AN ANALYSIS OF THE CORRELATION BETWEEN *EVA*® AND *MVA*®: THE CASE OF A NYSE EURONEXT LISBON LISTED COMPANY

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ABSTRACT

International management practices emphasize the *Economic Value Added* (*EVA*®) model as one of the most important performance measures. The main distinction between *EVA*® and traditional metrics relates to the fact that *EVA*® incorporates both remunerated liabilities and financing costs of debt as well as the invested capital. In addition, *EVA*® includes adjustments that minimize a set of distortions that result from the accounting practice adopted. Furthermore, *EVA*® and *MVA*® (*Market Value Added*) together, provide a more accurate evaluation of the firm's performance. Thus, our case study explores the use of *EVA*® in the corporate group Mota-Engil SGPS, SA, which has a significant presence in multiple activity sectors and is listed in NYSE Euronext Lisbon. We examine the incremental information of a set of performance measures between 2005 and 2009, using regression models. The empirical analysis allows us to identify the performance associated with the creation of value for the capital holders. Additionally, we analyse the *MVA*® performance and compare it to the existing link between the latter and the former measures, and we found a statistically significant relationship between *EVA*® e *MVA*®.

Key words: *EVA*®, *MVA*®, value based management.
JEL codes: G34; L21

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I. INTRODUCTION

Investing in a business typically implies an increase in the value of the invested resources as well as obtaining a certain return. Beyond assessing the accounting results achieved it is important to evaluate a broader set of indicators that provide information about the performance of a business. In recent decades, there have been several approaches to assessing the economic and financial performance of organizations. Many of them, however, focus on the "accounting profit". This profit, although one of the most used references in a firm's performance, involves some aspects that may adversely affect its relevance as an indicator of incremental value.

We can identify several reasons why accounting profit tends to fail as a way to measure a firm's economic value. First, there is the fact that alternative accounting methods are used. Second, it excludes cash flows in detriment of the bookkeeping of expenses and incomes (Holian & Reza, 2011; Chari, 2009; Oyadomari *et al.* 2008; Rappaport, 1998). Third, the growth of accounting profit does not necessarily imply the creation of economic value for shareholders. This value increases only if the firm is able to obtain, from new investments, a rate of return higher than investors could obtain from alternative applications, with a similar risk.
From all the performance measures based on value creation, we highlight the Economic Value Added (EVA®) model. In the last two decades, this model has achieved increasing attention and popularity worldwide.

The main assumption behind this model suggests that decisions concerning financial performance should aim to maximize the EVA® and not just the net profit. A considerable difference distinguishes these two metrics: the cost of capital. While the net income only considers the financial costs of liabilities, the EVA® model also takes into account the cost of recovering the capital invested by the shareholders.
If firms obtain a positive EVA® they achieve a return above the cost of capital and, therefore, create value. If companies have a negative EVA® they do not generate resources and thus destroy value. The simplicity of this model has inspired many studies that demonstrate the existence of an effective link between EVA® and the creation of value for shareholders, which is measured by Market Value Added (MVA).

In this paper, we examine a case study of Mota-Engil SGPS, SA, one of the largest firms among those listed on NYSE Euronext Lisbon. The following section presents a literature review on value-based management. Section three describes the case study, the methodology employed and the empirical analysis. Section four provides a conclusion.

II. VALUE BASED MANAGEMENT

Financial analysis based on traditional methods (e.g., book value) still play an important role as instruments for assessing the economic and financial performance of firms. However, this analysis only provides information from judgments on past performance. The question then becomes how should we analyse and evaluate the firms using financial indicators? What is the company's value after making public its results?
Increasingly, firms are using economic profit as a performance measure rather than accounting profit. In this context, a new management concept was developed - the Value Based Management (VBM). Its genesis dates back to the industrial revolution when corporate management began to be taken as a technical approach to issues such as efficiency and productivity, which had increased importance in organizations.

VBM identifies itself with management systems that base decision-making processes on the creation of value. In this management style, a new organizational attitude develops where everyone should be aware of alternatives that add value to the business (Rocha & Selig, 2001). A study on fifty-one US firms that started to use the economic profit as a performance measure (in spite of the accounting profit), revealed that all of them display significant performance improvements, resulting from the reformulation of the businesses planning methodologies that came to be specifically geared towards creating value (Weaver & Weston, 2003). Thus, in the context of VBM, all key processes and systems should focus on creating value – the true economic profit – and EVA® tends to be the model that better quantifies it (Oyadomari *et al.* 2008; Pike & Neale, 1999).

EVA® has been increasingly used as an indicator of financial performance, in designing incentive and compensation schemes for managers and as a way of communicating corporate performance to investors. According to Stewart (1991), this indicator measures the residual income that subtracts the cost of capital from the operational income, and can be regard as a performance measure that correctly determines the way in which we can create or destroy value. The model is formulated as following:

$$EVA® = \text{NOPAT} - WACC \times \text{IC} \quad (1)$$

Where,
NOPAT = Net Operating Profit After Tax
NOPAT = Operating Profit x (1 - tax rate)
WACC = $r_D (1 - t) \times \frac{D}{D+E} + r_E \times \frac{E}{D+E}$ (Weighted Average Cost of Capital)
IC = cash invested in the business by shareholders and creditors

A firm's EVA® will be positive if NOPAT exceeds the cost of capital (WACC x Invested Capital). In this case, we can say the company is adding value for its shareholders, given that the return on invested capital (ROIC) exceeds the weighted average cost of capital (WACC). Thus, a positive result reveals value creation and a negative result means loss of value.

That being the case, Pettit (2001) raises a pertinent question: should the entrepreneur then grow his business if it gets a positive EVA® and sell/close it if its EVA® is negative? The author explains that EVA® is an indicator that measures the organization performance in a given period; it means that a negative EVA® does not imply that the company will not have a positive EVA® in the near future. The firm present value results from the performance in the current period in addition to the amount it will achieve in future periods.

Stewart (1991) alerts to the fact that we have to remove many of the accounting distortions that have blurred cash flows in order to determine not the profit that comes from accounting principles, but the actual cash flow that firm is generating. About one hundred and sixty adjustments are possible in the accounting outputs, such as the capitalization of R&D costs, operating leases and amortization of goodwill. They may also pass through the elimination of certain accounting expenses such as depreciations/amortizations and provisions, since it does not correspond to an actual cash outflow (does not change the cash flow). According to the same author, adjustments are also necessary on the level of the invested capital and the net operating profits after taxes.

In order to ensure that the model is useful and cost effective to implement, it is essential to ensure simplicity and consistency of value over time, rather than be concerned with reaching an exact result with these adjustments. Typically, it does not take more than ten accounting data adjustments to calculate EVA®. Generally, the wisest option is to do only the adjustments materially relevant and about which information is easily available (Bhattacharyya & Phani, 2004; Ferreira, 2002; Stern *et al.*, 2001; Stewart, 1991). Firms that have a positive EVA® are creating wealth and, therefore, are viewed as attractive investments: their market value tends to rise. Likewise, if the economic value decreases, resulting in a wealth loss, investors will no longer see the company as an interesting target and its market value will decline.

Despite the model's ability to identify firms that create or destroy value in a given period, this indicator reveals nothing about the company's future development. This is therefore a limitation of the model, which can be overcome with the use of the MVA. We should note that the link between EVA® and MVA is not always present (or verified), because

share prices do not reflect the performance of past/present listed companies but the investors' future expectations. This is most noticeable in the case of companies providing negative EVA® (Stern *et al.*, 2001).

MVA = [present value of all future expected *EVA*®]
MVA = [market value] – [invested capital]
Where,
market value: company's market value (total shares x price per share)
invested capital: book value of the adjusted invested capital

There are several studies examining the correlation between EVA® (independent variable) and MVA (dependent variable). Faria (2008) lists a considerable number, highlighting the work of Milunovich & Tsuei (1996), O'Byrne (1996) and Grant (1997), whose findings show the existence of a quite acceptable R^2 (positive linear correlation generally above 50%) between the two variables.

III. THE CASE STUDY

This case study intends to analyse the correlation between EVA® and MVA, using data from Mota-Engil SGPS, SA, a major Portuguese business group listed in the NYSE Euronext Lisbon, for the period of 2005 to 2009.

The selection process of the company for the study was based on a set of assumptions. These required that the company was quoted on the NYSE Euronext Lisbon and included to PSI-20 index; demonstrated an effective openness to value-based management issues; and was the market leader or assumed a relevant position in its main activity.

We checked whether the results revealed in the literature have any similarities to this Group's performance, by comparing the relationship of MVA with the operating income, the net income and EVA®. We gave major emphasis to the correlation between EVA® and MVA.

The basic procedure of adjusting invested capital and operating profit before interest and income tax expenses, for subsequent EVA®, was calculated according to the method initially proposed by Stewart (1991).

A. Model Assumptions

The basic model assumptions are:

1) EVA® explains more accurately the market value of equity and earnings per share than the traditional accounting measures;
2) EVA® and MVA are strongly related.

In this study, we began by analysing which performance indicators (Operating Profit - OP, Net Income - NI or EVA®) have greater explanatory power over the market value of the company.

1st hypothesis

The explanatory information of EVA®, regarding the company's equity market value, is higher than the one we get from OP or NI

To measure the explanatory power of the information provided by each of the indicators, we compared the coefficient of determination of simple regressions that analyse the correlation between various measures of performance with the equity market value. By knowing the content of the information of the performance indicators it is possible to organize them hierarchically and prioritize the measures to be used in assessing performance.

The second hypothesis concerns the contemporary relationship that can be observed between MVA and OP, NI or EVA®.

2nd hypothesis

The MVA that is computed each year is related to the EVA® for the same period and this correlation is higher than the one between MVA and OP or NI.

As mentioned, MVA is the present value of the expected EVA® for a given future period. Therefore, it would be expected that the relationship between these two indicators over a past period would be stronger than the existing relationship, over the same time period, between MVA and OP or NI. To test the second hypothesis, we compared the coefficients of determination of the different regressions. The independent variables were EVA®, OP and NI and MVA the dependent variable.

B. Econometric study

To study these two hypotheses we used regression and correlation analysis to identify the relationship between the dependent variable and the three independent variables.

To test the1st hypothesis, concerning the explanatory information of EVA® to the equity market value, we used the following model:

Model 1: $Y'_{i,t} = ß_0 + ß_1 X_{i,t} + \mu_{i,t}$ (2)

Where,

$Y'_{i,t}$ equity (ordinary and preferred shares) market value of the company *i* (EMV_i), at the end of the period *t*;

$X_{i,t}$ OP, NI or *EVA®* of the company *i*, at the end of the period *t*;

$ß_0$ individual effects of each sectional unit;

$ß_1$ explanatory variable associated coefficient;

$\mu_{i,t}$ random disturbance term.

To test the 2nd hypothesis, regarding the contemporary relationship between MVA (dependent variable) and OP, NI and EVA®, we used the following model:

Model 2: $Y''_{i,t} = ß_0 + ß_1 X_{i,t} + \mu_{i,t}$ (3)

Where,

$Y''_{i,t}$ is the *MVA* of company *i*, at the end of the period *t*; and

$X_{i,t}$, $ß_0$, $ß_1$ and $\mu_{i,t}$ are as previously defined.

For both models, the first two terms of the second member of the equations ($ß_0 + ß_1 X_{i,t}$) represent the deterministic component that can also be designated as the explanatory model. Once the parameter values are known this set represents the linear predictor model.

With the data collected, it was possible to isolate the variables and make the necessary and required adjustments in order to calculate the weighted average cost of capital and determine the variables OP, NI and EVA® (independent variables) and MVA (dependent variable).

C. Results

Throughout the study period the company had a positive net income and operating profits:

Table 1. Net Income and Operating Profits (2005-2009)

	2009	2008	2007	2006	2005
Net Income	79.912.161	39.769.683	107.745.198	37.634.559	37.535.951
Operating Profit	172.358.215	192.740.342	148.186.387	84.193.679	92.691.258

in euros, consolidated results

Different numbers are displayed, however, when we consider EVA® and MVA. In fact, although the Group has always presented positive operating profits and net incomes, this not meant that it has created value for shareholders. Actually, we verify that EVA® was negative for the periods of 2006 and 2008.

Table 2. EVA® e MVA (2005-2009)

	2009	2008	2007	2006	2005
EVA®	7.788.992	- 43.650.398	28.913.403	- 9.091.253	2.362.932
MVA	450.950.460	138.655.430	685.813.029	507.455.791	220.336.834

in euros, consolidated results

D. Hypothesis testing

The first hypothesis was tested based on Model 1 and relied on the information of OP, NI and EVA® compared to EMV. This model's purpose involves testing whether EVA® is further associated with the equity market value, compared to OP and NI. To test the second hypothesis we used the Model 2. The objective here was to test which of the variables has a stronger relation to MVA: EVA®, Operating Profit or Net Income.

For the first hypothesis, it was found that NI is the independent variable that best explains the dependent variable and the one that has relatively higher positive correlation to EMV (ρ = 79.0%). In other words, the market reacts and sets up its expectations in line with the company's net income. EVA® also has a positive and significant correlation with the dependent variable (ρ = 77.3%). Contrarily, OP shows a negative (and low) correlation (ρ = -10.9%).

The test of the second hypothesis reveals a higher explanatory contribution for EVA® (ρ = 78.9%), followed by NI (ρ = 76.1%). As for OP, it presents a relatively low negative correlation to the dependent variable (ρ = -17.1%).

Regarding the content of relative information, the data confirms the correlation detected in both hypothesis (models). In the first hypothesis, NI reveals a higher content compared to incremental EMV (R^2 = 62.3% for NI, R^2 = 59.8% for EVA® and R^2 = 1.2% to OP). For the second hypothesis, EVA® more accurately explains the dependent variable (R^2 = 62.2% for EVA®, R^2 = 58.0% for NI and R^2 = 2.9% for OP).

In analyzing the pairwise correlation coefficients, it is possible to verify that OP has a very weak influence in explaining the variability of both the MVA (R^2 = 2.9%) and EMV (R^2 = 1, 2%). The same does not apply with EVA® and NI. They have a significant R^2 (62.2% and 58.0%, respectively) and demonstrate a greater ability to determine the MVA variability, as shown in Table 3 below:

Table 3. EMV**:** Pearson's correlation coefficient (ρ)

	EMV $_{i,t}$	**EVA®**$_{i,t}$	**OP** $_{i,t}$	**NI** $_{i,t}$
EMV $_{i,t}$	1.00	0.77	-0.11	0.79
EVA®$_{i,t}$	-	1.00	-0.28	0.75
OP $_{i,t}$	-	-	1.00	0.37
NI $_{i,t}$	-	-	-	1.00

Of the several indicators that assess the value of a share, the price to earnings ratio (PER) is the most commonly used in capital markets. Anderson & Brooks (2005) refer to this indicator that compares current share price with the company's per-share earnings, stating that the higher the ratio, the greater the expectations about future earnings and, consequently, the greater the pressure on the securities price. Thus, we can argue the NI weight is the independent variable that, in this study, best explains the EMV variability.

IV. CONCLUSION

In recent years, Economic Value Added became increasingly relevant in the context of business. In fact, it was in the last decade of the twentieth century that this metric become a key tool in measuring the creation of value in business management.

In this study, we defined the following items for investigation:

- Describe alternative ways of calculating the value of a company;
- Describe the value-based management and EVA® as the preferred measurement of value creation;
- Evaluate the use of EVA® and its applications;
- Explore the use of the value based performance measures in the Portuguese business environment.

As the main element of differentiation between traditional valuation metrics and EVA®, we point to the fact that the latter incorporates all the capital invested by shareholders and creditors and the financing costs of debt. In addition, in its estimation, some adjustments are provided in order to minimize distortions resulting from the accounting practice adopted. Selecting the adjustments to be made will depend on a set of constraints (e.g., size analysis, study schedule, information availability, budgetary constraints), which eventually discourage future comparisons between EVA® from different companies. EVA® increases its strength when analysed in combination with MVA and they usually have a strong positive correlation.

We examined the incremental information content of a set of performance measures, from 2005 to 2009, using regression models.

When compared with traditional measures based on accounting results, EVA® proponents claim that this indicator has a higher explanatory power once it takes into consideration the Equity Market Value. In our study, the results do not support this statement, since EVA®, although displaying a significant correlation with EMV, reaches values below the correlation between EMV and NI.

The literature also shows that EVA® and MVA are closely related. Our analysis confirms the association between these two indicators and

shows a statistically significant relationship between EVA® and MVA in the time period studied.

Therefore, we conclude that the Group analyzed is neither recognizing the benefits of EVA® nor viewing this indicator as a crucial source of information concerning the Group's equity valuation. However, we note that the company's target is to maximize the MVA and not merely the market value, since the MVA reflects the difference between the company's market value and the capital invested.

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