

## Value Based Corporate Finance in the Secondary Sector in Greece

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### **Abstract**

*The purpose of the present research is to evaluate the value creation capacity of the secondary sector firms, listed in the Athens Stock Exchange over the period 2000 – 2004, using the Economic Value Added Model developed by Stern Stewart & Co. The percentage of the sample firms with a negative Economic Value Added ranges from 48% to 61%; the majority of the firms experience positive return on the capital invested, but this is not enough to cover their weighted average cost of capital. Two industries have positive average Economic Value Added in all five years, while the remaining two have positive average Economic Value Added in only two years. All industries in all five years have positive average return on the capital invested, however some of them have disproportionately high weighted average cost of capital.*

### **1. Objectives and Methodology**

Professional financial managers hold the maximization of the firm's total value to be the objective of all decision-making. This concept is more commonly expressed as the maximization of the shareholder wealth, which is measured by the market value of the firm's stock (Damodaran 2001).

While market value of stocks widely served as acceptable measure of a firm's success in the past, and is still being used by listed firms, in the early nineties Stern Stewart & Co suggested Economic Value Added (EVA<sup>2</sup>) as an alternative measure of the capacity of a firm to create value.

The EVA Model, in its simplest form, calculates the value that a firm has created or destroyed over a certain period by subtracting from the net operat-

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<sup>2</sup> EVA is a registered trademark of Stern Stewart & Co

ing profit after tax (NOPAT) the appropriate charges that have to be made for the capital the firm has used for its operations (Stewart 1994, p 71-84):

$$\text{EVA} = \text{NOPAT} - \text{Capital Charges} \quad (1)$$

The EVA is in essence an estimate of the residual income that a firm creates, since it takes into account not only the NOPAT the firm produces but also the capital charges, it has incurred in order to produce these profits. Since these charges are the product of the invested capital times the weighted average cost of capital (WACC), the EVA can also be defined as (Ehrbar and Stewart 1999, p. 18-31):

$$\text{EVA} = \text{NOPAT} - (\text{Invested Capital} \times \text{WACC}) \quad (2)$$

The NOPAT is a function of earnings before interest payments and taxes (EBIT) and the tax rate of the firm, that is (Young and O' Byrne 2000, p.35.):

$$\text{NOPAT} = \text{EBIT} \times (1 - \text{Tax Rate}) \quad (3)$$

Now, if we define the return on invested capital (ROIC) as the ratio of the NOPAT over the invested capital then the EVA can be redefined as follows:

$$\text{EVA} = \text{Invested Capital} \times (\text{ROIC} - \text{WACC}) \quad (4)$$

The invested capital refers to the sum of the net operating capital and the operating long-term assets. More specifically the invested capital is calculated as follows (Brigham and Ehrhardt 2002, p. 44):

$$\begin{aligned} \text{Invested Capital} = & (\text{Cash} + \text{Accounts Receivable} + \text{Inventories} + \\ & \text{Operating Long Term Assets}) - \\ & (\text{Accounts Payable} - \text{Accruals}) \end{aligned} \quad (5)$$

The WACC is the average cost of equity and cost of debt of a firm weighted by the proportion of equity and debt in the total capital of the firm. The cost of equity is calculated using the Capital Asset Pricing Model, taking as a risk free rate of return the yield of the ten-year Greek Government Bond and as risk premium the expected excess return investors require in order to invest money in the stock exchange (Damodaran 2002):

$$\text{Cost of Equity} = r_f + b (r_m - r_f) \quad (6)$$

where,

$r_f$  = Risk free return

$b$  = Beta coefficient

$r_m$  = Market return

The before-tax cost of debt,  $K_{db}$ , is the average interest rate on borrowed funds that is annual interest expenses over principal. The after-tax cost of debt,  $K_d$ , is equal to the before-tax cost of debt times  $(1 - \text{tax rate})$ .

The difference between the ROIC and the WACC is the net return the firm achieves for the capital it uses in its operations. Companies that have a positive spread between ROIC and their WACC will have positive EVA and thus create wealth.

The objective of the present research is to investigate whether the management of the secondary sector firms listed in the Athens Stock Exchange over the period 2000 - 2004 produce or destroy value using the EVA Model developed by Stern Stewart & Co. Balance sheets and income statements are used to collect all the data needed to calculate EVA for each firm in every of the last five years. The industry distribution of the sample firms is shown in Table 1 (Athens Stock Exchange 2000 - 2004).

For the accurate estimation of EVA, a number of adjustments had to be made to the financial statements of the firms, concerning mainly the research and development expenditures, the depreciation method used, the leasing expenses, the valuation of inventories, and the deferred taxes (Epstein and Young 1999, p. 45-49, Stewart 2003, Young and O' Byrne 2000).

## **2. Findings**

The first step in the process of creating value is to ensure that the investment projects undertaken by the management of a firm can produce a positive ROIC. The results of the present research indicate that the majority of the sample companies are successful in the area of producing a positive ROIC (Table 2).

The percentage of sample firms that exhibited a positive ROIC is quite impressive, ranging from 89.25% in 2002 to 95.70% in 2000 and 2001. From 2000 to 2002 the percentage of sample firms with a positive ROIC was declining, showing the effects of the recession in the economies globally during the period, while from 2002 to 2004 this percentage was rising. The maximum ROIC ranges from 27.63% in 2004 to 51.24% in 2001, while the minimum ROIC from -16.59% in 2003 to -5.55% in 2001. Over the last five years the spread between maximum and minimum ROIC has decreased from 56.82% to 42.88%.

Examining in more depth the results, it can be seen that the financial performance of the sample firms is not as impressive as it appears at first sight. First, the majority of the firms (66% and over) have a ROIC between 0% and 10%. Secondly, the percentage of firms with ROIC greater than 10% ranges from only 25% to 34% (Table 3). This indicates that although the sample firms are in a position to produce positive ROIC from their operations, this might prove inadequate in the process of creating wealth. Finally the simple average ROIC shows a decreasing trend over the research period (9.57%, 7.89%, 6.52%, 6.35% and 6.47%).

The simple average WACC ranges from a low value of 7.03% in 2003 to a high value of 7.46% in 2000, showing a very low dispersion over the five years. Furthermore, in all five years over 57% of the sample firms have a WACC between 6% and 9% (Table 4). Thus, in most cases, for a firm to be

in a position to have a positive EVA and produce wealth for its shareholders it must have ROIC over 7.5%.

As the ROIC of a firm increases so does the probability for the firm to produce a positive EVA. For the sample companies that have a ROIC greater than 7.5%, there is at least a 90% probability of producing positive EVA, in all five years.

Whether a firm is in a position to produce wealth, under the EVA criterion, is determined by the economic spread (the spread between the ROIC and its WACC). With exception in 2000 when 52% of the sample firms had a positive spread, in the remaining period, this percentage ranges from 37% to 42% (Table 5). Furthermore, the simple average economic spread is positive only in years 2000 and 2001, 2.11% and .52% respectively.

The picture in the area of value creation for the secondary sector firms listed in the Athens Stock Exchange is not encouraging. The percentage of the sample firms with a negative EVA ranges from 48% to 61% (Table 6).

All industries in all five years have positive average ROIC. Two industries have positive average EVA in all five years, while the remaining two have positive average EVA in only two years (Table 7).

In 2004 the industry with the largest ROIC is the energy industry reflecting both the oligopolistic energy market in Greece and the above the average profits made by the constituent firms due to historical high oil prices globally. All industries except the industrial have a negative geometric average growth rate from 2000 to 2004, showing that the ability of Greek firms to produce wealth has severely deteriorated during the last five years.

### **3. Conclusions**

Having set wealth maximisation as the main objective of a firm one has to decide upon the measure that management has to use to appraise the wealth creation ability of the firm. The present research uses the Economic Value Added, as Stern Stewart & Co has developed it, in examining the value creation capacity of the secondary sector Greek listed firms over the years 2000 - 2004.

The results of the present research indicate that the majority of the sample companies are successful in the area of producing a positive ROIC. However, although the sample companies are in a position to produce positive ROIC from their operations, this might prove inadequate in the process of creating wealth. Furthermore, the simple average ROIC shows a decreasing trend over the research period.

In all five years over 57% of the sample firms have a WACC between 6% and 9%. Thus, in most cases, for a firm to be in a position to have a posi-

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**Table 1**  
**Industry Distribution of Sample Firms**

Industry	Number of Firms				
	2000	2001	2002	2003	2004
Energy	4	4	4	4	4
Industrial	61	61	61	61	61
Basic Materials	26	26	26	26	26
Utilities	2	2	2	2	2

**Table 2**  
**Return on Invested Capital**

	2000	2001	2002	2003	2004
Number of Firms	93	93	93	93	93
Positive ROIC	89	89	83	85	85
% of Positive ROIC	95.70	95.70	89.25	91.40	91.40
Max ROIC (%)	51.24	43.58	32.18	28.73	27.63
Min ROIC (%)	-5.59	-5.55	-14.30	-16.59	-15.26
Spread Max-Min (%)	56.82	49.13	46.48	45.31	42.88

**Table 3**  
**Distribution of ROIC**

ROIC (%)	2000		2001		2002		2003		2004	
	No.	%	No.	%	No.	%	No.	%	No.	%
- 0	4	4	4	4	10	11	8	9	8	9
0 - 5	29	31	36	39	34	37	42	45	41	44
5 - 10	28	31	25	27	25	27	20	21	18	19
10 - 20	25	27	22	24	20	21	19	21	20	22
20 - 30	4	4	5	5	3	3	4	4	6	6
30 -	3	3	1	1	1	1	0	0	0	0
<b>Total</b>	<b>93</b>	<b>100</b>	<b>93</b>	<b>100</b>	<b>93</b>	<b>100</b>	<b>93</b>	<b>100</b>	<b>93</b>	<b>100</b>

**Table 4**  
**Distribution of WACC**

WACC (%)	2000		2001		2002		2003		2004	
	No	(%)	No	(%)	No	(%)	No	(%)	No	(%)
- 6	18	19	18	19	26	28	31	33	29	30
6 - 7	19	20	25	27	21	23	18	19	18	20
7 - 8	24	26	16	17	14	15	13	14	11	12
8 - 9	21	23	22	24	25	27	22	24	25	27
9 - 10	7	8	7	8	5	5	7	8	6	7
10 - 11	0	0	3	3	0	0	0	0	2	2
11 - 12	2	2	0	0	0	0	1	1	1	1
12 -	2	2	2	2	2	2	1	1	1	1
<b>Total</b>	<b>93</b>	<b>100</b>	<b>93</b>	<b>100</b>	<b>93</b>	<b>100</b>	<b>93</b>	<b>100</b>	<b>93</b>	<b>100</b>

**Table 5**  
**Economic Spread Distribution**

Spread Range (%)	2000		2001		2002		2003		2004	
	No	(%)	No	(%)	No	(%)	No	(%)	No	(%)
- 0	45	48	54	58	55	59	59	63	57	61
0 - 5	28	30	20	22	17	18	15	16	15	16
5 - 10	10	11	11	12	14	15	10	11	12	13
10 - 15	3	3	3	3	5	5	7	8	7	8
15 - 20	1	1	3	3	1	1	1	1	2	2
20 -	6	6	2	2	1	1	1	1	0	0
<b>Total</b>	<b>93</b>	<b>100</b>	<b>93</b>	<b>100</b>	<b>93</b>	<b>100</b>	<b>93</b>	<b>100</b>	<b>93</b>	<b>100</b>

**Table 6**  
**Economic Value Added**

EVA Range*	2000		2001		2002		2003		2004	
	No	(%)	No	(%)	No	(%)	No	(%)	No	(%)
- 0	45	48	54	58	55	59	59	63	56	61
0 - 1	16	17	10	11	8	9	6	6	8	9
1 - 3	13	14	14	15	10	11	5	5	5	5
3 - 10	7	8	4	4	9	10	10	11	9	10
10 - 15	5	5	4	4	0	0	3	3	1	1
15 -	7	8	7	8	11	12	10	11	13	14
<b>Total</b>	<b>93</b>	<b>100</b>	<b>93</b>	<b>100</b>	<b>93</b>	<b>100</b>	<b>93</b>	<b>100</b>	<b>92</b>	<b>100</b>

\* In millions of Euros

**Table 7**  
**Industry ROIC and EVA\***

Industry	2000	2001	2002	2003	2004	GAGR* *
<b>Energy</b>						
ROIC	19.2 %	7.0 %	7.0 %	8.8 %	12.1 %	-10.90%
EVA	251,514	11,855	12,854	59,568	176,338	
<b>Industrial</b>						
ROIC	8.7 %	8.0 %	8.7 %	8.3 %	9.0 %	0.68%
EVA	126,631	104,136	206,920	190,826	253,781	
<b>Basic Materials</b>						
ROIC	9.2 %	7.1 %	4.1 %	3.8 %	5.1 %	-13.71%
EVA	76,838	16,134	-99,600	-109,066	-58,054	
<b>Utilities</b>						
ROIC	4.8 %	5.5 %	7.2 %	3.7 %	4.0 %	-4.2%
EVA	-9,673	33,203	143,797	-207,527	-193,097	

\* In thousands of Euros

\*\* Geometric average growth rate