

**VARIABLES DETERMINING SHAREHOLDER VALUE OF  
INDUSTRIAL COMPANIES LISTED ON THE  
JOHANNESBURG STOCK EXCHANGE**

**by**

**John Henry Hall**

**Submitted in partial fulfilment with the requirements  
for the degree**

**DOCTOR IN BUSINESS ADMINISTRATION**

**in the Faculty of  
ECONOMIC AND MANAGEMENT SCIENCES**

**University of Pretoria  
PRETORIA**

**May 1998**

## ACKNOWLEDGEMENTS

I WISH TO EXPRESS MY SINCERE GRATITUDE AND APPRECIATION, FIRSTLY TO MY HEAVENLY FATHER AND ALSO TO THE PEOPLE WHO HAVE CONTRIBUTED TO THE FULFILMENT OF THIS DISSERTATION. WITHOUT THEM, THIS STUDY WOULD NOT HAVE BEEN COMPLETED.

- \* **Professor L.M. Brümmer (University of Pretoria - Supervisor)** - This dissertation could not have been written without his guidance, supervision and support. The immeasurable contributions he has made in terms of advice and academic input are greatly appreciated. As one of my academic mentors, he has always believed in me and had faith in my capabilities.
- \* **The Bureau of Financial Analysis, University of Pretoria**, for the use of their database. I would especially like to thank **Ina Botes**, for her time, effort, advice and recommendations regarding the statistical analyses of the data concerned.
- \* **To Yvonne and Idette**, for their inputs regarding the typing and editing of this dissertation.
- \* Finally, to my **family** for their sacrifice and continuous support, whilst I was consumed in the hell fires of this study. I dedicate this dissertation to my dear wife, **Nonnie**.

\* \* \* \* \*

# VARIABLES DETERMINING SHAREHOLDER VALUE OF INDUSTRIAL COMPANIES LISTED ON THE JOHANNESBURG STOCK EXCHANGE

## INDEX

### CHAPTER 1

#### INTRODUCTION

1.1 INTRODUCTION AND PROBLEM STATEMENT .....	1
1.2 JUSTIFICATION OF THE STUDY .....	2
1.3 RESEARCH OBJECTIVES .....	2
1.4 FRAMEWORK OF THE STUDY .....	3
1.5 RESEARCH DESIGN AND METHOD .....	6
1.6 STRUCTURE OF THE STUDY .....	7

### CHAPTER 2

#### ACCOUNTING-BASED METHODS TO DETERMINE SHAREHOLDER VALUE

2.1 INTRODUCTION .....	9
------------------------	---

<b>2.2 THE BOOK VALUE APPROACH . . . . .</b>	<b>10</b>
2.2.1 Inflation . . . . .	13
2.2.2 Obsolescence . . . . .	14
2.2.3 Organizational capital . . . . .	14
2.2.4 Adjusting book value to reflect replacement cost . . . . .	16
2.2.5 Adjusting book value to reflect liquidation value . . . . .	17
2.2.6 Concluding remarks . . . . .	17
<b>2.3 THE EQUITY AND DEBT APPROACH . . . . .</b>	<b>18</b>
2.3.1 Introduction . . . . .	18
2.3.2 The Efficient market hypothesis . . . . .	19
2.3.3 The EMH and appraisal practice . . . . .	20
<b>2.4 THE DIRECT COMPARISON APPROACH . . . . .</b>	<b>21</b>
2.4.1 Introduction . . . . .	21
2.4.2 Selecting comparable companies . . . . .	22
2.4.4 An application of direct comparison : the use of P/E ratios . . .	23
2.4.5 Adjusting the financial data . . . . .	24
2.4.6 Concluding remarks . . . . .	25
<b>2.5 DISCOUNTED CASH FLOW MODELS . . . . .</b>	<b>26</b>
2.5.1 Introduction . . . . .	26
2.5.2 Discounted cash flow models . . . . .	28
2.5.2.1 No growth in dividends . . . . .	28
2.5.2.2 Constant growth in dividends . . . . .	29
2.5.2.3 Nonconstant growth in dividends . . . . .	31
2.5.2.4 Concluding remarks . . . . .	32
<b>2.6 THE RELEVANCE OF EARNINGS PER SHARE AND RETURN ON EQUITY . . . . .</b>	<b>33</b>
<b>2.7 CONCLUSION . . . . .</b>	<b>38</b>

## CHAPTER 3

### MEASURING SHAREHOLDER VALUE THE ECONOMIC WAY - SUNDRY APPROACHES

<b>3.1 THE ACCOUNTING MODELS VERSUS THE ECONOMIC MODELS . . . . .</b>	<b>40</b>
<b>3.1.1 Introduction . . . . .</b>	<b>40</b>
<b>3.1.2 Inventory valuation - LIFO versus FIFO . . . . .</b>	<b>42</b>
<b>3.1.3 The amortization of goodwill . . . . .</b>	<b>42</b>
<b>3.1.4 Research and development . . . . .</b>	<b>43</b>
<b>3.1.5 Deferred tax . . . . .</b>	<b>43</b>
<b>3.1.6 Earnings per share and return on net assets (RONA) . . . . .</b>	<b>44</b>
<b>3.1.7 Dividends . . . . .</b>	<b>47</b>
<b>3.1.7.1 <i>The theory on dividends</i> . . . . .</b>	<b>47</b>
<b>3.1.7.2 <i>The evidence on dividends</i> . . . . .</b>	<b>49</b>
<b>3.1.8 Concluding remarks . . . . .</b>	<b>50</b>
<b>3.2 INTRODUCTION TO THE ECONOMIC MODELS . . . . .</b>	<b>50</b>
<b>3.3 USING ECONOMIC VALUE TO MEASURE SHAREHOLDER WEALTH - EARLIER     MODELS . . . . .</b>	<b>52</b>
<b>3.3.1 Introduction . . . . .</b>	<b>52</b>
<b>3.3.2 Method of calculating shareholder value . . . . .</b>	<b>54</b>
<b>3.3.3 Evaluation . . . . .</b>	<b>55</b>
<b>3.4 SHAREHOLDER VALUE CREATION . . . . .</b>	<b>56</b>
<b>3.4.1 Introduction . . . . .</b>	<b>56</b>
<b>3.4.2 The shareholder value approach to a business . . . . .</b>	<b>56</b>
<b>3.4.3 Calculation of shareholder value created . . . . .</b>	<b>57</b>
<b>3.4.3.1 <i>Basic principles and models</i> . . . . .</b>	<b>57</b>
<b>3.4.3.2 <i>The threshold margin</i> . . . . .</b>	<b>59</b>
<b>3.4.3.3 <i>Calculation example</i> . . . . .</b>	<b>61</b>

<b>3.4.4 Concluding remarks . . . . .</b>	<b>63</b>
<b>3.5 THE ECONOMIC PROFIT MODEL . . . . .</b>	<b>64</b>
<b>3.5.1 Introduction . . . . .</b>	<b>64</b>
<b>3.5.2 Economic valuation principles . . . . .</b>	<b>65</b>
<b>3.5.3 The economic profit model . . . . .</b>	<b>69</b>
<b>3.5.4 Evaluation . . . . .</b>	<b>72</b>
<b>3.6 CONCLUSION . . . . .</b>	<b>73</b>

## CHAPTER 4

### MEASURING SHAREHOLDER VALUE THE ECONOMIC WAY - ECONOMIC VALUE ADDED

<b>4.1 INTRODUCTION . . . . .</b>	<b>74</b>
<b>4.2 CONCEPTS UNDERLYING EVA . . . . .</b>	<b>75</b>
<b>4.2.1 The rate of return on total capital . . . . .</b>	<b>76</b>
<b>4.2.2 The rate of return from a financing perspective . . . . .</b>	<b>77</b>
<b>4.2.3 The rate of return from an operating perspective . . . . .</b>	<b>81</b>
<b>4.2.4 Concluding remarks . . . . .</b>	<b>82</b>
<b>4.3 EVA DEFINED . . . . .</b>	<b>83</b>
<b>4.3.1 The theoretical model . . . . .</b>	<b>83</b>
<b>4.3.2 Explanatory calculations . . . . .</b>	<b>91</b>
<b>4.3.3 Standardized EVA . . . . .</b>	<b>95</b>
<b>4.3.4 Concluding remarks . . . . .</b>	<b>96</b>

<b>4.4 MARKET VALUE ADDED . . . . .</b>	<b>97</b>
<b>4.4.1 Introduction . . . . .</b>	<b>97</b>
<b>4.4.2 MVA and EVA . . . . .</b>	<b>99</b>
<b>4.4.3 Standardized MVA . . . . .</b>	<b>103</b>
<b>4.4.4 The Q-ratio . . . . .</b>	<b>103</b>
<b>4.4.5 Concluding remarks . . . . .</b>	<b>104</b>
<b>4.5 EVA CALCULATION OF SASOL (LIMITED) . . . . .</b>	<b>105</b>
<b>4.6 CRITICISM OF EVA . . . . .</b>	<b>116</b>
<b>4.7 BENEFITS OF THE EVA SYSTEM . . . . .</b>	<b>120</b>
<b>4.8 CONCLUSION . . . . .</b>	<b>125</b>
<b>4.8.1 Evolution . . . . .</b>	<b>126</b>
<b>4.8.2 The rise and fall of the leveraged buyout. . . . .</b>	<b>128</b>
<b>4.8.3 The best method . . . . .</b>	<b>131</b>

## CHAPTER 5

### VARIABLES WHICH DETERMINE SHAREHOLDER VALUE

<b>5.1 INTRODUCTION . . . . .</b>	<b>133</b>
<b>5.2 INTERNAL VARIABLES . . . . .</b>	<b>135</b>
<b>5.2.1 Introduction . . . . .</b>	<b>135</b>
<b>5.2.2 The variables . . . . .</b>	<b>136</b>
<b>5.2.3 Concluding remarks . . . . .</b>	<b>142</b>
<b>5.3 EXTERNAL VARIABLES . . . . .</b>	<b>144</b>
<b>5.4 EVA VARIABLES . . . . .</b>	<b>147</b>
<b>5.4.1 Introduction . . . . .</b>	<b>147</b>

5.4.2 Variables determining EVA . . . . .	148
5.4.3 Concluding remarks . . . . .	151
<b>5.5 CONCLUSION . . . . .</b>	<b>153</b>

## CHAPTER 6

### RESEARCH METHODOLOGY

<b>6.1 INTRODUCTION . . . . .</b>	<b>155</b>
<b>6.2 DATA COLLECTION METHOD . . . . .</b>	<b>155</b>
<b>6.3 STATISTICAL TECHNIQUES . . . . .</b>	<b>158</b>
<b>6.4 HYPOTHESES . . . . .</b>	<b>161</b>
<b>6.5 CONCLUSION . . . . .</b>	<b>163</b>

## CHAPTER 7

### EMPIRICAL RESEARCH RESULTS

<b>7.1 INTRODUCTION . . . . .</b>	<b>165</b>
<b>7.2 CORRELATION ANALYSES . . . . .</b>	<b>166</b>
7.2.1 Background . . . . .	166
7.2.2 MVA without inflation adjustments to data . . . . .	169
7.2.3 MVA with inflation adjustments to data . . . . .	169
7.2.4 Standardized MVA without inflation adjustments to data . . . . .	172
7.2.5 Standardized MVA with inflation adjustments to data . . . . .	174
7.2.6 Concluding remarks . . . . .	177

<b>7.3 STEPWISE REGRESSION ANALYSES . . . . .</b>	<b>179</b>
<b>7.3.1 Background . . . . .</b>	<b>179</b>
<b>7.3.2 EVA without inflation adjustments to data . . . . .</b>	<b>180</b>
<b>7.3.3 EVA with inflation adjustments to data . . . . .</b>	<b>184</b>
<b>7.3.4 Standardized EVA without inflation adjustments to data . . . . .</b>	<b>188</b>
<b>7.3.5 Standardized EVA with inflation adjustments to data . . . . .</b>	<b>192</b>
<b>7.3.6 Concluding remarks . . . . .</b>	<b>195</b>
<b>7.4 CONCLUSION . . . . .</b>	<b>198</b>

## CHAPTER 8

### VALUE-BASED MANAGEMENT

<b>8.1 INTRODUCTION . . . . .</b>	<b>201</b>
<b>8.2 CONCLUSIONS FROM EMPIRICAL RESULTS . . . . .</b>	<b>201</b>
<b>8.2.1 Hypotheses testing . . . . .</b>	<b>201</b>
<b>8.2.2 Conclusions . . . . .</b>	<b>203</b>
<b>8.3 RECOMMENDATIONS . . . . .</b>	<b>205</b>
<b>8.3.1 Introduction . . . . .</b>	<b>205</b>
<b>8.3.2 Recommendations based on the study . . . . .</b>	<b>206</b>
<b>8.4 CONCLUSION TO THE STUDY . . . . .</b>	<b>211</b>

### REFERENCES

### APPENDIX A        ALPHABETIC LIST OF COMPANIES IN SAMPLE

# VERANDERLIKES WAT AANDEELHOUERS WELVAART BEPAAL

## VAN NYWERHEIDSMAATSKAPPYE GENOTEER OP DIE

### JOHANNESBURGSE AANDELEBEURS

Dit is 'n algemeen aanvaarde beginsel dat die primêre doelwit van 'n onderneming die maksimering van aandeelhouers welvaart is. 'n Verhoging in welvaart lei tot verhoogde nutsbevrediging van enige deelnemer in finansiële markte, in dié geval die aandeelhouers van 'n onderneming.

In bestuur se pogings en besluitnemingsaksies om aandeelhouers welvaart te verhoog, word die veranderlikes wat aandeelhouers welvaart bepaal, voortdurend beïnvloed. Om aandeelhouers welvaart op die mees doelmatige wyse te verhoog, is dit nodig om te **kwantifiseer** welke effek elkeen van hierdie veranderlikes op aandeelhouers welvaart uitoefen.

Indien die waardetoevoeging van die kapitaal onder beheer van bestuur verbeter moet word, lê deel van die oplossing in die bepaling van daardie veranderlikes wat aandeelhouers welvaart bepaal, en om gevvolglik bestuur se fokus op daardie veranderlikes te vestig. Die doelwit van hierdie studie is dus om 'n kwantifiseerbare verwantskap tussen hierdie veranderlikes en aandeelhouers welvaart te ontwikkel.

In die literatuur gedeelte van hierdie studie val die klem op die onderskeid wat getref word tussen die rekeningkundige metodes om aandeelhouers welvaart te bepaal, in teenstelling met die sogenaannde ekonomiese gebaseerde metodes. Daar word getoon dat die ekonomiese gebaseerde metodes, en in die besonder ekonomiese waarde toevoeging (in Engels, "Economic value added" , of "EVA"), besondere voordele het bo enige ander metode om die waarde wat bestuur toegevoeg (of vernietig) het, te bepaal.

Terwyl EVA as interne maatstaf van aandeelhouers welvaart dien, is markwaarde toevoeging (in Engels "Market value added" of "MVA") die eksterne of markgedreve metode om waarde te bepaal.

Nadat die veranderlikes wat aandeelhouers welvaart soos verteenwoordig deur EVA bepaal is, is die navorsings metodologie, insluitend die statistiese tegnieke wat gebruik is sowel as die bepaling van die steekproef, behandel. Die resultate van die empiriese analise is bespreek en vergelyk met die teoretiese beginsels.

Die korrelasie tussen MVA en (verdiskonterde) EVA was die hoogste en was selfs groter wanneer inflasie aanpassings aan die data gemaak was. Laer positiewe korrelasies is gevind tussen MVA en die meer tradisionele maatstawwe ter bepaling van aandeelhouers welvaart soos opbrengs op totale bates, opbrengs op aandeelhouers fondse, verdienste per aandeel en dividend per aandeel.

Nadat daar bewys is dat EVA die beste aanwyser is van waarde wat deur bestuur geskep of vernietig is, is dit nodig om EVA te analyseer in terme van sy veranderlikes of komponente.

Indien EVA as afhanglike veranderlike en 'n aantal onafhanglike veranderlikes by wyse van 'n stapsgewyse regressie analise ontleed word, is dit verskeie inkomste staat verhoudingsgetalle wat die beste verduideliking (soos verteenwoordig deur  $r^2$ ) van aandeelhouerswelvaart gee. Geen betekenisvolle resultate kon van verskeie balansstaat verhoudingsgetalle verkry word nie.

Met hierdie resultate as basis word verskeie aanbevelings aan bestuur gemaak oor die bestuur en toevoeging van waarde vir aandeelhouers op die mees doelmatige wyse.

Die beoefening van waardemaksimering is nie maklik nie, maar EVA en sy veranderlikes kan die taak vergemaklik.

## VARIABLES DETERMINING SHAREHOLDER VALUE OF INDUSTRIAL COMPANIES LISTED ON THE JOHANNESBURG STOCK EXCHANGE

It is widely accepted that the primary objective or goal of a firm is to maximise the value of its shareholders' equity. An increase in wealth increases the satisfaction of any financial market participant, or in this case, of any shareholder.

In management's attempts and decision-making to increase shareholder value, they continuously influence, directly or indirectly, those variables that affect shareholder wealth. In order to increase shareholder wealth in the most efficient way, it becomes necessary to **quantify** the effect that each of these relevant variables has on shareholder wealth.

If the value created from the assets under the control of management is to be improved, the answer lies partly in determining the real drivers of value and focusing management attention on these. The objective and value of this study lies in the fact that a meaningful mathematical relationship between these variables and shareholder value is developed.

In the literature part of this study, the main emphasis fell on drawing a distinction between the accounting-based and the economic-based models of determining shareholder value. It has been demonstrated that the economic-based models, and Economic value added (EVA) in particular, have distinct advantages in determining value created (or destroyed) by the management of a company.

Whilst EVA is the best internal measure of shareholder value creation. Market value added (MVA) is the external method of determining shareholder's wealth.

After the variables that can determine shareholder value as represented by the EVA of a company had been identified, the research methodology, including the statistical techniques as well as the boundaries of the sample used, were set out. The results of the empirical analyses were reported and compared with the theoretical principles.

The correlation between MVA and (discounted) EVA was the highest of all the variables and was at its most positive when inflation adjustments to the data had been made. Slightly lower positive correlations were also obtained from more traditional measures such as return on assets (ROA), return on equity (ROE), earnings per share (EPS) and dividends per share (DPS).

Once it has been determined that EVA is arguably the best indicator of value that has been created or destroyed by management, it is necessary to analyze EVA in terms of its variables or components.

If one turns to the stepwise regression analyses done with EVA as dependent variable with a number of independent variables, various income statement ratios provided the best explanation (as represented by  $r^2$ ). No meaningful results were obtained from a number of balance sheet ratios.

Using these results as a basis, recommendations to management on managing and creating shareholder wealth in the most efficient way is made.

Practising value maximization is not easy, but EVA and its variables can be the answer.