An Examination of Potential Changes in Ratio Measurements Historical Cost versus Fair Value Measurement in Valuing Tangible Operational Assets

Pamela Smith Baker
Texas Woman's University

A fictitious property management company is created by randomly selecting 30 tangible, operational assets valued using both historical cost and fair value measurements. Two sets of financial statements are created for the years 2004 to 2008, one using the historical cost valuations and the other using the fair value measures. Ratio analysis performed shows that the ratios calculated using historical cost measures present more favorable profitability and asset utilization results, while ratios based upon fair value measures suggest more favorable debt utilization results.

INTRODUCTION

As the world becomes "flat" and more companies operate internationally, there is a pressing need for global accounting standards. The Financial Accounting Standards Board (FASB) and the International Accounting Standards Board (IASB) have been working on a convergence project to limit the differences between U.S. Generally Accepted Accounting Principles (GAAP) and International Financial Reporting Standards (IFRS). One area where the two standards differ is how property, plant, and equipment may be valued. IFRS allows an entity to choose either the cost method or the revaluation method, while GAAP only allows the use of the cost method for the measurement of fixed assets after recognition.

The revaluation, or fair value, system of accounting differs from the historical cost method in that fair value assigns some form of current value to assets instead of historical, reliable cost data. Advocates of the fair value approach claim that fair value is more relevant in that it provides current measures. However, there are important shortcomings of fair value measurements. Values not based on actual market prices have potential to be manipulated, which some believe increases uncertainty and added risk. The purpose of this paper is to examine the differences in ratio measures created using fair value and historical cost valuations of tangible, operational assets.

BACKGROUND AND HYPOTHESES DEVELOPMENT

Prior research analyzes impact and relevance of revaluing fixed assets versus historical cost measures. Results are mixed, but the majority of studies appear to conclude that fair value method is superior in providing relevance to financial statement users. Easton, Eddey, and Harris (1993) investigate the association between revaluations of tangible long-lived assets and stock market prices and returns for Australian firms, concluding that the annual increment to the asset revaluation reserve had significant explanatory power for annual returns and that inclusion of revaluation reserve in book value provides a better summary of the current financial condition of the firm. The study finds that using revaluations can

alter a firm's financial ratios and provide a more relevant picture of the company's current financial position.

Aboody, Barth, and Kasznik (1999) suggest that upward revaluations of fixed assets by UK firms are significantly positive in relation to changes in future performance indicating revaluations reflect asset value changes. However, correlations are weaker for firms in a more volatile economic time period. Dietrich, Harris, and Muller (2000) investigated the reliability, measured as bias and accuracy, of mandatory annual fair value estimates for investment properties in the UK using realized selling price as the benchmark. Results indicate that fair value estimates represent conservative estimates of actual selling prices, regardless of whether property values were increasing or decreasing.

Research performed to study the behavioral effects on decision makers in the U.S. and Germany of differing methods of valuing fixed assets for financial reporting purposes (Nichols and Buerger, 2002) finds that U.S. bankers granted significantly larger loan amounts for companies valuing fixed assets at historical cost, while German bankers granted larger loans to companies reporting fixed assets at fair value. The most probable reason for this finding is the high level of importance placed on reported income by U.S. Financial statement users and the U.S. focus on short-term bottom line as is evidenced by market reactions to missed earnings projections.

Herrmann, Saudagaran, and Thomas (2005) evaluate fair value and historic cost measures for property, plant, and equipment based on the qualitative characteristics of relevance, reliability, comparability, and consistency described in SFAC No. 2 (2005), suggesting fair value measures to be superior to historic cost based on the characteristics of predictive value, feedback value, timeliness, neutrality, represent-ational faithfulness, comparability, and consistency. Verifiability, however, favors historical cost.

The Valuation of Property, Plant, and Equipment under U.S. GAAP and IFRS

A summary of the allowable methods for the valuation of property, plant, and equipment (PPE) in the United States and under IFRS is provided. The following standards can be compared to evaluate the differences between valuation methods. FASB ASC 360 provides guidance on how to measure an item at the date of initial recognition. At acquisition, tangible fixed assets are measured at historical cost including allowed construction-period interest, if applicable, and all other costs necessarily incurred to bring it to condition and location necessary for intended use. Subsequent changes to carrying amounts occur, including: impairment adjustments, depreciation and changes in estimates. Depreciation is determined based on choice of aggression in method and estimated useful life—a means of allocation, not valuation.

Per IASB Standards, principal issues in accounting for property, plant, and equipment are the recognition of assets, determination of carrying amounts, depreciation charges and impairment losses, if any, to be recognized (IASC, 2003). Under IAS 16, an item of PPE shall be valued at cost at the time of recognition, measured as the cash price equivalent at recognition date. However, after recognition, PPE may be measured using either the historical cost model or the revaluation model. Under the cost model, the item of PPE is carried at cost less any accumulated depreciation and reduced further by any recognized impairment losses. Under the revaluation model, an item of PPE is carried at a revalued, current amount—if such fair value can be measured reliably—less subsequent accumulated depreciation and impairment losses. Revaluations are to be made with sufficient regularity to ensure that the carrying amount does not differ materially from the fair value. In addition, if an item of PPE is revalued, the entire class of PPE to which that asset belongs is to be revalued. Fair value of land and buildings is usually determined from market-based evidence by appraisal undertaken by professionally qualified appraisers. If there is no market-based evidence of fair value, an entity may need to estimate fair value using an income or a depreciated replacement cost approach.

METHODOLOGY

Thirty randomly selected properties in Denton County, Texas were examined for the years ending 2004 to 2008. All properties with property tax protests resulting in a change of taxable value, properties

without improvements (properties consisting only of land) and properties with improvements after assessment of 2005were eliminated from the study. Two corresponding outcomes are observed for the two independent variables, fair value and historical cost.

The 30 selected properties are first valued using the historical cost method. Historical cost is determined using the sales price during the year the properly was sold as recorded in the Denton County Central Appraisal District (DCCAD) website. Purchase price is allocated to the land and building accounts using the basket purchase method, and depreciation is computed on the buildings using a straight line method over a 27.5-year useful life.

Thereafter the same 30 properties are valued using the fair value method by means of market-based appraisal, as per IASB16, created by the Denton County Central Appraisal District. This data is publicly available and indicates separate property values for buildings, land, and total appraised value. The properties were initially recorded at cost as in the historic cost approach, and the revaluation model was used for measurement after recognition allowing for a restatement to estimated fair value on an annual basis. Depreciation is then computed on the buildings using a straight line method over a 27.5-year useful life. Subsequent depreciation after revaluation is computed using the revalued amount and remaining useful life of the asset.

Three journal entries are created using historical cost method for depreciation expense and accumulated depreciation for each year, 2004 through 2008 as well as fair value revaluation for each year, 2004 through 2008. The first journal entry was made for depreciation expense and accumulated depreciation. The second journal entry eliminated any accumulated depreciation against the gross carrying amount of the asset. Finally, the third journal entry restated the net amount of the building to the revalued amount of the asset. The increases in asset value from prior periods are recorded as "Revaluation Surplus." Any decrease on revaluation was reversed in the Revaluation Surplus account to the extent of any credit balance existing in the account. When the asset's value was decreased as a result of valuation, the decrease was recognized in a revenue account titled "Loss on Realization." Any increase on revaluation was reversed by crediting an account titled "Gain on Realization" to the extent of any decrease previously recorded in the Loss on Realization account.

Results of these journal entries are inserted into financial statements for a fictitious property management company by using actual information from a real property management company, Maxus Realty Trust, Inc. The percentages of all other accounts to fixed assets ratio is calculated on Maxus Realty Trust, Inc.'s financial statements. The fictitious company accounts are created based on these percentages and the company's own amount of fixed assets. Ratio analysis is performed to analyze the difference in the two methods of valuation.

RESULTS

Analysis reveals significant differences in values on the financial statements and resulting significant differences in ratios based thereon. A partial balance sheet and a partial income statement for 2008 are presented in Tables 1 and 2, respectively. Balance sheet data using fair values reports tangible fixed investment property as 38% higher than the historical cost method. The revaluation surplus substantially increases the firm's book value. Depreciation expense is 44% higher under the fair value method since the subsequent depreciation after revaluation was computed using the revalued amount. Due to the higher depreciation expense under the fair value method, net income is 57% higher under the historical cost method.

TABLE 1
PARTIAL BALANCE SHEET FOR 2008

	Fair Value Method	*Cost Method*	*Difference (%)*
Investment property	$7,480,609	$4,617,268	38%
Revaluation surplus	$3,810,599	0	100%
Shareholders' equity	$7,573,379	$5,005,265	33%

TABLE 2
PARTIAL INCOME STATEMENT FOR 2008

	Fair Value Method	*Cost Method*	*Difference (%)*
Depreciation Expense	$300,606	$167,556	44%
Net Income	$231,534	$364,584	57%

Results of the financial ratio analysis in 2008 are presented in Tables 3, 4, and 5. Profitability ratios are higher under the historic cost method because net income is higher. Assets and shareholders' equity are higher under the fair value method, but enough to compensate for the substantial amount of higher net income under historical cost.

TABLE 3
PROFITABILITY RATIOS

	Fair Value	*Historic Cost*
Profit Margin	15.62%	24.60%
Return on Assets (ROA)	2.32%	5.13%
Return on Equity (ROE)	3.06%	7.28%

Asset utilization ratios are more favorable under the historic cost method because the lesser valuations under historical cost gives the appearance that the company is generating the same amount of sales with fewer assets.

TABLE 4
ASSET UTILIZATION RATIOS

	Fair Value	*Historic Cost*
Fixed Asset Turnover	0.20	0.32
Total Asset Turnover	0.15	0.21
Capital Intensity	6.72	4.79

Debt utilization ratios are more favorable under the fair value method because the same amount of debt is spread over more assets and equity. Under historical cost measures, the company appears to be financed with a greater percentage debt than with fair value measures. Fair value accounting shows higher amounts in the following accounts: investment property, stockholders' equity, and depreciation expense. Under the two methods, the liabilities, current assets, revenues and expenses are the same (not including depreciation expense).

TABLE 5
DEBT UTILIZATION RATIOS

	Fair Value	*Historic Cost*
Debt to Total Assets	0.24	0.34
Debt-Equity	0.32	0.48
Equity Multiplier	1.32	1.42

DISCUSSION AND CONCLUSIONS

This study attempts to investigate the effect of different measures of fixed assets. Results present mixed findings. Historical cost appears to provide more favorable measures of profitability and asset utilization, because net income is higher and the lower value creates a more favorable return on assets. However, fair value measures present more favorable debt utilization ratios, likely because debt can be spread out over a higher value of assets.

Limitations

The sample used in this study is small, created by convenience and limited to one small, specific geographical area where real estate prices have experienced less variation in price that those in many other areas of the country. Moreover, the measures of tax appraisals used may not represent fair value. Varying measures of PPE are applied to only one firm in one industry, and results may vary greatly between industries. This study only examines the effect upon certain ratio measurements.

Implications for Future Research

Future research might examine other types of firms and other geographical locations. Moreover, appraisals performed by professional real estate appraisers will more nearly reflect a proper current fair value. Additional research could examine the gain or loss to investors or lenders due to the use of the fair value approach and to analyze which method is more popular among firms that are allowed to choose between both methods and the reason behind management's choice. Random samples could be used in lieu of the brief convenience sample obtained and used in this study.

APPENDIX 1
RATIO COMPUTATIONS USING FAIR VALUE MEASUREMENTS

Profitability Ratios	*2004*	*Change*	*2005*	*2006*	*Change*	*2007*	*Change*	*2008*
Profit Margin	37.81%	-14.43%	32.35%	22.39%	-23.72%	17.08%	-8.52%	15.62%
Return on Assets	7.63%	-22.56%	5.91%	3.53%	-26.59%	2.59%	-10.31%	2.32%
Return on Equity	14.55%	-33.17%	9.72%	5.31%	-32.27%	3.60%	-15.06%	3.06%

Asset Turnover Ratios	*2004*	*Change*	*2005*	*2006*	*Change*	*2007*	*Change*	*2008*
Receivable Turnover	102.75	-7.31%	95.25	83.99	-4.47%	80.23	0.00%	80.23
Fixed Asset Turnover	0.25	-7.31%	0.24	0.21	-4.47%	0.2	0.00%	0.2
Total Asset Turnover	0.2	-9.50%	0.18	0.16	-3.76%	0.15	-1.95%	0.15
Capital Intensity	4.95	10.50%	5.48	6.34	3.90%	6.59	1.99%	6.72

Liquidity Ratios	2004	Change	2005	2006	Change	2007	Change	2008
Current Ratio	8.52	11.85%	9.53	10.46	-3.08%	10.14	8.50%	11
Cash Ratio	6.78	14.89%	7.79	8.72	-3.69%	8.4	10.27%	9.26

Debt Utilization Ratios	2004	Change	2005	2006	Change	2007	Change	2008
Debt to Total Assets	0.48	-17.50%	0.39	0.34	-16.58%	0.28	-14.37%	0.24
Debt-Equity Ratio	0.91	-28.80%	0.65	0.51	-23.03%	0.39	-18.90%	0.32
Equity Multiplier	1.91	-13.69%	1.65	1.51	-7.74%	1.39	-5.30%	1.32

APPENDIX 2
RATIO COMPUTATIONS DONE USING HISTORICAL COST VALUATIONS

Profitability Ratios	2004	Change	2005	2006	Change	2007	Change	2008
Profit Margin	40.78%	-11.08%	36.26%	27.86%	-11.60%	24.63%	-0.12%	24.60%
Return on Assets	10.34%	-16.94%	8.59%	5.93%	-12.16%	5.21%	-1.52%	5.13%
Return on Equity	25.66%	-32.91%	17.22%	10.37%	-22.71%	8.01%	-9.11%	7.28%

Asset Utilization Ratios	2004	Change	2005	2006	Change	2007	Change	2008
Receivable Turnover	102.75	-7.31%	95.25	83.99	-4.47%	80.23	0.00%	80.23
Fixed Asset Turnover	0.34	-2.29%	0.33	0.32	-0.25%	0.31	2.07%	0.32
Total Asset Turnover	0.25	-6.59%	0.24	0.21	-0.64%	0.21	-1.40%	0.21
Capital Intensity	3.95	7.05%	4.22	4.69	0.64%	4.72	1.42%	4.79

Liquidity Ratios	2004	Change	2005	2006	Change	2007	Change	2008
Current Ratio	8.52	11.85%	9.53	10.46	-3.08%	10.14	8.50%	11
Cash Ratio	6.78	14.89%	7.79	8.72	-3.69%	8.4	10.27%	9.26

Debt Utilization Ratios	2004	Change	2005	2006	Change	2007	Change	2008
Debt to Total Assets	0.6	-14.85%	0.51	0.45	-13.87%	0.39	-13.88%	0.34
Debt-Equity Ratio	1.48	-31.22%	1.02	0.79	-24.22%	0.6	-20.52%	0.48
Equity Multiplier	2.48	-19.22%	2.01	1.75	-12.01%	1.54	-7.70%	1.42

REFERENCES

Aboody, D., Barth, M., & Kasznik, R. (1999). Revaluations of Fixed Assets and Future Firm Performance: Evidence from the UK. *Journal of Accounting & Economics*, 26(1-3), 149-178.

Dietrich, J., Harris, M., & Muller III, K. (2000, October). The Reliability of investment Property Fair Value Estimates. *Journal of Accounting & Economics*, 30(2), 125-158.

Easton, P.D., Eddey, P.H., & Harris, T.S. (1993). An Investigation of Revaluations of Tangible Long-lived Assets. *Journal of Accounting Research*, 31(3), 1-38.

Financial Accounting Standards Board (FASB). Accounting Standards Codification 360. Property, Plant, and Equipment.

Herrmann, D., Saudagaran, S.M., & Thomas, W.B. (2005). The Quality of Fair Value Measures for Property, Plant, and Equipment. *Accounting Forum*, 30(1), 43-59.

International Accounting Standards Committee (IASC) (2003). International Accounting Standard No. 16. Property, Plant, and Equipment. IASC.

Nichols, L.M., & Buerger, K.H. (2002). An Investigation of the Effect of Valuation Alternatives for Fixed Assets on the Decisions of Statement Users in the United States and Germany. *Journal of International Accounting, Auditing, & Taxation,* 11, 155-163.