An Empirical Study of Economic Performance Evaluation through Economic Value Added (EVA): A Case study of NTPC

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ABSTRACT

Economic Value Added (EVA) fundamentally affects the Management System, motivation, mindset and measurement aspects of the company. With the limited resources available the investor is confused as to what is better and why? Here comes the concept of EVA, which helps the investors in simplifying investment decision making. In the present market scenario where every second company is making an attempt to impress the investors, with their excellent financial performance showing the high growth rate, EVA seems to be the panacea to all stakeholders especially the investors. This paper discusses this much talked but less understood issue of EVA in modern perspective and explains why the EVA concept is gaining popularity in India. The paper also examines whether NTPC has been able to generate value for its shareholders by applying traditional performance indicators like ROI and EVA.

Keywords: Economic Value Added (EVA), National Thermal Power Corporation (NTPC), Financial Ratios, Cost of Capital, NOPAT (Net Operating Profit after Tax).

INTRODUCTION

The financial theory has since long suggested that every company's ultimate aim to maximize the wealth of its shareholders. That should be natural since shareholders own the company and as rational investors expect good long term yield on their investment. In the past, this ultimate aim has however been often partly ignored or at least misunderstood. This can be seen e.g. from measurement system. Metrics like return on investment and earnings per share are used as the most important performance measure and even as a bonus base in a large no. of companies, although they do not theoretically correlate with the shareholder value creation very well. Against this background it is no wonder that so-called value based measures have received a lot of attention in the recent years. These new performance metrics seek to measure the periodic performance in terms of change in value. Maximizing value means the same as maximizing long-term yield on shareholder's investment. Currently the most popular value based measure is economic value added, EVA & trade, there has been a dramatic debate for and against EVA in academics and management literature. Unfortunately most EVA supporters and adapters have not acknowledged or discussed the faults of EVA and it is widely recognized as a management tool. On the other hand most criticism against EVA has kept to fairly insignificant topics from the view point of corporate control.

REVIEW OF LITERATURE

Salomon and Laya (1967) studied the accounting rate of return (ARR) and the extent to which it approximates the true return measured with IRR. The IRR of a project can be measured, but because the projects constituting a firm are usually not visible, the true yield of a firm is unknown (Salomon and Laya, 1967, p. 157). The authors therefore studied a theoretical firm made up from projects with a known IRR, and found that the ARR of the firm differs from the IRR of the projects underlying the theoretical firm. The authors also show by means of a numerical simulation that inflation increases the ARR of a firm when IRR is being held at constant. (REF De Villiers 1989, p. 494-495).

De Villiers (1989) studies the relationship between accounting and true rate of return with different asset structures. Typically firms can have three different types of assets: Current assets (inventories and receivables), Depreciable assets (e.g. machinery&equipment and buildings) and Non-depreciable assets (e.g. land and stocks). De Villiers (1989) finds that if a firm had nothing but current assets, ROI (on average) would equal IRR. However, the more a firm has depreciable assets (ceteris paribus), the more ROI overstates IRR. On the other hand the more firm has non-depreciable assets (ceteris paribus) the more ROI understates IRR. In the real world companies have assets of all these three kinds and their relative proportions determine whether ROI underestimates or overestimates IRR (and true rate of return). De Villiers (1989) also presents that even if the assets are valued at their current value (and not at their historical value) there is still some discrepancy between ROI and IRR. In other words when the understatement of asset value (caused by inflation and historical values) is eliminated there is still discrepancy between ROI and IRR that can

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thereby be ascribed to a deficiency in the accounting profit only. (De Villiers 1989, p.502-503) De Villiers concludes that accounting rates of return of firms with different asset structures are not comparable.

Alongside with inflation rate and asset structure, also the length of investment period affects the discrepancy between ROI and IRR. Other factors being constant, the longer investment period (economic life of assets) the bigger is the discrepancy between ROI and IRR. This is obvious since long investment period gives inflation time to distort asset values. The effect of the project duration to the discrepancy is shown in the article of De Villiers (1997, p.293-294).

Since EVA is calculated from the accounting based numbers and some version of accounting return is used in calculating EVA, it is obvious that all the discrepancies mentioned above affect also EVA. If ROI overstates IRR then EVA also overstates the real shareholder value added. De Villiers (1997) demonstrates with numerical examples how big these distortions can be. He also suggests the use of a modified concept of EVA called adjusted EVA (or AEVA) in order to radically decrease these discrepancies. The adjusted EVA is simple using current value of all assets in calculating the accounting rate of return (ROI). De Villiers pointed out that one should not use market values of equity in calculating EVA as so often is done. Using market value of equity would be circular reasoning and lead to EVA of zero. Instead current value (market value) of individual assets produce much more sound result, but they are admittedly often either very difficult or even impossible to estimate. The use of current value of assets does not however eliminate the discrepancy wholly but it does diminish it to a fraction of original discrepancy.

Storrie & Sinclair (1997) present also that EVA based on historical values can be somewhat misleading. They first demonstrate that the valuation formula of EVA is theoretically exactly the same as the valuation formula of discounted cash flow (DCF) (Proved also by Käppi 1996). After that Storrie & Sinclair also prove mathematically that this equivalence is due to the fact that the book value in EVA valuation formula is irrelevant in determining value. That is because an increase in "book value of equity" (formula 5 below) decreases the periodic EVA-figures ("present value of future EVA") and these changes cancel each other out.

Harcourt (1965), Salomon and Laya (1967), Livingston and Salomon (1970), Fischer and McGowan (1983) and Fisher (1984) concluded that the difference between accounting rate of return and the true rate of return is so large that the former cannot be used as an indication of the latter (REF De Villiers 1997, p.286-287). The effect of inflation on the discrepancy was addressed by Salomon and Laya (1967),

Kay (1976), Van Breda (1981) Kay and Mayer (1986) and De Villiers (1989). They have shown that inflation exacerbates the discrepancy between accounting and true return. (REF De Villiers 1997, p.286-287) Although inflation strengthens the discrepancy, it should be pointed out that accounting rate of return is not, on average, equal to the true rate of return even with no inflation.

Telaranta's results (1997a) indicate the level of Economic profit (the nearest measure to EVA of all those variables that Telaranta use) to explain 30,7% of the level of Market value added as the next best measure NOPAT explain 30,16%. When talking about changes instead of absolute levels, Economic Profit is the best with R squared of 17,18% whereas Operating profit is the second best with R squared of 16,64%. In several other regressions residual income variables are generally found to be the best measures although with a tiny difference compared to some accounting based variables. In some regressions some accounting based variable is even found to be slightly better than Economic Profit, but these regressions are not much meaningful.

Wallace (1997) study the effects of adopting management bonus plans based on residual income measures. The sample in the study consists of forty firms that have some residual income measure, mainly EVA, as bonus base. This sample is compared to sample of same size consisting of similar companies where the bonus is tied to accounting based measures. Wallace tests with various methods the management actions in these sample groups and concludes that "…I interpret the results as being consistent with a residual income-based performance measure providing incentives for managers to act more like owners, thus mitigating the inherent conflict between managers and shareholders." Wallace's tests support the adage "you get what you measure", with significant increases noted in residual income for the firms adopting residual income based compensation relative to the comparison group. The firms that adopted residual income based compensation outperformed the market over the twenty-four month period by over 4 %-points in cumulative terms.

The survey of the related studies reveals that there is very limited research in the development aspects of EVA in general especially in the public sector undertakings in particular. The existing gap in research in the area of EVA justifies the rationale of the study at hand. The present study has been conducted so as to reduce the existing gap in research in this important finance area.

RESEARCH METHODOLOGY

The primary objective of the study is to examine whether NTPC has been able to generate value for its shareholders. It will help other companies how effectively EVA should

be used as a management tool. What precautions should be taken and what is the effect of the industry in this evaluation? And the study entails the sub-objectives of computing the performance of the company by applying traditional performance indicators like ROI and EVA.

Overall, the study is descriptive and analytical in nature. Data is primarily secondary in nature but for the better understanding of the concept, both the academicians and subject experts were consulted. For the calculation of EVA, last three financial reports (FY 2007-08 to 2009-10) of NTPC were extensively used. Considering the paucity of the concept, convenient sampling method was applied. For analyzing the data, Empirical Formulas, Bar Graphs, and MS-Excel were used.

DATA ANALYSIS AND DISCUSSION

EVA seems to have importance for companies as a performance measurement and controlling tool. The premise behind EVA – that businesses must cover their capital costs – is neither new nor peculiar. Putting it into practice can still be eye-opening. EVA shows financial performance with a new pair of glasses or offers new approach especially for the companies where equity is viewed as free source of funds and performance is measured by some earnings figure. At best EVA helps with creating a mind-set throughout the organization that encourages managers and employees to think and behave like owners.

Table 1: Economic Value Added
Statement Showing EBIT & Net Operating
Profit After Tax (Rs. in Millions)

Particulars		2007-08	2008-09	2009-2010
Income				
Net Sales		370501	419237	463226
Other Income		29676	33490	29241
	[A]	400177	452727	492467
Expenditure				
Fuel Cost		220202	271107	294627
Employee Cost		18960	24631	24123
Depreciation		21385	23645	26501
Other Expenditure		19100	19520	20271
	[B]	279647	338903	365522
EBIT (A-B)		120530	113824	126945
NOPAT=EBIT(1-TAX)		79562	75135	83796

Table 2: Capital Employed
Statement Showing Calculation of Capital Employed

Particulars	2007-08	2008-09	2009-2010
Net Worth			
Paid & Share Capital	82455	82455	82455
Reserve & Surplus	443931	491246	541920
Debenture Redemption Reserve	13602	16889	19867
	539988	590590	644242
Add-: Secured Loans	73147	89696	90799
Add-:Unsecured Loans	198759	255982	287171
	271906	345678	377970
Capital Employed	811894	936267	1022242

Table 3: Computation of Weighted Average
Cost of Capital (WACC) for the Year 2007-08

Particulars	Amount	Weight	Cost	Total
Equity, reserve and surplus	539988	66.5	0.14	9.31
Debt	271906	33.5	0.048	1.61
Total	811894			10.92

Weighted Average Cost of Capital = ke * w1 + kd * w2

$$= 0.14*65.94+0.048*34.06$$

$$= 10.92\%$$

Calculation:

❖ Cost of equity is taken as 14% as per govt. norms

❖ Cost of Debt = Total interest expenses*{(1 effective tax rate)/total borrowing}

$$= 17981*(1-0.3399)/244844$$

$$= 0.048$$

Where effective tax rate = 33.99% (as per income tax act)

Table 4: Computation of Weighted Average
Cost of Capital (WACC) for the Year 2008-09

Particulars	Amount	Weight	Cost	Total
Equity, reserve and surplus	590590	63.07	0.14	8.82
Debt	345677	36.93	0.049	1.81
Total	9936267			10.63

Weighted average cost of capital = ke * w1 + kd * w2

$$=0.14*63.07+0.049*36.93$$

$$=10.63\%$$

Calculation:

❖ Cost of equity is taken as 14% as per govt. norms.

❖ Cost of Debt = Total interest expenses * {(1-effective tax rate)/total borrowing}

$$= 20229*(1-0.3399)/271906$$

$$= 0.049$$

Where effective tax return = 33.99% (as per income tax act)

Table 5: Computation of Weighted Average Cost of Capital (WACC) for the Year 2009-10

Particulars	Amount	Weight	Cost	Total
Equity, reserve and surplus	644242	63.02	0.14	8.82
Debt	377970	36.98	0.035	1.29
Total	1022242			10.11

Weighted average cost of capital = ke * w1 + kd * w2

$$=0.14*63.02+ 0.035*36.98$$

$$= 10.11\%$$

Calculation:

❖ Cost of equity is taken as 14% as per govt. norms.

❖ Cost of Debt = Total interest expenses * {(1-effective tax rate)/total borrowing}

$$= 18089* (1-0.3399)/345678$$

$$= 0.035$$

Where effective tax return = 33.99% (as per income tax act)

Table 6: Comparison of EVA & ROI for the 3 financial years (FY 2007-08 to 2009-2010) Statement showing EVA & ROI comparison of NTPC (In millions)

EVA Calculation	2007-08	2008-09	2009-2010
EBIT	120530	113824	126945
Tax Rate	33.99%	33.99%	33.99%
NOPAT	79562	75135	83796
Capital Employed	811894	936267	1022242
WACC	10.92%	10.63%	10.11%
EVA=NOPAT-(Capital Employed*WACC)	-(9097)	-(24390)	-(19553)
ROI=(EBIT/Capital Employed)*100	14.85%	12.16%	12.42%

CALCULATION OF EVA

Year 2007-08   : 79562-(811894*0.1092) = (9097)
Year 2008-09   : 75135-(936267*0.1063) = (24390)
Year 2009-2010 : 83796-(1022242*.1011) = (19553)

CALCULATION OF ROI

Year 2006-07   : 107668/730812*100   = 14.73%
Year 2007-08   : 120530/811894*100   = 14.85%
Year 2008-09   : 113824/936267*100   = 12.16%
Year 2009-2010 : 126945/1022242*100 = 12.42%

The above statement basically implies that unlike the traditional measure of accounting measures of accounting profit where only a part of the cost of capital (cost of debt) is deducted , EVA requires deduction of full cost of capital (cost of debt as well as well the cost of equity).

Return on investment measures a company's profitability & its management's ability to generate profits from funds investors have placed at its disposal but just earning profit is not enough, a business should earn sufficient profit to cover its cost of capital & create surplus to grow. Therefore it is advisable to the company to follow the EVA method as it gives a more rigorous. A positive EVA means the firm generated a return to invested capital that exceeds the opportunity cost of capital i.e. the "value".

In case of NTPC, EVA comes out to be negative implying that the profit of the company did not add any value to the shareholder's wealth but if we look at ROI it is not necessarily good for the shareholders the reason could be that ROI measures profitability , while EVA measures shareholder wealth. EVA focuses on after-tax instead income instead of before-tax operating profit.

The reason for EVA being negative is the cost of capital being greater than the operating profit of the firm i.e. there is no capital employed rather there is the capital erosion taking place. It shows that NTPC is not considering the cost aspects.

MAJOR FINDINGS

❖ ROI increases in 2007-08 because of increase in EBIT but at the same time there is an increase in Capital employed also thus implying that the effect of EBIT on ROI is more as compared to that of capital employed.

❖ In the year 2007-08, EVA increased because of increase in EBIT & decrease in cost of capital but in 2008-09 it became negative as the cost of capital was more than the operating profit. In the year 2009-10, EVA increases because of increase in EBIT.

❖ EVA is better than ROI as an indicator of creation of value.

❖ Calculation reflects the idea that firm must earn enough to cover the cost of debt and the opportunity cost of equity before it even begins to create value.

CONCLUSION AND RECOMMENDATIONS

The EVA depicts the actual profits benefit over cost of capital employed where as ROI shows actual profits over normal profits. Hence EVA is good measure of evluating performance as it evaluate profit against cost. If EVA is positive, that it indicates that the firm is adding value to its shareholders. But if EVA is negative , it shows that the firm is destroying value evan though it may be reporting a positive or growing earning per share(EPS) or return on investment(ROI). This means, if a firm wants to have an attractive invstment: it has to have a return that would exceed other investment options with a similar risk.

EVA shows financial performance with a new pair of glasses or offers new approach especially for the companies where equity is viewed as free source of funds and performance is measured by some earning figure.

Inflation can distort the value of EVA. Furthermore EVA suffers from wrong periodization Economic value added is a residual income variable. It is defined as Net operating profit after tax subtracted cost of capital tied in operations. In a periodical performance measurement EVA can how-ever in some occasions give misleading information because it suffers from the same shortcomings as (ROI). EVA inspite of its fault seems to have importance for companies as a performance measurement and controlling tool.

The study reveals that NTPC has a negative EVA so NTPC has been not able to generate shareholders value. The study reveals the following suggestions to NTPC that positively can change its negative EVA to positive EVA:

1. Earning more profit without using more capital and this could be done by carry out a cost analysis over product line or by doing analysis of expenses.

2. Change capital structure to reduce capital cost by employing less capital or invest capital in projects with greater return potential.

3. Decrease overall cost of capitalby paying debts, loans etc. if sufficient funds are available or it can buy back its equity.

4. Generally the suppliers look at the current ratio of the company.However, NTPC has a brand value being a Maharatan, so it can lower down its current asstes to the standard. Moreover these assets can be used in those projects which can give more returns than the cost of the capital.

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Appendix-1
SWOT Analysis of NTPC

STRENGTHS

- ❖ Largest market share in domestic power generation and a broad customer portfolio across the country.

- ❖ Diversified thermal generation portfolio – multiple sizes and fuel types.

- ❖ Highly skilled and experienced human resources,

- ❖ Maharatna status.

- ❖ Strong balance sheet – ability to raise low cost debt.

- ❖ Excellent track record of performance in project implementation and plant operations.

- ❖ Engineering skills in project configuration and package design.

- ❖ High credit rating that is indicative of the confidence of lenders.

WEAKNESSES

- ❖ Low risk-diversification of business portfolio consists primarily of generation assets.

- ❖ Poor financial health of customers.

- ❖ Long and multi layered procurement process leading to long lead times and process delay.

- ❖ Hierarchy for decision making that affects responsiveness.

- ❖ Gaps in HR systems such as performance management, rewards and incentives and career development

- ❖ Old tradition practises & no innovation in process.

- ❖ Fragmented IT architecture.

OPPORTUNITIES

- ❖ Expand generation capacities by putting up thermal and hydro capacities

- ❖ Expand services for EPC, R&M and O&M activities in the domestic as well as international markets.

- ❖ Improve collections by trading, direct sale to bulk customers and the active role in allocation in new plants.

- ❖ Broad base fuel mix by considering imported coal, gas, domestic coal, nuclear power etc with a view to mitigate fuel risks and maintain long run competitiveness.

- ❖ Targeting new market segments like renewable sources.

THREATS

- ❖ Limited experience of operating in a truly liberalized environment.

- ❖ Downward regulatory and competitive pressure on tariffs.

- ❖ Stringent norms for approval of increase in capital costs for projects in event of time overrun.

- ❖ Redirecting power may be constrained by inter-regional connectivity.

- ❖ Limited experience of operating in a truly liberalized environment with competition

- ❖ Delayed SEB reforms and continuing financial ill-health.

- ❖ Stringent environmental norms in the future may add to the cost of generation

- ❖ Availability of coal in the future

Appendix-2
Steps in EVA Calculation

EVA computation requires some basic steps. The common steps are here that may be modified due to the typical nature of business or processes where it has been used.

Step 1:

Collect and Review Financial Statements

EVA is based on the financial data produced by traditional accounting systems. Most of the data come from either income statement or balance sheet both of which are available from general purpose financial statements.

Step 2:

Identify the company's structure

A company's capital structure comprises all of the money invested in the company

either by the owner or by borrowing from outsiders. It is the proportions of debt instrument and preferred and common stock of a company's balance sheet.

However, it can be computed by anyone of the following methods:

- **Direct Method:** By adding all interest bearing debt (both short and long term) to owner's equity.
- **Indirect Method:** By subtracting all noninterest bearing liabilities from total liabilities (or total assets).

Step 3:

Determine the company's weighted average cost of capital (WACC)

Estimation of cost of capital is a great challenge so far as EVA calculation for a company is concerned. The cost of capital depends primarily on the use of fund, not the source. It depends on other factors like financial structures, business risks, current interest level, investors expectations

and so on. It is the minimum acceptable rate of return on new investment made by the firm from the viewpoint of the creditors and investors in the firm's securities. Some financial management tools are available in this case to calculate the cost of capital. A common and simple method is Weighted Average Cost of Capital (WACC).

For calculating WACC we have to know a lot of other issues like

- ❖ Components of capital employed like equity, debt etc
- ❖ Respective weight of various components into total amount of capital employed
- ❖ Factors that affect the risk and return of various components in a capital structure

The overall cost of capital is the weighted average of the costs of the various components of the capital structure

Step 4:

Calculate the company's Net Operating Profit after Tax (NOPAT)

NOPAT is a measure of a company's cash generation capability from recurring business activities and disregarding its capital structure. NOPAT is derived from NOP or EBIT simply by subtracting calculated taxes from NOP [NOPAT=EBIT (1-TAX)]

Step 5:

Calculation of economic value added

Finally, the EVA can be calculated by subtracting capital charges from NOPAT i.e.

EVA=NOPAT-CAPITAL EMPLOYED*WACC

If the EVA is positive, the company created value for its owner. If the EVA is negative owner's wealth gets reduced.