Int J Economics & Managment
Vol. 2 (2) July 2014 pp 30 - 35
ISSN : 2278-2478

MEASURING EFFECT OF OPERATING EFFICIENCY ON FIRM VALUE

DYAL BHATNAGAR[1]* & PRITPAL SINGH BHULLAR[2]

[1]*Assistant Professor, University School of Business Studies, Punjabi University, Guru Kashi Campus, Talwandi Sabo, Bathinda, Punjab.*

[2]*Assistant Professor, Giani Zail Singh PTU Campus, Bathinda, Punjab*

**Corresponding Author, email : dyalbhatnagar@gmail.com*

Abstract: In the present competitive business scenario, accurate valuation of firm has been emerged as big challenge for firms. Crucial role has been played by Operating efficiency plays for increasing firm's value. An attempt has been made to examine the effect of operating efficiency on valuation of firm. The entire previous research attempts related to the impact of efficiency on the share performance has been confined to banking sector only. In this paper, other sectors (IT, Pharmaceutical, FMCG, Automobile and Infrastructure) also have been considered along with banking sector. Ninety Indian firms across six major economic sectors have been studied from 2005 to 2012. Six key financial ratios as independent variables have been used to measure the effect of operating efficiency on firm value. The output of this research paper gives quantitatively more accurate results in evaluating valuation of firm through operating efficiency of firm. The results indicate that effect of operating efficiency in valuation is quite significant.

Keywords: Operating efficiency, Time Series Analysis, EV/EBITDA, ROCE, NPM, Multiple Regression Analysis

INTRODUCTION

Valuation is considered as the dimension of measurement in the world of financial market. It is a systematic quantitative technique of determining the value of a firm in the associated industry. Evaluating firm value and determining various value drivers for both public and private sector firms are the crucial key stones in corporate restructuring strategy. Investors want to invest in those companies which add economic value to their investment. Companies create values for investors by generating cash more than cost of acquiring capital. In the recent research, Ohlson (1995) shows that the value of a firm can be expressed as a function of the firm's book value and future abnormal earnings or future return on equity in excess of the cost of capital. Another research study by Feltham and Ohlson (1995) shows that it is the operating activities that yield abnormal earnings. A change in profit margin may reflect a change in operating efficiency or a change in accounting conservatism. Increases (decreases) in profit margin from increases (decreases) in efficiency should result in an increase (decrease) in profitability one year ahead. Operational efficiency yet a dimension of the usefulness of the ratio analysis, relevant from the management's viewpoint, are that it highlights the level of competence & effectiveness in the management and asset utilization.

REVIEW OF LITERATURE

Allen and Rai (1996) focus on operational cost efficiency of banks. Research has been conducted on 785 observations of 195 banks from 15 countries across a time period of 5 years (Year 1988 –Year 1992). A stochastic cost frontier has been applied. They found that large banks in separated banking countries (countries that prohibit functional integration of commercial and investment banking) have significantly less efficient operations than any other bank group. The results of study revealed that for all financial firms across all countries, the input X- inefficiencies re more prevalent than output inefficiencies.

Chu. S.f and Lim G.h. (1998) analyzed profit efficiency of 6 Singapore listed banks for the period of 1992 -1996 by applying Data Envelopment Analysis (DEA) as an analysis tool. They found the correlation between changes in share prices and changes in Profit

efficiency is a statistically significant 0.75. They also concluded that market over- reacts to changes in profit efficiencies. Improvements in profit efficiency caused a bull run, leading to high prices while falls in Profit efficiency scores led to massive sell- offs sending prices tumbling down.

Beccalli, Casu and Girardone (2002) examined the relationship between estimated banks' efficiencies and their share prices. They investigated the influence of X - efficiency on the share price of banks in five European markets in year 2000. Data Envelopment Analysis (DEA) and Stochastic Frontier Approach (SFA) have been applied to measure the cost efficiency of banks by taking a sample of European banks listed in the year 2000. Stock performance of each bank has been regressed on early change of frontier change measures. The results suggested that change in banks' share price reflect percentage changes in cost efficiency and the stocks of cost efficient banks tend to outperform their inefficient counterparts.

Abdul Majid and Sufian (2008) studied the relationship between China banks' efficiency and their share price performance. Annual share price returns of banks have taken for each year between 1997 and 2006. Efficiency of banks estimated through Data Envelopment Analysis (DEA). The relationship between bank efficiency and share price performance is examined by regressing bank share returns against bank efficiency estimates derived from the DEA Window Analysis method. The empirical findings suggested that large China banks have exhibited higher technical and pure technical efficiency levels compared to their small and medium size bank counterparts, while the medium sized banks have exhibited higher scale efficiency

Baik et al., (2010) analyzed the relation between operational efficiency and firm performance. They also measured whether the operating efficiency derived from frontier analysis improved profitability forecast and whether capital market participants impound the predictive information in the efficiency measure? Study has been done from the year 1976 to year 2008. The results revealed that frontier analysis based efficiency change measures are positively associated with current and future profitability changes. The findings of the research also suggested that efficiency changes are positively related to future return and the firms which improve their efficiency show high profitability changes in current and future areas.

In the present study, an attempt has been made to bridge the gap as discussed in review of literature. The core focus of present research is to determine the effect of operating efficiency in Enterprise value. True valuation of firms is very crucial during corporate restructuring, IPOs and other corporate scenarios. In the current research study, the scope of research has been widened. The focus has been intended to identify variables of operating efficiency that may have impact on valuations of firms across different sectors. Moreover in the present research, an attempt has been made to use Enterprise value as proxy of firm value as compared to stock price which has been used as proxy of firm value in previous researches reviewed.

RESEARCH METHODOLOGY

The research study has been conducted from the time period of 8 years (2005-2012). The reason behind considering 8 years (2005-2012) as cut off for selection criteria is that this period faced the headwinds of major business cycles. 90 companies have been considered for the research from 6 economic sectors. Six variables of Operating Efficiency (EV/EBITDA, Return On Capital Employed (ROCE) , Quality of Income, EV/Sales, Fixed Asset Turnover Ratio(FATO) and Net Profit Margin (NPM)) has been considered in the research as an independent variables

whereas Enterprise Value has been used as dependent variable.

1. Enterprise Value

Enterprise Value (*EV*) = Equity Value (Market Capitalization) + Net Debt + Preferred Stock + Minority Interest

Where

- Equity Value = Equity value of firm is also known as Market capitalization of a firm.
- Market Capitalization = Total no. of outstanding share × Current share price
- Net Debt = Total Debt - Cash & Cash equivalents (Marketable securities, Treasury bills)
- Minority Interest = Interest on Non - Controlling shareholders
- Preferred stock = It is not convertible into common stock
- Return On Capital Employed (ROCE)

2. Return on Capital Employed represents the efficiency of company in terms of profitability of a firm expressing its operating profit as a percentage of capital employed.

Operating ProfitCapital Employed

$$ROCE = \frac{\text{Operating Profit}}{\text{Capital Employed}}$$

Where,

Capital Employed = Total Assets - Current Liabilities

3. Enterprise Value/Sales (EV/S)

It shows the total value of firm to its sales. It represents the cost of buying a firm's sales. This ratio is very useful during corporate restructuring of firm

4. Quality of Income (Cash Flow from Operating Activities/ Net Income) Net Cash Flow from Operating Activities Sales

$$CFOA = \frac{\text{Net Cash Flow from Operating Activities}}{\text{Sales}}$$

5. Fixed Asset Turnover Ratio (FATR) Fixed Asset turnover ratio is measure of operating efficiency of firm.. High fixed asset turnover ratio represents that company's ability to effectively utilize its fixed assets to generate revenue.

$$FATR = \frac{\text{Net Sales}}{\text{Total Fixed Assets}}$$

6. Net Profit Margin (NPM) This ratio shows the efficiency of company in converting its sales into profitability.

$$NPM = \frac{\text{Profit after Tax}}{\text{Sales}} \times 100$$

Net Profit margin has direct relationship with shareholder's value. Higher the net profit margin of company, greater will be the shareholders return on any given sale.

Six economic sectors (Automobile, Banking, FMCG, Infrastructure, IT and Pharmaceutical) have been considered for the research. 15 companies from each economic sector (total 90 companies) have been considered. Time series analysis through multiple regression technique has been implemented with the application of SPSS software to measure the effect of operating efficiency on firm value.

$$\frac{EV}{S} = \frac{\text{Equity Value} + \text{Net Debt} + \text{Preferred Stock} + \text{Minority Interest}}{\text{Sales}}$$

$$\frac{EV}{S} = \frac{\text{Equity Value} + (\text{Total Debt} - \text{Cash/Cash Equivalents}) + \text{Preferred Stock} + \text{Minority Interest}}{\text{Sales}}$$

$$EV/S = (EBIT(1-T)/Sales)(1-\text{Reinvestment Rate}) / \text{Cost f Capital} - g_n$$

HYPOTHESES

The following Null and Alternative hypotheses have been formulated to achieve the second objective.

- H_0 – Operating efficiency variables have no significant effect upon Enterprise Value.
- H_1 – Operating efficiency variables have significant effect upon Enterprise Value.

To test the above hypotheses, six sub hypotheses have been formulated.

- H_{011}: EV/EBITDA has no significant effect upon Enterprise Value.
- H_{012}: Return on Capital Employed (ROCE) has no significant effect upon Enterprise Value
- H_{013}: EV/ Sales has no significant effect upon Enterprise Value
- H_{014}: Quality of Income (Cash Flow from Operating Activities (CFOA)/Net Income) has no significant effect upon Enterprise Value
- H_{015}: Fixed Asset Turnover Ratio (FATO) has no significant effect upon Enterprise Value
- H_{016}: Net Profit Margin has no significant effect upon Enterprise Value

ANALYSIS

The following table shows the statistical output of multiple regression technique. Effect of variables of operating efficiency on Enterprise value has been measured across all the years.

In the above table the significance of relationship among study variables at 5percent level of significance has been shown for all the years respectively. The results indicate that EV/EBITDA and NPM are significantly related to EV in all the 8 years. Quality of Income was also had a significant relationship with EV in 7 years of the study.

Causal Analysis For All The Years Together

The analysis related to all years together has been depicted in ensuing paragraphs. For this purpose OLS regression was employed at data of all 8 years together

Table 2 – Multi Collinearity Statistics for all years together

Variables	VIF
EV / EBITDA	1.912
ROCE	1.566
EV/ Sales	2.927
Quality of Income	1.338
FATO	2.533
NPM	1.815

Table 1 – Significance of relationship at 5 percent level of significance for all the years

Year / Independent Variables	2005	2006	2007	2008	2009	2010	2011	2012	Total
EV/ EBITDA	0.207	0.204	0.092	0.075	0.056	0.359	0.185	0.464	8
ROCE	0.063	0.307	0.061	0.000*	0.000*	0.003*	0.312	0.058	5
EV/ SALES	0.104	0.218	0.000*	0.000*	0.055	0.032*	0.218	0.069	5
QUALITYOF INCOME	0.925	0.278	0.274	0.069	0.005*	0.084	0.239	0.111	7
FATO	0.001*	0.169	0.000*	0.004*	0.023*	0.301	0.427	0.647	4
NPM	0.581	0.416	0.616	0.162	0.470	0.175	0.232	0.068	8

**Non Significant Variables*

On the basis of VIF values depicted in the above table 2, all the variables have been declared independent. Variables are free from any threat of existence of multi collinearity among themselves. The values for all variables are less than 10 that is evidence of non existence of multi collinearity. Variables are safe and adequate for further analysis.

Table 3. Regression Statistics for the all years together

Variables	Unstanderadized Co-efficient (β_n)
EV / EBITDA	0.479
ROCE	0.740
EV/ Sales	1.377
Quality Of Income	-0.210
FATO	-0.402
NPM	-0.220
Constant (α)	-1.266
R –Square	0.572
F – Value	105.929
Sign. Value (p value)	0.000

Regression equation has been formulated on the basis of the co-efficient values depicted in table 3

$$EV = -\alpha_1 + \beta_1 \times (EV/EBITDA) + \beta_2 \times ROCE + \beta_3 \times (EV/SALES) - \beta_4 \times \text{Quality of Income} + \beta_5 \times FATO - \beta_6 \times NPM$$

It has been evident from R-square value in table 4.36 that 72.1% of variation in dependent variable i.e. EV has been explained by independent variables.

Table 4. Interpretation of F-value for all years together

Degree of freedom for Numerator	Degree of freedom for Denominator	Critical Table Value	F Value	Analysis
6	89	2.202	20.771	20.771 > 2.202

It has been interpreted from the F- value depicted in table 4 that Independent variables as a group has significant effect on Enterprise value in case of all years together

Table 5 – Significance of relationship among study variables for the all years together

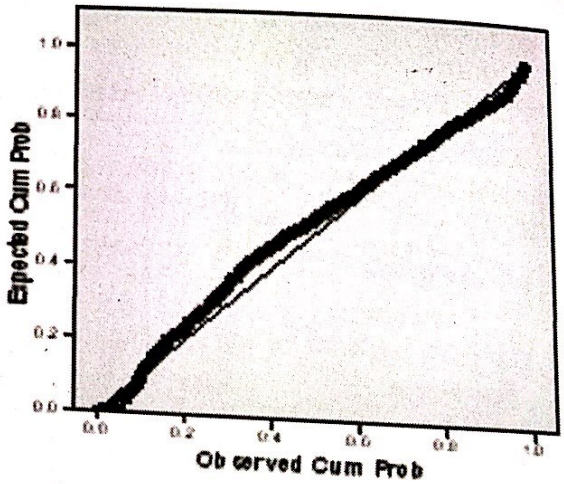
Variables	Significant Value	Significance at 5% level	Significance at 1% level
EV/EBITDA	0.404	S	S
ROCE	0.274	S	S
EV/Sales	0.218	S	S
Quality of Income	0.603	S	S
FATO	0.000	NS	NS
NPM	0.201	S	S

FATO has been emerged as non significant variables at 5% and 1% level of significance from the analysis that means FATO has no significant effect on the dependent variable i.e. Enterprise value. EV/EBITDA, ROCE, Quality of Income, EV/Sales and NPM have their significant values are more than 0.05 at 5% level of significance and more than 0.01 at 1% level of significance This signifies that these variables have significant effect upon Enterprise value.

P-P plot has been drawn in regression analysis to check the distribution tendency of residuals whether they are normally distributed or not.

Normal P-P Plot of Regression Standardized Residual

Dependent Variable : EV



Graph 1. Normality P- P PLOTS FOR ALL YEARS TOGETHER

Residuals are nearly normally distributed as the data points are approximately laying along the straight line in the above graph 1. Normal distribution of residuals in P-P plot confirms the validity of research output.

CONCLUSION

Time series analysis has been performed across all the years as well as taking all the years together by applying SPSS. Variables have been identified which have significant effect upon the Enterprise value (Dependent variable) across all the years. In previous research studies, Stock price has been used as dependent variable. But with change in business scenario, the importance of Stock price has been decreased as a proxy for firm value. In this research study Stock Price has been replaced by Enterprise value as a proxy for firm value and the results are more reliable and significant as compared to Stock Price. The present research work has produced some thought provoking results that may act as guidelines for the research studies in future. In this fragile business environment, accurate valuation of firm by considering all micro and macro economic factors is a daunting task. On the basis of the previous research studies and the findings of present research, analysts must realise the importance of Enterprise Value and Enterprise Value should be incorporated as proxy for firm value rather than stock price in their future valuation projects. This study serves as an important platform to understand the importance of Enterprise Value multiples over P/E multiples. In the area of valuation, Enterprise Valuation multiples have grasped the attention of analysts and their role has been considered influential for the valuation.

LIMITATIONS OF STUDY

Some shortcomings have been noticed that are expected to overcome by future research studies in the same area. The present research study was based upon the sample selection of 90 companies across 6 economic sectors. To bring the homogeneity in the sample of companies, only those companies have been considered whose financial year ends on 31st March. To avoid any anomalies, companies whose financial year ends either in June or in December have been ignored. In this attempt some big companies have been left that have large market cap but their financial year ends either in June or in December. There were some companies which have significant market cap but those companies were not listed on or before 2005.

REFERENCES

Allen, Linda , and Anoop Rai. "Operational efficiency in banking: An intemational comparison." *Journal of Banking & Finance* 20 (1996): 655-672. Print.

Baik Boak, Chae Joon, Choi Sunhwa and Farber David B. "Changes in Operational efficiency and firm performance: A frontier analysis approach." *Contemporary Accounting Research* 30 (2010) 996-1026. Print

Beccalli Ellina, Casu Barbara and Girardine Claudia. "Efficiency and Stock performance in European Banking." *Journal of Business Finance and Accounting* 33.1-2 (2006): 245-262. Print

Chu. S.F and Lim G.H, "Share performance and profit efficiency of banks in an oligopolistic market: evidence from Singapore." *Journal of Multinational Financial Management* 8(1998): 155-168. Print

Kumbirai, Mabwe , and Robert Webb. "A financial Ratio Analysis of Commercial Bank Performance in South Africa." *African Review of Economics and Finance* 2.1 (2010): 30-53. Print.

Lim, Steve. C"The information content of disaggregated accounting profitability: operating activities versus financing activities." *Review of Quantitative Finance and Accounting* 40 (2013): 1-30. Print

Manish, Mittal, and Dhade Aruna. "Profitability and Productivity in Indian Banks: A Comparative Study." *AIMS international* 1.2 (2007): 132-157. Print.

Subramanyam, K. R. , and Mohan Venkatachalam. "Earnings, Cash Flows, and Ex Post Intrinsic Value of Equity." *The Accounting Review* 82.2 (2007): 457-481. Print.

Sufian, F., and A M-Z Majid. "Banks Efficiency and Stock Prices in Emerging Markets: Evidence from Malaysia." *Journal of Asia-Pacific Business* 7.4 (2006): 35-53. Print.

Damodar, Gujarati N., and Dawn C. Porter. "Panel Data Regression." *Basic Econometrics*. New York: Mc-Graw Hill, 2008. 637-639. Print.

Damodaran, Aswath. *The Little Book on Valuation*. Hoboken, New Jersey: John Wiley & Sons, 2011. Print.

Damodaran, Aswath. *Investment Valuation " Tools and techniques for determining the value of any asset*. 3. Reprint. University Edition: Wiley Finance Series , 2012. Print.

CONCLUSION

Time series analysis has been performed across all the years as well as taking all the years together by applying SPSS. Variables have been identified which have significant effect upon the Enterprise value (Dependent variable) across all the years. In previous research studies, Stock price has been used as dependent variable. But with change in business scenario, the importance of Stock price has been decreased as a proxy for firm value. In this research study Stock Price has been replaced by Enterprise value as a proxy for firm value and the results are more reliable and significant as compared to Stock Price. The present research work has produced some thought provoking results that may act as guidelines for the research studies in future. In this fragile business environment, accurate valuation of firm by considering all micro and macro economic factors is a daunting task. On the basis of the previous research studies and the findings of present research, analysts must realise the importance of Enterprise Value and Enterprise Value should be incorporated as proxy for firm value rather than stock price in their future valuation projects. This study serves as an important platform to understand the importance of Enterprise Value multiples over P/E multiples. In the area of valuation, Enterprise Valuation multiples have grasped the attention of analysts and their role has been considered influential for the valuation.

LIMITATIONS OF STUDY

Some shortcomings have been noticed that are expected to overcome by future research studies in the same area. The present research study was based upon the sample selection of 90 companies across 6 economic sectors. To bring the homogeneity in the sample of companies, only those companies have been considered whose financial year ends on 31st March. To avoid any anomalies, companies whose financial year ends either in June or in December have been ignored. In this attempt some big companies have been left that have large market cap but their financial year ends either in June or in December. There were some companies which have significant market cap but those companies were not listed on or before 2005.

REFERENCES

Allen, Linda , and Anoop Rai. "Operational efficiency in banking: An intemational comparison." *Journal of Banking & Finance* 20 (1996): 655-672. Print.

Baik Boak, Chae Joon, Choi Sunhwa and Farber David B. "Changes in Operational efficiency and firm performance: A frontier analysis approach." *Contemporary Accounting Research* 30 (2010) 996-1026. Print

Beccalli Ellina, Casu Barbara and Girardine Claudia. "Efficiency and Stock performance in European Banking." *Journal of Business Finance and Accounting* 33.1-2 (2006): 245-262. Print

Chu. S.F and Lim G.H, "Share performance and profit efficiency of banks in an oligopolistic market: evidence from Singapore." *Journal of Multinational Financial Management* 8(1998): 155-168. Print

Kumbirai, Mabwe , and Robert Webb. "A financial Ratio Analysis of Commercial Bank Performance in South Africa." *African Review of Economics and Finance* 2.1 (2010): 30-53. Print.

Lim, Steve. C"The information content of disaggregated accounting profitability: operating activities versus financing activities." *Review of Quantitative Finance and Accounting* 40 (2013): 1-30. Print

Manish, Mittal, and Dhade Aruna. "Profitability and Productivity in Indian Banks: A Comparative Study." *AIMS international* 1.2 (2007): 132-157. Print.

Subramanyam, K. R. , and Mohan Venkatachalam. "Earnings, Cash Flows, and Ex Post Intrinsic Value of Equity." *The Accounting Review* 82.2 (2007): 457-481. Print.

Sufian, F., and A M-Z Majid. "Banks Efficiency and Stock Prices in Emerging Markets: Evidence from Malaysia." *Journal of Asia-Pacific Business* 7.4 (2006): 35-53. Print.

Damodar, Gujarati N., and Dawn C. Porter. "Panel Data Regression." *Basic Econometrics*. New York: Mc-Graw Hill, 2008. 637-639. Print.

Damodaran, Aswath. *The Little Book on Valuation*. Hoboken, New Jersey: John Wiley & Sons, 2011. Print.

Damodaran, Aswath. *Investment Valuation " Tools and techniques for determining the value of any asset*. 3. Reprint. University Edition: Wiley Finance Series , 2012. Print.