing accrued depreciation
- A major difficulty in the use of the method relates to the accurate estimation of accrued depreciation. This becomes even more critical where the property is not newly constructed.
- A number of studies have been carried out in attempts to provide a framework within which depreciation for valuation purposes can be accurately estimated.
- The paper attempts to add to this body of knowledge and is aimed at providing a basis for discussion within the profession to arrive at a common methodology for the estimation of depreciation.

DEPRECIATION AND ITS CAUSES

- Depreciation is defined by Baum (1991) as the loss in the existing value of property and he attributes the causes to physical deterioration, functional or aesthetic obsolescence. Other writers provide similar definitions; See Mansfield (2000) and Barreca (1999)
- One thing is apparent from the definitions; that is depreciation is attributable to two main causes
 - Physical depreciation
 - Obsolescence (functional, external or aesthetic)
- The Guidance Notes of the Ghana Institution of Surveyors also attributes depreciation to three causes
 - Age
 - Condition
 - Functional obsolescence
- It is clear from the above that there is a general consensus on what the causes of depreciation are.
- The areas of divergence relate to how these should be accounted for to arrive at total accrued depreciation for a particular property.

ESTIMATING DEPRECIATION (AGE)

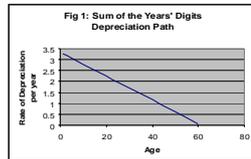
- The three causes of depreciation as enumerated under the Gh.I.S guidance notes are now treated in detail;
- First we consider Age
 - Though age is a cause of depreciation in itself, the passage of time is also necessary for the other causes to take effect.
 - Age as a cause of depreciation is properly treated as the incurable component of physical depreciation ie those aspects of physical depreciation that are almost impossible to cure through repairs and maintenance
 - A number of methods are in use that incorporate age as a variable in estimating depreciation. These include
 - The Age-life method
 - The Sum of the years' digits method
 - The Reverse Sum of the years' digits.

ESTIMATING DEPRECIATION (AGE)

- Two variables become critical in using these methods
 - Useful Economic life of properties; This has been estimated in some countries such as the US to be about 88 years. What can we say about property lives in Ghana? There appears to be no empirical evidence to give any indication.
 - The actual or effective age of properties. Where effective age can be objectively and accurately estimated it may be preferred.
- The Age-life method
 - This is given as Age/Useful Economic life
 - Based on the premise that an asset will depreciate by the same amount every year. How realistic is this premise?
 - This path of depreciation imposed by this method has been rejected by a number of empirical studies. See Hulten and Wycoff (1978) and Follain and Malpezzi (1980). Others are Jones et al (1981), Taubman and Rashe (1969) and Connaday and Sunderman (1986)

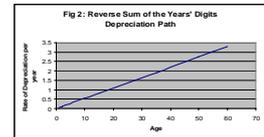
ESTIMATING DEPRECIATION (AGE)

- The Sum of the Years' Digits
 - Based on the premise that an asset will depreciate at a higher rate during the initial years of the asset's life than at latter years.
 - The path of depreciation implied by this method as shown in figure 1 is supported by the empirical studies conducted by Hulten and Wycoff (1978) and Follain and Malpezzi (1980)
 - Accrued depreciation is given by $1 - \frac{N(N-1)}{Life(Life+1)}$



ESTIMATING DEPRECIATION (AGE)

- Where N is the number of years remaining at any particular time given as $(Life+1)-Age$
- The Reverse Sum of the Years' Digits
 - This method presupposes that depreciation is slower initially and more pronounced later.
 - The path of depreciation implied by this method as depicted in figure 2 below is supported a number of empirical studies. See Jones et al (1981), Taubman and Rashe (1969) and Connaday and Sunderman (1986)
 - Accrued Depreciation is given by $\frac{Age(Age+1)}{Life(Life+1)}$



ESTIMATING DEPRECIATION (AGE)

- No consensus on which path of depreciation accurately models the impact of depreciation on the life of properties but instructive to note that the age-life method is overwhelmingly rejected by all the empirical studies surveyed.
- Does age tell the entire story about depreciation? Obviously no.

ESTIMATING DEPRECIATION (CONDITION)

- Physical Deterioration (maintenance)
 - Physical deterioration as a cause of depreciation is the result of wear and tear with usage and deterioration with age among others. Physical deterioration as used in this context refers to the curable aspect.
 - How do we estimate physical depreciation?
 - A common approach is to identify the defects in the assets which when rectified will restore the asset into a state that is comparable to a similar asset that is new.
 - Such defects are quantified and the amount expressed as percentage of the replacement cost as new of the property to arrive at the rate for physical depreciation.

ESTIMATING DEPRECIATION (OBsolescence)

- Obsolescence
 - Generally difficult to define and estimate objectively.
 - Can be grouped into two main types
 - Functional and external but emphasis in the paper is on functional
 - Functional depreciation is defined by Barreca (1999) as the loss in value (ie depreciation) resulting from a relative deficiency of the asset to function for its intended purpose
 - How do we estimate functional obsolescence?
 - An approach that has been adopted in the estimation of functional obsolescence is to estimate the extra cost that is incurred in using the property in question as compared to using a similar more efficient property (See Brueggeman and Fisher 2001).

Bringing it all together

- Estimating Total Accrued Depreciation
 - Up until this point, depreciation has been looked at in terms of its causes. What is ultimately important in the estimation of value via the cost method is total accrued depreciation.
 - How do we estimate total accrued depreciation given the fact that none of the methods discussed so far incorporates all the causes of depreciation? The approach being proposed here is to combine the impact from the various causes of depreciation
 - This involves first accounting for the curable physical depreciation before any reduction is made for incurable physical depreciation and functional obsolescence. Such an approach as explained by Brueggeman and Fisher (2001) is important because the estimate for incurable items must be based on the assumption that all curable items are repaired.

Bringing it all together cont.

- Total Accrued Depreciation will then be given by:
 $1 - ((1-x)^y(1-y))$
- Where x is the rate of depreciation for curable physical deterioration and y , rate for age and functional obsolescence
- **Illustration**
 - To illustrate how the approach being proposed could work, consider a property that is 20 years old and would require about 10% of Replacement cost as new to fix all curable defects. Functional Obsolescence is estimated at 5% of cost. Total accumulated depreciation can be calculated as follows;

ILLUSTRATION

- Total Depreciation = $1 - ((1-0.1)^{20}(1-0.05))$
- = 0.2483
- = 24.83%

CONCLUSION

- The proper estimation of depreciation for valuation purposes within the cost approach to value estimate is of crucial importance not only in arriving at correct estimate of value but also has the potential to reduce the variation that usually exist between values declared by valuers on the same property.
- The three causes of depreciation of interest to appraisers are age, level of maintenance and functional obsolescence. The approach that this paper supports is one that explicitly incorporates all these elements in the process of estimating depreciation. Such an approach provides perhaps the valuer's best estimate of accumulated depreciation for any particular property.

CONCLUSION

- We, however, suggest that a further study and discussion be carried out to explore the possibility of developing or adopting a single model that will allow for a more objective estimation of functional obsolescence and age.

THANK YOU FOR YOUR ATTENTION