ECONOMIC USABILITY VALUES OF MACHINE PERFORMANCE USING COMPUTER ALGORITM

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ABSTRACT

The major problem that users of machines e.g. Power generating plants, Motor cycles, Motor cars etc, normally face is performance of the machine after use for certain period of time. The main reason to this problem is that users do not take into consideration the life span assigned for such machine. The objective of this study is to develop a computer based Algorithm to determine economic and worth value for any machine with its life span assigned by manufacturers after use for certain period of time. MATLAB is the chosen programming language and it was used to carry out the analysis for the algorithm that was developed base on the book value and life span expected of such machines. This will greatly help to know the performance and the economic worth of such machine and also this will greatly assist the users from underdeveloped and developing Nations to determine and evaluate the economic and worth value of any machine when used for a certain period of time in other to avoid economic loss and some hazards that normally occur with machines that have higher depreciation value with little or no economic gain.

Keyword and Phrases: Economic, usability, values, machines, performance, Computer Algorithm

1. INTRODUCTION

The relationship between price and book value has always attracted the attention of investors and users. The items such as machines and any valuable items sell below the book value are always considered as undervalued items, while those selling for more than book value are regarded as overvalued items. Chan, Hamao and Lakonishok (1991) define the book value of an asset as its original purchase cost, adjusted for any subsequent changes, such as for impairment or depreciation. Book value is recorded in the accounting records of a business. According to Anderson (1990), n**et book value** is an asset's total cost minus the accumulated depreciation assigned to the asset. He further opined that net book value rarely equals market value, which is the price someone would pay for the asset. In fact, the market value of an asset, such as a building, may increase while the asset is being depreciated. Net book value simply represents the portion of an asset's cost that has not been allocated to expense. The market value of the equity in a firm reflects the market's expectation of the firm's earning power and cash flows. The book value of equity is the difference between the book value of assets and the book value of liabilities, a number that is largely determined by accounting conventions. In the United States, the book value of assets is the original price paid for the assets reduced by any allowable depreciation on the assets. Consequently, the book value of an asset decreases as it ages. The book value of liabilities similarly reflects the "at-issue" values of the liabilities. Since the book value of an asset reflects its original cost, it might deviate significantly from market value if the earning power of the asset has increased or declined significantly since its acquisition.

Furthermore salvage value equals the value, if any, that a company expects to receive by selling or exchanging an asset at the end of its useful life. It is the net amount of money obtainable from the sale of used property over and above any charges involved in removal and sale (Dooley, 2005).

Useful life is an estimate of the productive life of an asset. Although usually expressed in years, an asset's useful life may also be based on units of activity, such as items produced, hours used, or miles driven (Robert, 2003).

Depreciation is the process of allocating the cost of long-lived plant assets other than land to expense over the asset's estimated useful life. For financial reporting purposes, companies may choose from several different depreciation methods. The methods must be understood in order to know the economic value of the assets (Brief, 1967).

2. LITERATURE REVIEW

The concept of depreciation value of an asset such as machine is a major issue in economics, because it plays major role in determining the value of an asset after used for a long period of time. The issue of the evaluation of fixed asset price at the beginning and the end of the periods is basically rooted in their permanent character, for as a result of their relatively long service lifetime, their value is not only influenced by the changes that may be grasped in the physical sense, but also by several processes occurring in the outside business environment. Therefore, the valuation procedure selected must be suitable for the overall recognition of the above mentioned impacts. The major characteristic of these fixed assets is that their service lifetime spans over several reporting periods. Preinreich *(1937)*differentiates between two main categories of fixed assets on the basis of the services these assets provide. One category encompasses assets providing a limited quantity of services, the other category includes fixed assets that have only limited possibilities to provide services (David, 2000).

For the complete service lifetime of the fixed assets, the problems related to the consumption of the fixed assets and the costs incurred in relation to this phenomenon would not arise at all, for in this case the fixed assets would be entirely exhausted by the end of their service lifetimes and, instead of use value, would only possess scrap value, which is considerably easier to establish. In this case actually, the value recognised in the business income would only be the part of the value of the fixed assets – almost entirely consumed during their service lifetimes – which remains after deduction of the scrap value (Andrle, 2002).

Baricz (1994) breaks the lifetime of assets down to physical lifetime and economic lifetime, physical lifetime being the interval during which the asset may be used in line with the relevant technical requirements, while economic lifetime would be the time interval during which the asset may be used in an economical manner.8 Baricz observes that economic lifetime is usually shorter than physical lifetime, a phenomenon explained by the effects of obsolescence, to be analyzed henceforth. For the purpose of the analysis of fixed assets depreciation, it is always the shorter of these two time periods – i.e. service lifetime, the time interval during which the asset is kept in use, as opposed to economic lifetime – that should be taken into consideration. According to Dooley (2005) the end-of-period value of fixed assets used may be calculated using the market prices of these assets or on the basis of the discounted present value of their future returns, where the return of the asset is usually identified as its theoretical rental. However, end of-period valuation of assets in both methods is derived from market prices, which is problematic because in reality relevant markets for fixed assets hardly ever exist. As a consequence, the end-of-period asset value is determined using estimated depreciation rates calculated with due regard to the phenomena influencing asset value. Economic usability of an asset, after all, is determined by the performance of such asset, for example machines and other usable items (Romer, 2000). There are many depreciation methods determine the economic value of an asset. Straight-line depreciation is the method that is most frequently used for financial reporting purposes. If straight-line depreciation is used, an asset's annual depreciation expense is calculated by dividing the asset's depreciable cost by the number of years in the asset's useful life.

Units-of-activity depreciation, which is sometimes called units-of-production depreciation, allocates the depreciable cost of an asset based on its usage. A per-unit cost of usage is found by dividing the asset's depreciable cost by the number of units the asset is expected to produce or by total usage as measured in hours or miles. The per-unit cost times the actual number of units in one year equals the amount of depreciation expense recorded for the asset that year. Declining-balance depreciation:Declining-balance depreciation provides another way for companies to shift a disproportionate amount of depreciation expense to the first years of an asset's useful life. Declining-balance depreciation is found by multiplying an asset's net book value (not its depreciable cost) by some multiple of the straight-line rate for the asset. The straight-line rate is one divided by the number of years in the asset's useful life. Companies typically use twice (200%) the straight-line rate, which is called the double-declining-balance rate, but rates of 125%, 150%, or 175% of the straight-line rate are also used. Once the declining-balance depreciation rate is determined, it stays the same for the asset's useful life.

3. MATERIAL AND METHOD

The material used in this paper in based on algorithm.

1. Input n, the age of the equipment
2. Input cost, the cost of the equipment
3. Input L, useful life of the equipment
4. Book Value = cost
5. For n=2:1:N
6. r=(N*(N+1))/2
7. Book Value = cost
8. Annual Depreciation = 2*(Book value-cost)/N
9. Book value = cost – (Annual depreciation)
10. Salvage value = cost-((Book value-cost)/(L-N))
11. Print, Annual depreciation, Boo value Salvage value

4. DISCUSSION OF RESULT

Enter the age of the Equipment or that you have being using the Equipment: 6.
Enter cost of purchasing the Equipment :3000
Enter the useful life of the Equipment: 8

Year	Annual Depreciation	Book Value	Savage Value
1.00	0.00	3000.00	3000.00
2.00	1000.00	2000.00	3500.00
3.00	666.67	1333.33	2333.33
4.00	444.44	888.89	1555.56
5.00	296.30	592.59	1037.04
6.00	197.53	395.06	691.36

Enter the age of the Equipment or that you have being using the Equipment:3
Enter cost of purchasing the Equipment :5000
Enter the useful life of the Equipment: 6

Year	Annual Depreciation	Book Value	Savage Value
1.00	0.00	5000.00	5000.00
2.00	3333.33	1666.67	6111.11
3.00	1111.11	555.56	2037.04

Enter the age of the Equipment or that you have being using the Equipment: 6
Enter cost of purchasing the Equipment : 6000
Enter the useful life of the Equipment: 12

Year	Annual Depreciation	Book Value	Savage Value
1.00	0.00	6000.00	6000.00
2.00	2000.00	4000.00	6333.33
3.00	1333.33	2666.67	4222.22
4.00	888.89	1777.78	2814.81
5.00	592.59	1185.19	1876.54
6.00	395.06	790.12	1251.03

Enter the age of the Equipment or that you have being using the Equipment:8
Enter cost of purchasing the Equipment :5000
Enter the useful life of the Equipment: 15

Year	Annual Depreciation	Book Value	Savage Value
1.00	0.00	5000.00	5000.00
2.00	1250.00	3750.00	5178.57
3.00	937.50	2812.50	3883.93
4.00	703.13	2109.38	2912.95
5.00	527.34	1582.03	2184.71
6.00	395.51	1186.52	1638.53
7.00	296.63	889.89	1228.90
8.00	222.47	667.42	921.67

Enter the age of the Equipment or that you have being using the Equipment:6
Enter cost of purchasing the Equipment :5000
Enter the useful life of the Equipment: 13

Year	Annual Depreciation	Book Value	Savage Value
1.00	0.00	5000.00	5000.00
2.00	1666.67	3333.33	5238.10
3.00	1111.11	2222.22	3492.06
4.00	740.74	1481.48	2328.04
5.00	493.83	987.65	1552.03
6.00	329.22	658.44	1034.69

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