Financial Indicators of Performance Measurement: Reality, Relevance and Distortion

Flavius-Andrei Guinea
Bucharest University of Economic Studies
flavius.guinea@cig.ase.ro

Abstract

The main criticism brought to managers and to managerial accounting systems was the lack of emphasis on the return of the use of invested capital and the excessive focus on the efficiency of production processes. This fact forced the transition to a new view on the way of establishing the strategic objectives measured by financial indicators. The aim of this paper is to demonstrate, through case studies, the relevance and possibilities of manipulation of a series of indicators used for assessing performance: return on investment, residual profit, economic added value, commercial profitability. The relativity and the criticized appraisal of performance only through the means of profit were thought to be solved by implementing other indicators that would link several ingredients of profitability. The conclusions highlight that the remedy promoted by the new sets of financial indicators imposes a considerable cost, represented by the temptation of information distortion.

1. Introduction

In most of the decentralized profit centers, also known as strategic units, the general manager has the authority to take the operational decisions related to products range, prices, client relations, production methods. In addition, he/she determines the type of the assets and the extent to which there are used within the unit. For these kinds of units, the financial measure used to evaluate the unit and the managerial performance should be the profit earned per assets used. By connecting unit profit with assets used, the managers of the companies may asses if the profits generate the adequate return on the assets invested in unity.

Usually, as the capital may be differently distributed, the managers must be preoccupied if the return on the capital employed exceeds the cost of the capital. The cost of the capital can be measured by calculating the return that might have been given if otherwise invested. Another reason to calculate the capital return is given by the need of having a control and an analysis during the capital budgeting process. Many companies have elaborated systems to authorize the capital expenditure. Without having a measure for the effective capital return, during the investing budgeting process, it may exist a low incentive for managers to get an accurate estimation of the future cash flows. Measuring the return of the capital employed drives manager's attention to the ways of reducing the level of the working capital, especially in receivables and inventories cases (Kaplan, 1983, pp. 686-705).

2. Return on Investment (ROI): apparently, a better method of analyzing performance

ROI is the most popular method that incorporates investment to measure performance. This indicator, calculated as a ratio between profit and investment, combines in one figure, the major components of profitability (revenues, costs, investments). ROI may be compared to any internal or

external opportunity return of the company. An improvement to any of those items by keeping constant the other one will determine an increase of ROI. There are differences in the way the components of the ratio are defined. For example, some analysts use the ordinary profit, others the net profit of the period, or they can use total assets and others total assets less current liabilities. Also, regarding the asset value, there are pros and cons: the historical cost, the current value, the current cost or the realizable value, the gross or net value. Surveys of company practice report net book value to be the dominant asset measure used by companies in their internal performance evaluations (Drury, 2000, p. 803).

Example 1: The A Company operates three projects. Table no. 1 summarizes data for each of the three projects (X, Y, Z) for 2016. At present, the A Company does not allocate to the three separate projects the total long-term debt of the company.

Table no. 1 Annual financial data for A company for 2016

	X	Y	Z	TOTAL
Revenues	2.400	2.800	6.370	11.570
Variable costs	620	750	1.990	3.360
Fixed costs	1.300	1.450	3.360	6.110
Operating income	480	600	1.020	2.100
Interest cost on long term debt at 5%				450
Income before income taxes				1.650
Income taxes at 10%				165
Net income				1.485
Current assets	800	1.000	1200	3.000
Long-term assets	1.200	3.000	4.800	9.000
Total assets	2.000	4.000	6.000	12.000
Current liabilities	100	300	600	1.000
Long term debt				9.000
Stockholder's equity				2.000

Source: Processed by the author, 2016, based on Horngren et al, 1997, p. 934

Is it proper to compare the performance of the three projects using their operating income? Is project Z the most efficient one? By using the operating income to compare the projects' performance, the investments made in each project will be ignored (by investments being understood the resources or the assets used to generate benefits).The problem is how big are the resources involved to obtain the profit, not the profit by its own. The indicators incorporating the investment concept are return on investment, residual income and economic value added.

The A Company may increase ROI by increasing the revenues, decreasing the costs, or by decreasing the investments.

Consider the ROI of each of the three A Company's projects in table no. 1. X project proves the best utilization of its total assets (Table no. 2).

Table no. 2 Calculation of return on investment for company A in 2016

Project	Operating income	Total assets	ROI
X	480	2.000	24,00%
Y	600	4.000	15,00%
Z	1.020	6.000	17,00%

Source: Processed by the author, 2016

ROI underlines the benefits that managers can get by reducing the investments of current or fixed assets. Some managers are aware of the need to sustain revenues or to control costs and pay less attention to the reduction of the investments. ROI became the reality itself, an objective set by the managers of the corporation for the managers of the different divisions. Once the rewarding of the managers was related to the ability to achieve the objectives, the managers have been strongly stimulated to "adjust" the information (Kaplan & Atkinson, 1998, pp. 345-405).

The decisions that determine the increase of ROI at the unit level may have as consequence an unsatisfactory running activity. As opposite, those actions that decrease ROI may improve the

economic health of the company. These perverse effects may appear even if the performance is measured as ration, such as ROI.

Example 2: Let's take into consideration a subsidiary having assets of m.u. 100.000 (monetary units) and an income before income taxes of m.u. 20.000, so ROI is 20%:

$$(1) \qquad ROI = \frac{Income\,before\,income\,taxes}{Assets} = \frac{20.000}{100.000} = 0,20$$

It is assumed that the cost of the capital employed for this subsidiary is 12%. An investing opportunity is available. It would generate an increase of the profit of the year by m.u. 1.500. The cost of the capital employed would be of m.u. 10.000. ROI for this new investment is 15% (1500/10000), value that is much above the cost of capital. Still, if this project would be accepted, the new ROI will be:

$$(2) \qquad ROI = \frac{20.000 + 1.500}{100.000 + 10.000} = \frac{21.500}{11.000} = 0,1955$$

Therefore, it would result in a decrease comparing to the previous ROI (20%). This new ROI motivates the managers of the subsidiary to reject this investment because, even if it goes above the cost of capital (additional profit of m.u 300, after the deduction of the cost of the capital employed of 12%: 1500-12%*10000), this project reduces the value of ROI. If unadjusted, this bug may transform ROI in an inadequate measure at the subsidiary level.

In addition, troubles may appear when the assets are disposed. If the subsidiary has an asset having an estimated cost of m.u 30.000 and generates annual profits of m.u. 4.200 (return ratio is 14%), ROI can be increased by selling the asset, even if its return ratio is superior to the cost of capital. After the disposal, the manager can calculate another ROI:

$$(3) \qquad ROI = \frac{20.000 - 4.200}{100.000 - 30.000} = \frac{15.800}{70.000} = 0,2257$$

A similar problem may appear if there are compared two subsidiaries having different investment structures. The second subsidiary having assets of m.u. 35.000 and a profit of m.u. 8.400 will generate a ROI of 24%. This subsidiary may seem more profitable as its ROI is higher than the first subsidiary's ROI (20%). A deeper analysis will show that the first subsidiary's assets beats with m.u. 65.000 the second subsidiary's assets, generating this way a profits increase of m.u. 11.600 (20.000-8.400). The ROI marginal rate is 17,85% (11.600/65.000) and is superior to the cost of capital (12%).

For this reason, after the cost of capital is deducted, the first subsidiary looks more profitable than the second one. Previous problems are caused by the performance evaluation with ROI. The managers, who wish to maximize this ratio, may increase the profit or reduce the investments. Investments are reduced when managers refuse new profitable opportunities, that go beyond the cost of capital, but that lead to a lower ROI then the current one. Generally, any project or assets having a ROI under the medium division ROI will be disposed or refused, as its acceptance will decrease ROI at the division level.

3. Residual Income (RI): a better method than return on investment?

Residual income can be determined using the following formulas: Residual Income = Income – (Required Rate of Return x Investment). The cost of investment (the result between the required rate of return and the investment) is the return that a company gives up for investing in assets with similar risk.

Example 3: Let's take into consideration the information from table no. 1. The A Company defines residual income for each project as the difference between ordinary profit and a rate of return of 13% on total assets (table no. 3).

Given the 13% required rate of return, the Z project is performing best in terms of residual income.

Table no. 3 Calculation of residual income for company A in 2016

Project	Operating income	Cost of investment	Residual income
X	480	13%x2.000=260	220
Y	600	13%x4.000=520	80
Z	1.020	13%x6.000=780	240

Source: Processed by the author, 2016

Some companies favor the use of residual income as managers concentrate on maximizing an absolute amount rather than a percentage (ROI). Residual income can be maximized as long as a subsidiary obtains a ratio greater than the requested one.

Maximizing ROI can determine subsidiary's managers to reject projects that from the organization's point of view should have been accepted. The targeted ROI for A Company is 13%. The development of X project will increase the ordinary result by m.u. 320 and the assets by m.u. 2.000.

The marginal (development) ROI = 320/2.000=16%, which makes the project seem attractive for the group as a hole. Through this development project, the X project ROI will decrease:

(4)   ROI before the development = 480/2.000 = 24%
(5)   ROI after the development = (480+320)/(2.000+2.000) = 20%

The annual bonus of the manager of the project X could decrease if ROI is an essential part to this calculation and if the new project is accepted. As opposite, if the remuneration is related to the residual income, the manager will accept the new project:

(6)   RI before the development = 480-(13%x2.000) = 220
(7)   RI after the development = (480+320)-13%x(2.000+2.000) = 280

Example 4: Let's take into consideration the information from the second example (table no. 4).

Table no. 4 The comparative residual income for subsidiaries 1 and 2

	Subsidiary 1	Subsidiary 2
Assets	100.000	35.000
Income	20.000	8.400
Cost of investment (12%)	12.000	4.200
Residual income	8.000	4.200

Source: Processed by the author, 2016

This calculation proves that the first subsidiary is more profitable then the second one because its residual income is higher. The residual income difference of 3.800 is due to the difference between the marginal rate of ROI (17,85 %) and the cost of capital (12%) applied to the marginal investment of m.u. 65.000.

Also, if the first subsidiary takes into account the project offering a rate of return of 15% (10.000 investments, 1.500 income), the residual income will increase. Instead, if the asset amounted at m.u. 30.000 is disposed, the residual income will decrease (table no. 5).

Table no. 5 The comparative analysis of managerial decisions

	Present	Option 1 new investment 10.000	Option 2 selling assets 30.000
Assets	100.000	110.000	70.000
Income	20.000	21.500	15.800
Cost of investment (12%)	12.000	13.200	8.400
Return on investment	20%	19,55%	22,57%
Residual income	8.000	8.300	7.400

Source: Processed by the author, 2016

The reconciliation between the subsidiaries' objectives and the group ones can be accomplished by using RI instead of ROI as a measure of the manager's performance. Managers can take actions that generate short-term increases of ROI or RI, but contradicting the company's long-term objectives.

4. Economic Value Added (EVA): the best performance indicator

Economic value added is a derivation from residual income, being calculated using the following formula:

(8)   EVA= ATOI - WACC x (TA-CL),

considering: ATOI = after tax operating income, WACC = weighted average cost of capital, TA = total assets, CL = current liabilities. The key element of the determination relation is weighted average cost of capital.

Example 5: Let's take into consideration the information from table no 1. The A Company has two long term financing possibilities: a long term loan of m.u. 9.000 at a 5% interest rate, book value and market value being the same; equity capital has a book value of m.u. 2.000 and a market value of m.u. 6.000. Knowing that interest expenses are deductible, the cost of the loan is 5%x(1-10%) = 4,5%. The cost of the capital is the opportunity cost of the investors of not investing their money in other business having a similar risk. For the A Company, the cost of capital is 20%. WACC calculation uses the market values for both liabilities and owner's equity:

$$(9) \qquad WACC = \frac{(4,5\% \cdot 9.000) + (20\% \cdot 6.000)}{(9.000 + 6.000)} = 10,7\%$$

After tax project, operating income = Project operating income x (1-10%).

Table no.6 Calculation of economic value added for company A in 2016

Project	After tax operating income	EVA=ATOI-WACC x (TA-CL)	EVA
X	480x90%=432	10,7%(2.000-100)=203	229
Y	600x90%=540	10,7%(4.000-300)=396	144
Z	1.020x90%=918	10,67%(6.000-600)=578	340

Source: Processed by the author, 2016

The Z project has the highest EVA (table no. 6). As residual income, EVA makes managers accountable for the investment cost of the fixed assets and for the working capital. The value is added only when the net ordinary income exceeds the cost of capital. In order to improve EVA, managers have to obtain a higher ordinary income by using the same amount of capital, less capital or by investing it in very efficient projects.

EVA will always increase when the return of the investments exceeds the cost of capital or when investments having a return under the cost of capital are disposed. For these reasons, subsidiary's assessment and the actions that maximize the economical welfare should be reconciliated. A corporation will prefer its divisions to have a high residual income. According to this vision, EVA is offering significant advantages comparing to ROI. EVA is more flexible, because different percentages may be applied to different investments with different risk levels. The cost of capital can be different for the different actions taken by the units. Even assets – as part of the same unit – can be differently risk ranked.

5. Return on Sales (ROS): a component of return on investment

ROI provides a profounder analysis if it is divided in the following elements: asset's efficiency ratio and profitability ratio or return on sales.

Example 6: Let's take into consideration the information from table no. 1. The calculation of ROS for the three projects leads to the following conclusions, presented in table no. 7.

Table no. 7 Calculation of return on sales for company A in 2016

Project	Operating income	Revenues	ROS
X	480	2.400	20,00%
Y	600	2.800	21,43%
Z	1.020	6.370	16,01%

Source: Processed by the author, 2016

The ranking projects obtained if using all the indicators lead to some significant conclusions (table no. 8).

Table no. 8 Ranking of performance metrics for company A in 2016

Project	Operating income	Rank	ROI	Rank	RI	Rank	EVA	Rank	ROS	Rank
X	480	3	24,00%	1	220	2	229	2	20,00%	2
Y	600	2	15,00%	3	80	3	144	3	21,43%	1
Z	1.020	1	17,00%	2	240	1	340	1	16,01%	3

Source: Processed by the author, 2016

The rank obtained when using RI and EVA is different from the one given if ROI and ROS are used. The Z project has a lower ROI. Even if its ordinary income is almost twice the income of the X project, its total assets are three times the assets of the X project. The ROI of the Z project is not as high as the ROI of the X project. The Z project C has a higher RI because it has a greater ordinary income after covering the requested rate of return of 13%. The Y project has the highest ROS, but the smallest ROI. Even if it obtains a high income for m.u. 1 of revenue, it generates small revenues for each m.u. invested.

6. Conclusions

None of the indicators above is superior to other as each indicator assesses different aspects of performance. For example, on the markets where revenues increase is limited, ROS is the most representative indicator for the subsidiary. In order to assess the general performance, ROI or RI is more indicated if the income or the investment is taken into account. RI and EVA show some objective divergences that ROI can generate. Several empirical studies (Shields *et al*, 1991, pp. 61-77; Bailes *et al*, 1991, pp. 131-142) have highlighted the fact that the dimension and cultural differences may result in the use of certain performance metrics. Anglo-American society groups show a significant preference for objectives measured by ROI, ROS, EVA, budget analysis, profits, turnover. Japanese groups entail a completely different approach, favoring the objectives characterized by turnover, production, costs, profits, gross margin, ROS, market share, while the presence of ROI is almost insignificant. Asian entities are, obviously, less individualistic and more long-term oriented. They focus less on immediate gains and choose specific objectives for long-term stability. By contrast, Anglo-American entities generally prefer objectives for a shorter-term, based on profit. The advantages of a modern managerial accounting system should not be confined to numerical information. There are situations where organizational concerns and the description of certain projects should be quantified in non-financial terms also. The decision making process is based on a tandem of financial and non-financial measures, performance also involving qualitative information. Organizational problems tend to have as a remedy, obviously not exclusively, the accounting information generated by a particular managerial accounting tool, chosen based on the circumstances. The organization must not be limited to this particular tool and should not consider this a panacea for its „sufferings".

7. References

1. Bailes, J.C., Assada, T. 1991. Empirical Differences Between Japanese and American Budget and Performance Evaluation Systems, *International Journal of Accounting*, 26(2), pp. 131-142.
2. Drury, C. 2000. *Management & Cost Accounting*. 5th Edition. London: Thomson Learning.
3. Horngren, C.T., Foster, G., Datar, S.M. 1997. *Cost Accounting A Managerial Emphasis*, New Jersey: Pretince Hall.
4. Kaplan, R.S. 1983. Measuring Manufacturing Performance: A New Challenge for Managerial Accounting Research, *Accounting Review*, 58(4), pp. 686-705.
5. Kaplan, R.S., Atkinson, A.A. 1998. *Advanced Management Accounting*. 3rd Edition. New Jersey: Prentice Hall
6. Shields, M, Chow, C., Kato, Y., Nakagawa, Y. 1991. Management Accounting Practices in the U.S. and Japan: Comparative Survey Findings and Research Implications, *Journal of International Financial Management and Accounting,* 3(2), pp. 61-77.