All about EVA and financial analysis

EVA is an accepted tool of financial analysis in terms of asset management but it is not a forecasting technique. JEAN CANIL and BRUCE ROSSER mount a case for using EVA with other financial analysis tools.

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For some years now economic value added (EVA) has been advocated by leading US financial consulting firm Stern, Stewart & Co. as a financial performance benchmark superior to traditional measures of return that do not take into account the required return on invested capital.

The intended purpose of EVA is to promote timely asset management and not as a forecasting technique. Essentially, EVA provides a benchmark to show whether projected value-adding activities are on track.

In principle, EVA equals annual income *minus* a charge for invested capital and has its roots in the notion of residual income. Both accounting and cash flow variants exist.

In an entity-based accounting approach, adopted here, income is defined as (after-depreciation) earnings before interest and tax (EBIT).

Invested capital is the sum of debt and equity capital, as would be represented in the replacement cost of assets (assuming a profitable firm). The book value of total assets is at best a rough approximation, but at least accumulated depreciation is partly offset by asset revaluations.

The required rate of return is represented by the after-tax weighted average cost of capital (WACC) applicable to a company.

WACC is measured by multiplying the debt- and equity-funded portions (measured at book) by their respective costs for each year:

$$WACC=(k_D)(1- t_C)(IBD/TA)+(k_E)\left[(TA-IBD)/TA\right]$$

where k_D is the cost of debt (calculated from the interest rate risk exposure note to financial statements), t_c is the effective company income tax rate (calculated from the income tax note to financial statements), *IBD* is the book value of all interest-bearing debt, *TA* is the book value of ending total assets, and k_E is the cost of equity determined from the Capital Asset Pricing Model[1].

The company income tax rate for 1999-2000 was 36%. This figure was adjusted for permanent differences to arrive at an

TABLE 1 **Base data**

Earnings ($m)	100
Beginning total assets ($m)	400
Earnings/total assets (ROA) (%)	25
Market capitalisation ($m)	1,000
Price/earnings (PE)	10
Market-to-book (MB)	2.5
Weighted average cost of capital (WACC) (%)	10
Economic Value Added (EVA) ($m) [= 100 - .10*(400)]	60

TABLE 2 **Scenarios analysed**

#1	Earnings double permanently
#2	Earnings double for one year only
#3	Earnings halve permanently
#4	Earnings halve for one year only
#5	Earnings turn negative for one year only
#6	Earnings decrease and stabilise at 50
#7	Earnings increase and stabilise at 150

effective tax rate, which in many cases was considerably lower than 36%. Thus, an accounting-based measure of EVA is:
EVA = after-tax EBIT – (WACC * Beginning total assets).In competitive industries, the return on invested capital (ROI) will equal WACC, so EVA should average zero.

When EVA is positive (negative), performance is better (worse) than benchmark. Earnings growth *alone* does not guarantee value creation because ROI may still be below WACC and hence generate a negative EVA. Earnings growth lower than asset growth implies ROI falling below WACC.

Another performance metric also advocated by Stern Stewart & Co. is market value added (MVA), which is market capitalisation *minus* equity capital plus debt. However, MVA is not benchmarked to WACC like EVA.

Market capitalisation/net assets at book, or market-to-book (MB)[2], has gained some popularity as a tool of financial analysis after it was shown by Fama and French in the US some years ago that it more successfully proxied for risk than more conventional measures[3].

Importantly, both the price/earnings (PE)[4] ratio and MB reflect market expectations with reference to a current performance benchmark: current earnings (whether maintainable or not) in the case of PE, and ending book value of total assets in the case of MB.

PE is expected to be more volatile than MB because earnings are typically more volatile than aggregate book values of assets.

The purpose of this paper is to explore how EVA complements existing tools of financial analysis. As a bonus we develop a refinement of EVA termed the Capitalised Growth Index (CGI), which also indicates the degree of permanency that the market attaches to current year earnings. We show that no other single metric possesses this information content and how CGI may be used to infer the efficiency of current asset management.

DISCUSSION

For a given invested capital base, an increase in earnings increases EVA by the same amount[5]. For firms with adequate interest coverage, market capitalisation will also increase because most of the gain accrues to equity capital.

The increase in market capitalisation will be proportionately higher as the market expects the higher level of earnings to be maintained. Thus, the relation between EVA and market capitalisation can be used to reveal the market's view of the permanency as well as the adequacy of current earnings.

We devise a growth capitalisation index to show this:

$$CGI = \frac{(\text{Market capitalisation}_{end} - \text{Market capitalisation}_{start}) - EVA}{\text{Invested capital}}$$

The numerator effectively benchmarks the change in market capitalisation to EVA to reveal the anticipated trend in earnings in future periods. The denominator, invested capital, is a scaling device and is measured by end of period total assets.

To interpret CGI, first consider a situation where the change in market capitalisation and EVA are the same, causing CGI to be zero. Here, the market does not anticipate excess earnings relative to that required beyond the current period.

A positive CGI therefore suggests further positive EVA in future periods (not necessarily the next), while a negative CGI suggests declining EVA in future periods.

In short, the Index may be seen as a barometer of the market's current evaluation of future earnings potential, intermingled with all other intervening factors.

To illustrate, consider four typical cases in the table below, all of which have an invested capital of $100m (see case table below).

The CGI synthesises EVA and changes in market capitalisation. Case A has increasing market capitalisation, but negative EVA. The latter reinforces the positive trend in CGI, and suggests market confidence of a turn around in future earnings, such that EVA will improve.

Case B exhibits strong market optimism combined with a positive EVA, indicating that EVA is trending further upwards. Case C shows a loss of market confidence allied with a current EVA deficit. The fall in market capitalisation outweighs the impact

Case:	A	B	C	D
Beginning of period market capitalisation ($m)	200	200	200	200
End of period market capitalisation ($m)	300	600	100	100
Economic Value Added (EVA) ($m)	–100	70	– 80	70
Capitalised Growth Index (CGI)	2.00	3.30	– 0.20	–1.70

TABLE 3 **Behaviour of financial ratios across seven scenarios**

End of current period:	Earnings ($m)	Expected future earnings	Ending total assets ($m)	Market capitalis-ation ($m)	ROA	PE	MB	EVA ($m)	CGI
Prior period earnings = 100									
Scenario:									
#1	200	200	800	2000	25.0	10	2.50	120	1.10
#2	200	100	425	1100	47.1	5.5	2.59	157.5	–0.14
#3	50	50	200	500	25.0	10	2.50	30	–2.65
#4	50	100	375	950	13.3	19	2.53	12.5	–0.17
#5	–50	100	350	850	–14.3	–17	2.43	– 85	– 0.19*
Prior period earnings = -50									
#6	50	50	200	500	25.0	10	2.50	30	–2.65
#7	150	150	600	1200	25.0	8	2.00	90	0.18

*For example, –.19 = [(850-1000)-(-85)]/350.

of a negative EVA, which is therefore expected to deteriorate further.

Case D represents a situation where an EVA surplus is expected to turn into a deficit. The CGI for Case D is more negative than that for Case C because the anticipated fall in EVA is proportionately greater (from positive to negative). In practice, market capitalisation changes are not usually as exaggerated, so the CGI shows more modest variation.

ANALYSIS

To show how CGI interacts with traditional financial ratios and to consider its interpretation, we first construct a highly simplified model of an all-equity firm that experiences either permanent or temporary earnings fluctuations in either direction, for which the base data are stated in Table 1.

Relative to current period earnings, the asset and market capitalisation multipliers are 4 and 10, respectively. Beginning investment in assets is assumed to move in proportion to permanent changes in earnings and to move only marginally for temporary earnings changes.

Seven scenarios are identified in Table 2, and Table 3 shows how the financial ratios interact across these scenarios. The scenarios represent most situations encounteredin the history of sound companies.

Several regularities emerge from Table 3. For permanent changes in earnings (either up or down), earnings and market capitalisation change by the same percentage because the earnings change is fully capitalised, so the PE ratio does not change.

For temporary earnings changes (where earnings are expected to revert to previous levels), market capitalisation changes are proportionately less than earnings because expectations of future earnings are unaltered. PE therefore moves in the opposite direction to the earnings change.

Table 3 highlights the inadequacy of ROA by showing that, irrespective of direction, the ratio is the same for all permanent changes (Cases #1, #3, #6 and #7). In fact, it gives the highest value to Case #2 where the increase in earnings is temporary.

Cases #3 and #6 have the same CGI, irrespective of the different prior period earnings because both have the same earnings outlook and invested capital. In general, higher positive CGI values suggest higher EVA growth, while high negative values imply declining or even negative future EVA.

EVA is more volatile than earnings owing to the leverage created by deducted cost of invested capital which is fixed, while the opposite is true for MB to the extent that asset levels either follow or lead earnings performance.

EMPIRICAL OBSERVATIONS

We analyse the performance of a small (22) but broadly-based sample of Australian listed companies for successive fiscal years 1999 and 2000 (listed in the Appendix).

All are industrials apart from three resource stocks. Table 4 reports comparative descriptive statistics for standard financials as well as EVA and CGI. Share prices adjusted for dividends and changes to equity capital were used in the calculation of market capitalisation, MB and PE.

Return on assets (ROA) is the ratio of EBIT to ending total assets at book. It can be seen that market capitalisation, ROA and PE have declined over the two-year interval.

EVA is negative on both counts in 1999, but (with zero as the benchmark) improves to barely passable in 2000. Given ROA has fallen, there must have been a commensurate fall in the average WACC as well, as shown in Table 4.

The improvement in EVA for 2000 is attributable to a downward trend in WACC outweighing the impact of an upward movement in invested capital (as proxied by beginning total assets) and a falling ROA.

Yet the recovery in EVA by 2000 occurred while market sentiment deteriorated, for total assets had increased at the same time. The implied increase in investment was presumably a consequence of the 200bp reduction in the WACC from 1999 to 2000.

However, the sampled EVA values for 2000 alone do not reveal the market's expectations of future earnings which are impounded in market capitalisation, along with the effects of capital transactions during the period (such as acquisitions and disposals of assets).

TABLE 4 **Descriptive statistics and EVA and CGI values for fiscal 1999 and 2000 for a sample of 22 Australian companies**

	Ending total assets ($m)	Market capital-isation ($m)	ROA (%)	PE	WACC (%)	EVA ($m)	CGI
n = 22							
1999							
Mean	2,707.5	2,482.4	9.1	11.9	10.7	–43.4	.065
Median	1,528.5	1,298.0	8.5	16.3	11.1	–1.2	.054
2000							
Mean	3,094.5	2,180.8	6.5	9.6	8.6	–18.6	–.067
Median	1,669.5	1,183.5	7.7	12.3	8.9	7.0	–.068

The trick is to separate the two. This is accomplished approximately in the CGI measure, which uses end of period total assets as the scaling factor in the denominator. Ending total assets include the costs of any acquisitions minus distributions of proceeds on asset disposals, the market valuation of which is represented in the change in market capitalisation in the numerator.

The sample CGI for fiscal 1999 is about .06. However, the slightly positive outlook suggested by this value did not materialise in 2000 for which all the profitability indicators fell.

The sample CGI for 2000 had eased to -06 suggesting a deteriorating earnings outlook, as characterised earlier by our Case D. It will therefore be interesting to see if the earnings levels for 2001 are in line with this expectation.

We again caution that CGI does not provide a forecast, but simply reflects market sentiment as represented in market capitalisation at balance date.

The final question concerns the extent to which companies' asset management is in tune with market appraisal.

Table 5 confirms that EVA when scaled by beginning total assets increased marginally during the interval, while at the same time CGI fell, suggesting a deteriorating outlook not captured by EVA.

The restrained outlook is mirrored in MB, driven by higher ending total assets in tandem with falling market capitalisation as can be seen from Table 4. Thus, CGI captures the information in both EVA and MB.

What are the consequences for asset management? EVA in fact increased from 1999 to 2000, which implies that on average the sample companies have done something right, ie, lower capital expenditure and/or higher asset disposals.

Capital expenditure here is defined to include all outlays on investments in businesses, associates and income-generating assets.

Table 5 shows the sample companies in 2000 had commenced pruning capital expenditure but had also curtailed asset disposals in comparison with 1999[6].

It could well be argued (especially for resource companies) that lead times for investment and divestiture decisions are longer than one year, so asset management may not be sensitive to yearly fluctuations in earnings, but we are not convinced that annual movements should be disregarded.

As already noted, the increase in EVA originated from a fall in WACC proportionately higher than the fall in earnings. Had WACC remained the same, EVA in 2000 would have averaged -.057 (median -.037), indicating a slow response in asset management to changing market conditions.

On the other hand, CGI for 2000 correctly points to the need for tighter asset management.

CONCLUSIONS

Despite its obvious advantages over regular accounting-based ratios, this paper has shown EVA falls short in prescribing asset management policy, whereas CGI fills the gap.

Though benchmarked, EVA is backward looking. In contrast, CGI incorporates current trends in market capitalisation to place a firm's EVA in a market-expectation perspective.

Our evidence, though based on small-sample averages, suggests the asset management policies of a sample of Australian companies in 2000 have not been optimised, or else take more time to implement than can be observed with currently available data.

This would be the case if the market for going concerns is illiquid or over-regulated, resulting in buyers being hard to find for under-performing assets that are being divested, or acquisitions not being proceeded with if asking prices are too high.

TABLE 5 **Asset management for fiscal 1999 and 2000 for a sample of 22 Australian companies**

	EVA/ beginning total assets ($m)	CGI	MB	Capital expenditure/ beginning total assets	Asset disposals/ beginning total assets
n = 22					
1999					
mean	–.004	.065	.80	.115	.065
median	–.001	.054	.73	.096	.030
2000					
mean	.010	–.067	.67	.084	.045
median	.016	–.068	.58	.078	.010
Direction of movement	up	down	down	down	down

APPENDIX

The list of sampled companies:
Burns Philp, Coles Myer, Evans Deakin Industries, F H Faulding & Co, Foster's Brewing Group, Futuris Corporation, George Weston Foods, Hills Industries, Lemarne Corporation, Lemvest, Lend Lease Corporation, Mayne Nickless, M.I.M. Holdings, Normandy Mining, Oil Company of Australia, OPSM Protector, Pacific Dunlop, Qantas Airways, Ridley Corporation, Southcorp, Spicers Paper, Wesfarmers.

REFERENCES

Grinblatt, M, Titman, S. (1998), "Financial Markets and Corporate Strategy", McGraw-Hill International, New York.

Fama, E, French K.. (1992), "The Cross-Section of Expected Stock Returns", *Journal of Finance*, 47, pp. 427-465.

NOTES

1 The CAPM was specified as:$(r_f + \hat{a} (R_m - r_f)$, where r_f is the annualised risk-free rate and R_m is the market return on the All Ordinaries Accumulation Index. β was estimated by regressing two years of weekly stock returns against weekly market returns prior to financial year-end.

2 Also known as price/book, or PB.

3 Specifically, MB explained more of volatility in stock returns than beta as defined in the Capital Asset Pricing Model; see Fama and French (1992).

4 PE is the ratio of the last price at balance date to earnings after tax and interest attributable to ordinary shareholders.

5 A straightforward explanation of the relation may be found in Grinblatt and Titman (1998), pp. 331-3.

6 Significance testing reveals that fiscal 2000 asset disposals were significantly lower than those in 1999, while 2000 capital expenditure was not significantly below the 1999 level. In other words, asset disposals were in the wrong direction and capital expenditure had not been effectively reduced, so 2000 EVA could have been higher still had asset management policy responded to earnings trends perceived in the market place. J