CHAPTER 7

EMPIRICAL RESEARCH RESULTS

7.1 INTRODUCTION

One of the main objectives of this study is to quantify certain variables that determine shareholder value. This was done in the study by means of a **stepwise regression analysis**. However, before these results are discussed, the **correlation** between MVA and the variables specified in the previous chapter is dealt with.

The **correlation analyses** consisted of **four** different runs. Firstly, "ordinary" MVA was correlated with the various variables without any inflation adjustments to the data. The second run made provision for inflation adjustments to all the amounts. The next two runs sought a correlation between standardized MVA and the variables under review, the third run with and the fourth run without inflation adjustments to the data. The results of these four different correlations are discussed below. The discussion concludes with a comparrison between the results of the individual four runs.

The stepwise regression procedure added one independent variable at a time to the model, one step at a time. The computer programme entered variables in single steps from best to worst, in other words, the independent variable that explained the greatest amount of variance in the dependent variable was calculated (as explained by r^2) first. The next variable to be calculated explained the greatest amount of variation in conjunction with the first, and so on.

Four different **stepwise regression procedures** were performed. In the first run, EVA was used as the dependent variable with the 19 independent variables specified in Chapter 6. No inflation adjustments were made to the data. The second run was similar to the first, except that all relevant data items were adjusted to take inflation into account. The next two regressions used standardized EVA as dependant variable with the same independent variables, the

third run with and the fourth run without inflation adjustments to the data. A discussion of the results of these four different regressions is set out below. The discussion concludes with a comparison between the results of the individual four runs.

7.2 CORRELATION ANALYSES

7.2.1 Background

As an introduction to this discussion, the reader is reminded that MVA is determined by taking the market value of the company (share price at year-end multiplied by the number of shares issued, plus the book value of all debt) and subtracting the book value of all equity and debt from this calculated market value. Variables that correlate positively (or negatively) with MVA most probably influence (or do not influence) the variables that make up MVA.

A quick glance at the four tables reveals that quite a number of correlation coefficients significant at the 1% level were achieved, although the correlation coefficients themselves were relatively low. The highest positive correlation coefficient were in the region of 0.35 to 0.40, the highest negative correlation coefficients were between -0.25 and -0.40, whilst the majority of variables had a small positive or small negative correlation with MVA or standardised MVA. Possible explanations for this are attempted in the discussion that follows.

7.2.2 MVA without inflation adjustments to data

A summary of the results of this correlation analysis is contained in **Table 7.1** (overleaf).

The correlation of MVA with EVA was negative. The correlation coefficient for the total 10 year period was -0.23 whilst the highest correlation was -0.64 during the "infamous" 1987 period, when share prices underwent a considerable downward

TABLE 7.1 CORRELATION OF MVA WITH THE FOLLOWING VARIABLES (WITHOUT INFLATION ADJUSTMENTS AND WITHOUT STANDARDIZATION TO DATA)

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
EVA	-0.22626*	-0.08160	-0.30643*	-0.28422*	-0.16429	-0.13915	-0.17565	-0.25153	*-0.17983	-0.00761	-0.64331*
SIGNIF	0.0001	0.3504	0.0003	0.0009	0.0598	0.1115	0.0439	0.0053	0.0391	0.9310	0.0001
ROA	0.04564	0.20593	0.19066	0.14108	0.28350*	0.27395*	0.14581	0.05665	0.02427	0.00187	-0.06939
SIGNIF	0.0946	0.0170	0.0273	0.1039	0.0009	0.0014	0.0940	0.5172	0.7816	0.9829	0.4274
ROE	0.00946	0.10132	0.07091	0.03249	0.01752	0.17378	0.05303	0.03817	0.05389	0.01344	-0.04376
SIGNIF	0.7324	0.2477	0.4209	0.7136	0.8438	0.0489	0.5475	0.6651	0.5409	0.8779	0.6169
ROCE	0.00496	0.08626	0.04772	0.04687	0.09207	0.07375	0.08529	-0.00881	-0.02070	0.00268	-0.06929
SIGNIF	0.8574	0.3273	0.5883	0.5936	0.2975	0.4007	0.3309	0.9201	0.8137	0.9756	0.4299
EPS	0.09741*	0.23489*	0.23276*	0.38523*	0.30244*	0.31159*	0.11329	0.05519	0.24156*	0.12677	-0.00869
SIGNIF	0.0004	0.0063	0.0068	0.0001	0.0004	0.0003	0.1942	0.5280	0.0051	0.1459	0.9209
DPS	0.11168*	0.18755	0.25117*	0.37343*	0.33422*	0.30363*	0.16219	0.05748	0.26256*	0.17282	-0.00098
SIGNIF	0.0001	0.0300	0.0034	0.0001	0.0001	0.0004	0.0622	0.5111	0.0023	0.0467	0.9911
TOT DEBT RAT	0.03668	0.01351	0.01366	0.09968	0.15386	0.04506	0.09696	0.23913*	0.22365*	0.17392	0.12841
SIGNIF	0.1807	0.8769	0.8755	0.2518	0.0770	0.6065	0.2669	0.0056	0.0097	0.0453	0.1407
TOT ASSET T/O	0.06390	0.06841	0.06796	0.15269	0.00589	0.01543	0.02050	0.03325	0.02907	0.00910	0.00489
SIGNIF	0.0297	0.4540	0.4589	0.0945	0.9489	0.8700	0.8294	0.7290	0.7609	0.9244	0.9594

TABLE 7.1 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
CURRENT RATIO	-0.02009	-0.04381	-0.05650	-0.13647	-0.12009	-0.13573	-0.16462	-0.12095	-0.04058	-0.08855	0.13038
SIGNIF	0.4639	0.6152	0.5167	0.1159	0.1686	0.1193	0.0583	0.1655	0.6428	0.3108	0.1362
NOPBT/CE	0.00312	0.18237	0.12028	0.05211	0.10945	0.05411	0.06507	-0.03662	0.03866	-0.00168	0.08944
SIGNIF	0.9129	0.0435	0.1833	0.5670	0.2243	0.5522	0.4728	0.6876	0.6686	0.9850	0.3334
NOPBT/SALES	0.11817*	0.22264	0.24638*	0.31809*	0.25713*	0.26960*	0.14348	0.03521	-0.01593	-0.04865	0.03726
SIGNIF	0.0001	0.0158	0.0072	0.0004	0.0048	0.0046	0.1330	0.7188	0.8694	0.6171	0.7086
NOPAT/SALES = MARGIN	0.11430*	0.16696	0.10903	0.33760*	0.29166*	0.38807*	0.16131	0.03042	0.01157	-0.05671	0.00174
SIGNIF	0.0001	0.0672	0.2339	0.0002	0.0012	0.0001	0.0864	0.7513	0.9036	0.5562	0.9855
EBIT/SALES	0.09048*	0.18809	0.20720	0.22729	0.34187*	0.32999*	0.15716	-0.00593	0.03128	0.02965	0.04605
SIGNIF	0.0021	0.0380	0.0226	0.0122	0.0001	0.0003	0.0964	0.9507	0.7434	0.7574	0.6313
SALES GROWTH	-0.02062	-0.00408	0.03230	0.01622	0.04426	0.12033	0.05617	0.00714	0.02216	0.00422	0.06924
SIGNIF	0.4833	0.9645	0.7251	0.8598	0.6297	0.2002	0.5545	0.9407	0.8166	0.9650	0.4702
RET.PROFIT/CE	0.02932	0.05959	0.08240	0.05643	0.13022	0.22725*	0.07196	0.01994	0.02888	0.030369	0.03628
SIGNIF	0.2847	0.4940	0.3439	0.5172	0.1352	0.0085	0.4104	0.8198	0.7415	0.7258	0.6785
SALES/CE	0.06483	0.06579	0.08515	0.12586	-0.03621	-0.05145	-0.05157	0.08542	0.05355	0.01273	0.01287
SIGNIF	0.0274	0.4716	0.3531	0.1690	0.6933	0.5850	0.5875	0.3727	0.5749	0.8945	0.8933

TABLE 7.1 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
SALES/NWC	0.01111	0.03530	0.04437	0.12720	0.10542	0.07971	0.11364	-0.02318	-0.03108	-0.01737	-0.06834
SIGNIF	0.7200	0.7143	0.6500	0.1834	0.2753	0.4235	0.2555	0.8162	0.7577	0.8645	0.5015
SALES/F.ASSETS	-0.01401	-0.03963	-0.13415	-0.13591	-0.02955	-0.10466	-0.11213	-0.02817	-0.07857	-0.02959	-0.03917
SIGNIF	0.6340	0.6647	0.1424	0.1372	0.7477	0.2656	0.2370	0.7692	0.4124	0.7578	0.6831
WACC	0.04280	0.09742	0.13848	0.08358	0.04896	0.09007	0.04125	-0.05283	-0.07968	0.11991	0.13802
SIGNIF	0.1197	0.2646	0.1119	0.3388	0.5772	0.3044	0.6386	0.5474	0.3638	0.1708	0.1145
TOT OWN INT/CE	-0.02410	-0.03261	-0.00853	-0.08259	-0.12043	-0.04310	-0.08847	-0.21799	-0.22108	-0.17410	0.13875
SIGNIF	0.3794	0.7084	0.9221	0.3428	0.1674	0.6223	0.3112	0.0117	0.0105	0.0450	0.1112
TOT LT LOAN/CE	0.01263	0.00574	0.02358	0.01656	0.04092	0.02388	0.07648	0.10680	0.12223	0.11805	0.10924
SIGNIF	0.6450	0.9475	0.7869	0.8494	0.6400	0.7850	0.3816	0.2211	0.1610	0.1760	0.2107
ST LOAN/CE	-0.03073	-0.01895	-0.05992	0.06753	-0.01376	-0.05439	-0.01921	0.04722	0.07754	0.06527	-0.11432
SIGNIF	0.2657	0.8299	0.4966	0.4434	0.8760	0.5388	0.8276	0.5922	0.3769	0.4554	0.1901
INVEST RATE											
Δ CE/NOPAT	0.00906	0.01388	0.00599	0.00613	0.00920	0.02562	-0.04075	0.03185	0.00508	0.01892	0.02640
SIGNIF	0.2657	0.8764	0.9463	0.9448	0.9182	0.7724	0.6492	0.7180	0.9546	0.8315	0.7701
TAX RATE	0.01970	0.15765	0.21343	0.16591	0.18724	0.04361	0.07988	0.02603	0.04757	0.00166	0.00548
SIGNIF	0.4889	0.0816	0.0173	0.0667	0.0365	0.6320	0.3778	0.7750	0.5983	0.9852	0.9428

TABLE 7.1 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
OPR LEV	-0.04631	-0.07220	-0.01405	-0.04253	-0.09027	-0.09270	-0.12794	-0.13992	0.00723	-0.01735	0.10589
SIGNIF	0.1227	0.4392	0.8789	0.6489	0.3373	0.3400	0.1978	0.1526	0.9403	0.8579	0.2777
FIN LEV	0.02969	0.07042	0.08398	0.04811	0.08285	0.07202	0.06803	0.02841	-0.02315	0.08777	0.07923
SIGNIF	0.2839	0.4296	0.3384	0.5838	0.3487	0.4155	0.4454	0.7493	0.7922	0.3151	0.3684
DISCOUNTED EVA						-0.25714*	-0.22193*	-0.22988*	-0.19220	0.00153	-0.53417*
SIGNIF						0.0027	0.0100	0.0075	0.0261	0.9860	0.0001

* Indicates significance at the 0,01 (1%) level.

adjustment. Both these correlations were significant at the 1% level. A possible explanation for the negative correlation might be the fact that MVA already to a large extent, discounts or provides for inflation in the share price, reflecting nominal values. EVA was, at that stage, not adjusted for inflation. A second possible reason might be the fact that, as share prices increase (to increase MVA), equity and therefore the weighted average cost of capital become more expensive and this fact reduces a company's EVA. The same arguments can be advanced to explain the even larger negative correlation coefficients between MVA and discounted EVA, which were significant in four of the six possible appearances.

Both return on assets (ROA) and return on equity (ROE) had a very low positive correlation coefficient with MVA. In some years, however, there was a relatively large positive correlation with only two significant correlations (both 0.28) with ROA during 1993 and 1992. According to the results of this study it seemed that these ratios have very little bearing on a company's market value. This confirms what was discussed in the literature study.

The contrary applies when one observed the relatively high positive correlation coefficient between MVA and earnings per share and dividend per share. Although the correlation coefficients for the total 10 year period were generally low (0.10 and 0.11 respectively), they were significant. In some years they varied between 0.25 and 0.37 and even 0.38 and in these cases they were also significant at the 1% level. Earnings and dividends did matter, according to these empirical results, contrary to the beliefs of some proponents of economic-based methods of determining shareholder value. It must, however, be stated that the theory admitted that these measures were not the best measures of shareholder value, but that their influence on the market value of a company cannot be ignored. It seemed that the dividend discount model is still very much in use: earnings and dividends do have a positive influence on a company's market value.

According to the results of this study, the total debt ratio, total asset turnover as well as the current ratio bear little relation to a company's market value. The debt

ratio in the study had a significant positive correlation of between 0.22 and 0.24 during 1989 and 1990.

Three different profitability ratios that were correlated with MVA were net operating profit before tax, net operating profit after tax and earnings before interest and tax, all expressed as a percentage of sales. These ratios all had positive correlation coefficients with MVA, especially during the period from 1992 to 1996, when the values varied between 0.18 and 0.39. This finding was in line with the positive correlation between MVA, return on assets, earnings per share and dividends per share during the same period. The profitability ratios were positively correlated with earnings attributable to ordinary shareholders as well as with dividends, hence the similar result. The shareholders seemed to be sensitive to this chain reaction, hence the positive correlation with the market value. All correlation coefficients over 0.25 during the individual years were significant at the 1% level. The correlation coefficient of 0.11 of the total 10 year period of all three these ratios was significant at the 1% level.

According to the results of this study, neither net operating profit nor retained profit expressed as a percentage of capital employed showed any significant correlation with the market value of a company.

Three balance sheet efficiency ratios were also correlated with MVA. Capital employed, net working capital as well as fixed assets were expressed as a percentage of sales. All these ratios provided small positive or small negative and no significant correlation coefficients with MVA.

Ratios that also provided a small positive correlation with MVA were the weighted average cost of capital (WACC) and the company cash tax rate. Both these ratios correlated positively with MVA from 1988 to 1995. Theory predicted that both of these ratios should have had a very small effect on the market value of a company. The correlation for the total 10 year period, however, was 0.04 and 0.02 respectively, which was very low indeed, as well as not significant.

Total owners' interest, total long-term loan capital and total short-term loan capital expressed as a percentage of capital employed had small positive or small negative correlation coefficients with MVA, indicating that the financing structure of a company bears little or no relation to its market value.

The fact that the operating and financial leverage respectively had, for the total 10 year period, a small negative (-0.05) and a small positive (0.03) correlation coefficient with MVA seemed to contradict some of the findings and possible explanations advanced above. One must bear in mind, however, that these two ratios differed from the other profitability ratios as discussed above, hence their indifference to MVA.

7.2.3 MVA with inflation adjustments to data

A summary of the results of this correlation analysis is contained in **Table 7.2** (overleaf).

The correlation of MVA with EVA was positive. The correlation coefficient for the total 10 year period was 0.16, and significant at the 1% level. The highest correlation coefficient was 0.44 (1991) and also significant, whilst the only negative correlation was found during 1987 (-0.42). Only during 1994 and 1995 was there not a significant correlation appearance. MVA already, to a large extent, discounts or provides for inflation in the share price, which reflects nominal values. EVA at this stage was also adjusted for inflation, hence the positive correlation.

The same arguments as in the above paragraph can be advanced in explanation of the even bigger positive correlation coefficients between MVA and discounted EVA. All the correlations obtained were significant. Barring 1987, in four of the five years (1992 to 1987) the correlation coefficients were between 0.36 and 0.43. This finding supported the theory which claims that MVA is equal to the discounted value of all future EVA.

TABLE 7.2 CORRELATION OF MVA WITH THE FOLLOWING VARIABLES (WITH INFLATION ADJUSTMENTS AND WITHOUT STANDARDIZATION TO DATA)

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
EVA	0.15585*	0.29654*	0.21684	0.11192	0.37525*	0.38004*	0.44281*	0.34668*	0.25106*	0.38119*	-0.41553*
SIGNIF	0.0001	0.0005	0.0122	0.1997	0.0001	0.0001	0.0001	0.0001	0.0037	0.0001	0.0001
ROA	0.10647*	0.20075	0.19921	0.17570	0.32929*	0.32461*	0.18572	0.16521	0.11407	0.10455	-0.00260
SIGNIF	0.0001	0.0200	0.0210	0.0423	0.0001	0.0001	0.0323	0.0574	0.1911	0.2310	0.9763
ROE	0.06005	0.12609	0.01346	0.12993	0.13796	0.22940*	0.12934	0.04612	0.10068	0.08025	-0.01518
SIGNIF	0.0294	0.1497	0.8782	0.1391	0.1175	0.0087	0.1409	0.5995	0.2507	0.3585	0.8624
ROCE	0.01711	0.09644	0.08409	0.05515	0.09626	0.06998	0.09350	0.02603	0.02462	0.04860	-0.09960
SIGNIF	0.5352	0.2732	0.3396	0.5300	0.2760	0.4253	0.2863	0.7670	0.7793	0.5800	0.2559
EPS	0.09763*	0.19956	0.13890	0.35998*	0.24840*	0.28528*	0.08499	0.08820	0.23193*	0.12011	0.01500
SIGNIF	0.0004	0.0208	0.1093	0.0001	0.0039	0.0009	0.3307	0.3127	0.0072	0.1685	0.8639
DPS	0.16888*	0.17871	0.25586*	0.29222*	0.31297*	0.31235*	0.21772	0.21289	0.28573*	0.24013*	0.07840
SIGNIF	0.0001	0.388	0.0028	0.0006	0.0002	0.0003	0.0118	0.0139	0.0009	0.0054	0.3697
TOT DEBT RAT	0.05530	0.00413	-0.00666	0.10762	0.15861	0.06255	0.12528	0.26054*	0.26073*	0.18616	0.10907
SIGNIF	0.0435	0.9622	0.9391	0.2158	0.0682	0.4745	0.1508	0.0025	0.0024	0.0319	0.2114
TOT ASSET T/O	0.05064	0.02341	0.00042	0.07561	0.13149	0.14289	0.15678	0.14756	0.14447	0.16084	0.18765
SIGNIF	0.0850	0.7980	0.9964	0.4098	0.1506	0.1276	0.0972	0.1222	0.1286	0.0917	0.0486

TABLE 7.2 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
CURRENT RATIO	-0.01291	-0.03904	-0.05504	-0.12459	-0.09689	-0.13791	-0.14058	-0.09315	-0.01839	-0.04544	0.13746
SIGNIF	0.6377	0.6543	0.5276	0.1515	0.2672	0.1134	0.1065	0.2862	0.8336	0.6035	0.1160
NOPBT/CE	0.03429	0.18806	0.14919	0.07574	0.14544	0.08190	0.09695	0.03843	0.02457	0.06860	-0.07401
SIGNIF	0.2285	0.0372	0.0982	0.4051	0.1056	0.3678	0.2841	0.6730	0.7856	0.4435	0.4258
NOPBT/SALES	-0.01040	0.17599	0.14780	0.22360	0.05223	0.04620	-0.09740	-0.16124	-0.15661	-0.14692	-0.19511
SIGNIF	0.7283	0.0577	0.1102	0.0149	0.5727	0.6334	0.3092	0.0971	0.1039	0.1292	0.0494
NOPAT/SALES = MARGIN	-0.03412	0.13638	0.06092	0.21835	-0.01451	0.09637	-0.13659	0.20419	-0.17750	0.21122	-0.25924*
SIGNIF	0.2450	0.1358	0.5068	0.0166	0.8744	0.2950	0.1473	0.0309	0.0612	0.0261	0.0058
EBIT/SALES	0.09183*	0.16841	0.17073	0.21899	0.30957*	0.28829*	0.11444	0.02523	0.02591	0.01342	0.04852
SIGNIF	0.0018	0.0637	0.0612	0.0158	0.0005	0.0018	0.2275	0.7926	0.7863	0.8888	0.6130
SALES GROWTH	-0.01222	-0.00926	-0.03828	-0.00727	0.01892	0.12015	0.03979	0.02798	0.00822	0.01955	-0.00993
SIGNIF	0.6777	0.9194	0.6768	0.9369	0.8368	0.2009	0.6756	0.7706	0.9314	0.8386	0.9176
RET.PROFIT/CE	0.05824	0.05347	0.10163	0.09068	0.18245	0.27158*	0.06216	0.05321	0.04905	0.04462	0.02927
SIGNIF	0.0335	0.5395	0.2426	0.2974	0.0356	0.0016	0.4772	0.5430	0.5750	0.6100	0.7380
SALES/CE	0.02455	0.02681	0.03050	0.07202	0.06683	0.05870	0.05046	0.07459	0.08827	0.11306	0.14770
SIGNIF	0.4039	0.7694	0.7398	0.4324	0.4664	0.5332	0.5956	0.4365	0.3547	0.2374	0.1219

TABLE 7.2 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
SALES/NWC	0.02945	0.05572	0.06355	0.15617	0.15715	0.11797	0.10072	0.03025	-0.00139	0.01335	0.00058
SIGNIF	0.3419	0.5631	0.5155	0.1017	0.1027	0.2353	0.3138	0.7616	0.9890	0.8957	0.9955
SALES/F.ASSET	-0.00559	-0.02024	-0.06703	-0.05408	0.10444	0.03091	0.01896	0.00116	0.07647	0.09535	0.10456
SIGNIF	0.8493	0.8249	0.4651	0.5558	0.2542	0.7430	0.8420	0.9904	0.4250	0.3195	0.2748
WACC	-0.00812	0.08431	0.12917	0.05020	-0.02426	0.02585	-0.04483	-0.15950	-0.17816	-0.18747	0.09829
SIGNIF	0.7680	0.3346	0.1384	0.5661	0.7825	0.7686	0.6097	0.0677	0.0410	0.0314	0.2622
TOT OWN INT/CE	0.08554*	0.00373	0.03449	-0.01768	0.04226	0.09621	0.04324	-0.01985	0.05061	0.03984	0.24624*
SIGNIF	0.0018	0.9659	0.6924	0.8393	0.6291	0.2706	0.6212	0.8206	0.5629	0.6489	0.0043
TOT LT LOAN/CE	0.02606	-0.00690	0.00932	0.02149	0.04653	0.02556	0.10489	0.14800	0.14017	0.13469	0.09588
SIGNIF	0.3418	0.9369	0.9149	0.8053	0.5949	0.7703	0.2296	0.0891	0.1076	0.1222	0.2723
ST LOAN/CE	0.01038	0.00475	-0.04007	0.11516	0.05531	0.01984	0.03611	0.10783	0.15148	0.11059	-0.08750
SIGNIF	0.7048	0.9566	0.6457	0.1852	0.5271	0.8207	0.6799	0.2167	0.0818	0.2051	0.3166
INVEST RATE											
Δ CE/NOPAT	0.01248	0.01533	0.01767	0.01725	0.01972	0.06600	-0.02559	0.01084	0.01109	0.06172	0.02435
SIGNIF	0.6561	0.0847	0.8425	0.8468	0.8265	0.4556	0.7778	0.9026	0.9007	0.4872	0.7884
TAX RATE	0.04270	0.23081	0.24561*	0.21558	0.26618*	0.17978	0.04119	0.10550	0.09336	0.13195	0.01860
SIGNIF	0.1337	0.0102	0.0060	0.0166	0.0027	0.0466	0.6497	0.2455	0.3004	0.1392	0.8416

TABLE 7.2 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
OPR LEV	-0.05187	-0.15331	-0.02351	0.03191	-0.12089	-0.06087	-0.12517	-0.22352	0.07459	0.06016	-0.03973
SIGNIF	0.0883	0.1004	0.7996	0.7373	0.2022	0.5334	0.2123	0.0239	0.4451	0.5421	0.6977
FIN LEV	0.04759	0.06360	0.06653	0.16342	0.14796	0.08786	0.14295	0.03864	0.03094	0.04182	-0.01512
SIGNIF	0.0904	0.4775	0.4556	0.0632	0.1068	0.3338	0.1118	0.6662	0.7257	0.6379	0.8660
DISCOUNTED EVA						0.26004*	0.40074*	0.36167*	0.39080*	0.42593*	0.34978*
SIGNIF						0.0024	0.0001	0.0001	0.0001	0.0001	0.0001

* Indicates significance at the 0,01 (1%) level

Both return on assets (ROA) and return on equity (ROE) were positively correlated with MVA. However, ROA had a higher positive correlation coefficient with MVA, with values ranging from 0.11 to 0.33. However, only the correlation coefficients for the total 10 year period (0.11), 1993 (0.33) and 1992 (0.32) were significant. The inflation adjustments to ROA might have had a bigger influence on the calculated correlation coefficients than those to ROE. It seemed that once these ratios were adjusted for inflation, they correlated more positively with MVA.

The same pattern was found in the relatively high positive correlation coefficients between MVA and earnings per share (EPS) and dividend per share (DPS). Although the correlation coefficients for the total 10 year period were low (0.10 and 0.17 respectively), they were significant at the 1% level. In most of the years, they oscillated between 0.25 and 0.33 and was significant. The positive correlation of DPS to MVA was higher than that of EPS and it seems that there was a cycle of rising and declining positive correlations - probably because of changes in the business cycle. As discussed above, earnings and dividends did matter, according to these empirical results. The shareholders attach a considerable weight to earnings and the resultant cash benefits.

According to the results of this study, the total debt ratio, total asset turnover and the current ratio had little or no relation to a company's market value, although the total debt ratio had a significant positive correlation coefficient of 0.26 for both 1989 and 1990.

Three different profitability ratios that were correlated with MVA were net operating profit before tax, net operating profit after tax and earnings before interest and tax, all expressed as a percentage of sales. Most of these ratios all had very small correlation coefficients with MVA with no significant appearances. EBIT divided by sales, however, had the highest correlation coefficient for the total 10 year period (0.09 and significant). It seemed that once these ratios were adjusted (downwards) for inflation, their correlation coefficients with MVA also dropped significantly.

According to the results of this study, neither net operating profit nor retained profit expressed as a percentage of capital employed had any significant correlation with the market value of a company.

Three balance sheet efficiency ratios were also correlated with MVA. Capital employed, net working capital and fixed assets were expressed as a percentage of sales. All of these ratios displayed relatively small positive or small negative correlations with MVA.

Ratios that provided a small negative and a small positive correlation coefficients with MVA respectively were the weighted average cost of capital (WACC) and the company cash tax rate. Both these ratios showed an increasing correlation with MVA from 1988 to 1995. It was especially the tax rate that achieved a correlation coefficient of above 0.20 during the last four years under review with two significant correlations (0.25 in 1995 and 0.27 during 1993). Theory predicted that both of these should have had a negative effect on the market value of a company. The correlation coefficients for the total 10 year period, however, were not significant and were -0.01 for WACC and 0.04 for the tax rate.

As found above, total owners' interest, total long-term loan capital and total short-term loan capital expressed as a percentage of capital employed had low positive or low negative correlation coefficients with MVA, indicating that the financing structure of a company had little or no effect on its market value, even when adjusted for inflation.

The fact that the operating and financial leverage respectively had, for the total 10 year period low negative (-0.05) and low positive (0.05) correlation coefficients with MVA was consistent with the previous analysis where no inflation adjustments to data were made.

7.2.4 Standardized MVA without inflation adjustments to data

A summary of the results of this correlation analysis is contained in **Table 7.3** (overleaf).

The correlation of standardized MVA with standardized EVA was very low. The correlation coefficient for the total 10 year period was 0.04, while the highest was 0.16 during 1987. Neither correlation coefficient was significant at the 1% level. One is once again dealing with the fact that MVA already, to a large extent, discounts or provides for inflation in the share price, which reflects nominal values. Standardized EVA was, at this stage, not adjusted for inflation. The same arguments can be advanced in explanation of the even lower positive correlation between standardized MVA and discounted standardized EVA (0.01 for the total 10 year period, and also not significant).

Return on assets and return on equity had a very low positive and a very low negative correlation with standardized MVA respectively. It is interesting to note that the negative correlation of ROA became slightly higher during the last three years under review (1994 to 1996). As found in the previous correlation analysis, it seemed that these ratios bore very little relation to a company's market value, which confirmed theory on this matter as discussed in the literature study. No significant correlation coefficients were found.

Quite the contrary to the relatively low correlations as described in the above paragraph was found when one observed the relatively high negative correlation between standardized MVA and earnings per share and dividend per share. Although the correlation coefficients for the total 10 year period for both these ratios were low (-0.15 and -0.14 respectively, but significant at the 1% level), in both cases they became increasingly negative towards the end of the period under review (1996). In the case of EPS, the negative correlation coefficient increased from -0.28 (1993) to -0.44 (1996), with DPS slightly lower at a constant correlation coefficient of -0.28 from 1992 to 1996. During these periods all the

TABLE 7.3 CORRELATION OF STANDARDIZED MVA WITH THE FOLLOWING VARIABLES (WITHOUT INFLATION ADJUSTMENTS AND WITH STANDARDIZATION TO DATA)

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
STDARD EVA	0.04180	-0.02465	-0.00005	-0.00571	0.01230	0.03699	0.02173	0.02981	0.06906	0.06326	0.16275
SIGNIF	0.1290	0.7790	0.9995	0.9482	0.8886	0.6737	0.8047	0.7344	0.4314	0.4712	0.0623
ROA	0.01175	-0.11797	-0.08069	-0.03201	-0.02319	-0.03533	-0.09195	0.05732	0.05959	0.07996	0.04139
SIGNIF	0.6685	0.1763	0.3558	0.7146	0.7910	0.6864	0.2925	0.5122	0.4957	0.3602	0.6362
ROE	-0.01510	0.00344	-0.03034	0.08045	-0.05089	-0.10304	-0.05917	-0.04776	0.08111	0.00961	0.07291
SIGNIF	0.5855	0.9689	0.7318	0.3648	0.5668	0.2452	0.5020	0.5880	0.3571	0.9126	0.4043
ROCE	0.08952*	0.04065	0.08301	0.08228	0.09482	0.07620	0.07225	0.08857	0.10285	0.12425	0.10177
SIGNIF	0.0012	0.6461	0.3477	0.3502	0.2832	0.3852	0.4103	0.3125	0.2406	0.1558	0.2456
EPS	-0.14920*	-0.43678*	-0.46038*	-0.37196*	-0.27851*	-0.17468	0.20107	-0.06226	0.10093	-0.09139	-0.06001
SIGNIF	0.0001	0.0001	0.0001	0.0001	0.0012	0.0443	0.0203	0.4765	0.2477	0.2955	0.4926
DPS	-0.14097*	-0.28318*	-0.35557*	-0.29794*	-0.26066*	-0.28051*	-0.15636	0.06960	0.12630	0.06991	-0.05551
SIGNIF	0.0001	0.0010	0.0001	0.0005	0.0024	0.0011	0.0723	0.4260	0.1474	0.4240	0.5257
TOT DEBT RAT	0.03873	0.05161	-0.04480	-0.05112	0.08878	0.06470	0.05038	0.11816	0.12494	0.08933	0.06219
SIGNIF	0.1581	0.5552	0.5927	0.5590	0.3095	0.4594	0.5647	0.1756	0.1519	0.3066	0.4770
TOT ASSET T/O	0.24895*	0.25518*	0.26764*	0.30038*	0.25072*	0.20455	0.21271	0.26460*	0.25650*	0.24981*	0.25312*
SIGNIF	0.0001	0.0047	0.0081	0.0009	0.0055	0.0283	0.0237	0.0050	0.0063	0.0082	0.0074

TABLE 7.3 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
CURRENT RATIO	0.01651	0.03024	-0.05929	0.04036	0.02170	-0.00925	0.02238	0.06558	0.03963	0.02489	-0.05112
SIGNIF	0.5477	0.7297	0.4978	0.6447	0.8042	0.9158	0.7982	0.4533	0.6506	0.7761	0.5605
NOPBT/CE	0.10240*	0.02242	0.06704	0.10597	0.07392	0.09838	0.10845	0.11176	0.10413	0.17589	0.10880
SIGNIF	0.0003	0.8064	0.4613	0.2454	0.4127	0.2790	0.2305	0.2184	0.2478	0.0479	0.2389
NOPBT/SALES	-0.17194*	-0.22128	-0.35521*	-0.29469*	-0.27027*	-0.17678	-0.20053	-0.20500	-0.13468	-0.08638	-0.18155
SIGNIF	0.0001	0.0170	0.0001	0.0013	0.0030	0.0659	0.0348	0.0342	0.1626	0.3741	0.0665
NOPAT/SALES = MARGIN	-0.14580*	-0.15636	-0.17847	-0.27760*	-0.25595*	-0.27993*	-0.18007	-0.17251	0.09754	-0.08767	0.14664
SIGNIF	0.0001	0.0881	0.0512	0.0022	0.0046	0.0020	0.0552	0.0702	0.3062	0.3624	0.1246
EBIT/SALES	-0.11273*	-0.19072	-0.26519*	-0.21577	-0.24651*	-0.18249	-0.18277	-0.03129	0.16769	-0.11233	0.13022
SIGNIF	0.0001	0.0361	0.0034	0.0179	0.0064	0.0509	0.0527	0.7444	0.0772	0.2405	0.1731
SALES GROWTH	0.02541	0.05293	0.01259	-0.00986	0.15328	-0.04579	-0.00045	0.05920	0.05890	0.05916	0.01874
SIGNIF	0.3883	0.5642	0.8914	0.9149	0.0932	0.6270	0.9962	0.5371	0.5373	0.5374	0.8452
RET PROFIT/CE	-0.03152	-0.06264	0.00493	-0.02475	-0.06192	-0.08860	-0.08300	0.05523	0.02059	0.00324	0.00094
SIGNIF	0.2506	0.4738	0.9551	0.7774	0.4789	0.3105	0.3422	0.5278	0.8140	0.9705	0.9915
SALES/CE	0.20276*	0.22316	0.23924*	0.24029*	0.20789	0.20609	0.18627	0.23565	0.21878	0.21853	0.22415
SIGNIF	0.0001	0.0139	0.0085	0.0082	0.0221	0.0271	0.0482	0.0128	0.0205	0.0212	0.0180

TABLE 7.3 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
SALES/NWC	0.04895	0.12214	0.08176	0.05878	0.12121	0.07543	-0.04789	0.08709	0.05537	0.05505	0.01888
SIGNIF	0.1145	0.2058	0.4047	0.5419	0.2093	0.4489	0.6327	0.3817	0.5824	0.5883	0.8528
SALES/F.ASSET	0.02480	0.09633	0.25178*	0.25057*	0.28343*	0.28359*	0.24647*	0.05654	0.25384*	0.25129*	0.24886*
SIGNIF	0.3999	0.2932	0.0055	0.0058	0.0016	0.0021	0.0085	0.5556	0.0072	0.0078	0.0084
WACC	-0.158828*	0.16743	-0.16915	-0.15295	-0.19523	-0.20257	-0.18563	-0.23838*	-0.25328*	0.24558*	0.22487*
SIGNIF	0.0001	0.0550	0.0525	0.0800	0.0249	0.0198	0.0331	0.0059	0.0034	0.0045	0.0095
TOT OWN INT/CE	-0.07414*	-0.01730	-0.03031	0.01407	-0.07803	-0.10115	-0.09524	-0.13325	0.13925	-0.13017	0.09630
SIGNIF	0.0068	0.8433	0.7291	0.8723	0.3720	0.2467	0.2755	0.1262	0.1099	0.1353	0.2702
TOT LT LOAN/CE	-0.01318	0.07138	0.04824	-0.00195	0.00794	0.01438	0.00262	0.07052	0.01100	0.03942	0.01099
SIGNIF	0.6310	0.4142	0.5813	0.9823	0.9278	0.8695	0.9761	0.4199	0.9000	0.6524	0.9001
ST LOAN/CE	0.09884*	0.11646	0.10586	0.01755	0.07982	0.09907	0.08893	0.08068	0.15057	0.15269	0.16452
SIGNIF	0.0003	0.1870	0.2306	0.8429	0.3648	0.2621	0.3124	0.3596	0.0848	0.0793	0.0584
INVEST RATE											
Δ CE/NOPAT	0.01199	0.06112	0.03435	0.03867	0.03619	-0.03550	0.01871	-0.04368	0.10535	0.04217	0.05267
SIGNIF	0.6681	0.4949	0.7003	0.6635	0.6863	0.6884	0.8346	0.6204	0.2366	0.6352	0.5596
TAX RATE	0.02832	0.01939	0.08406	0.02175	0.05509	0.09780	0.04641	0.06851	0.00502	0.06077	0.03381
SIGNIF	0.3203	0.8321	0.3553	0.8121	0.5417	0.2819	0.6086	0.4515	0.9557	0.4973	0.7151

TABLE 7.3 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
OPR LEV	0.02083	0.02003	0.07365	-0.19008	0.01603	0.06846	0.04741	-0.07004	0.08913	0.10698	0.02472
SIGNIF	0.4883	0.8310	0.4260	0.0410	0.8650	0.4814	0.6344	0.4756	0.3544	0.2682	0.8005
FIN LEV	0.01866	0.05424	0.04291	0.08733	0.00512	-0.03712	-0.02398	0.03696	-0.04186	0.07638	0.11268
SIGNIF	0.5010	0.5447	0.6265	0.3213	0.9539	0.6750	0.7882	0.6775	0.6337	0.3822	0.2000
DISCOUNT STD EVA						0.00730	0.00046	-0.00608	-0.03427	0.03360	-0.02400
SIGNIF						0.9333	0.9958	0.9444	0.6942	0.6999	0.7832

* Indicates significance at the 0,01 (1%) level

correlation coefficients were significant at the 1% level. Earnings and dividends did not matter according to these empirical results, which confirmed arguments advanced in the theory on this matter.

According to the results of this study, the total debt ratio as well as the current ratio bore little or no relation to the company's market value. However, the total asset turnover displayed a consistent positive correlation coefficient of approximately 0.25 over the entire 10 year period, which were also significant at the 1% level. This followed from the theory, as total asset turnover from a fundamental analysis point of view had a very definite bearing on share prices, and therefore MVA.

Three different profitability ratios that were correlated with standardized MVA were net operating profit before tax, net operating profit after tax and earnings before interest and tax, all expressed as a percentage of sales. These ratios all displayed negative correlation coefficients with standardized MVA, especially during the period from 1993 to 1996, where the values varied between -0.18 and -0.27. These correlation coefficients were significant at the 1% level. This finding was contrary to the positive correlation coefficients obtained with "ordinary" MVA.

Neither net operating profit nor retained profit expressed as a percentage of capital employed were correlated with the market value of a company.

Three balance sheet efficiency ratios were also correlated with standardized MVA. Capital employed, net working capital and fixed assets were expressed as a percentage of sales. Of these, fixed asset turnover provided the highest correlation, with a nearly consistent positive and significant correlation coefficient of 0.25. This finding also supported the positive correlation of total asset turnover with standardized MVA.

The weighted average cost of capital (WACC) provided a relatively low negative correlation coefficient (-0.16 for the total 10 year period), but significant at the 1%

level. The company cash tax rate displayed a low positive correlation coefficient of 0.03 for the total 10 year period with no significant appearances during the entire period under review. According to the results of this study, both these ratios had very little influence on standardized MVA.

Total owners' interest, total long-term loan capital and total short-term loan capital expressed as a percentage of capital employed displayed low positive or low negative correlations with standardized MVA, supporting previous findings that the financing structure of a company had little or no effect on its market value.

The fact that both the operating and financial leverage had a low positive correlation coefficient of 0.02 with standardized MVA for the total 10 year period seemed to support the fact that these ratios had a relative small bearing on standardized MVA. None of these correlation coefficients were significant at the 1% level.

7.2.5 Standardized MVA with inflation adjustments to data

A summary of the results of this correlation analysis is contained in **Table 7.4** (overleaf).

The correlation of standardized MVA with standardized EVA was, like the previous correlation analysis (where no inflation adjustments were made), very low. The correlation coefficient for the total 10 year period was 0.04, and the highest correlation coefficient was 0.20 during 1987. No significant correlations were obtained. Although the highest correlation coefficient was marginally higher with this run, where inflation adjustments had been made, according to the results of this study, there was no high correlation between standardized MVA and standardized EVA when adjusted for inflation. There was also an even lower correlation between standardized MVA and discounted standardized EVA (a correlation coefficient of 0.03 for the total 10 year period, with no significant appearances).

TABLE 7.4 CORRELATION OF STANDARDIZED MVA WITH THE FOLLOWING VARIABLES (WITH INFLATION ADJUSTMENTS AND WITH STANDARDIZATION TO DATA)

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
STDARD EVA	0.03951	-0.01155	0.01927	0.02523	0.03081	0.05078	0.04857	0.05582	0.09446	0.11134	0.19615
SIGNIF	0.1516	0.8954	0.8264	0.7740	0.7258	0.5646	0.5817	0.5250	0.2813	0.2037	0.0242
ROA	0.07552*	-0.05837	-0.00316	0.04605	0.07012	0.06982	0.03447	0.16893	0.17436	0.15233	0.11431
SIGNIF	0.0059	0.5046	0.9712	0.5986	0.4226	0.4245	0.6937	0.0519	0.0447	0.0800	0.1901
ROE	0.02864	0.02252	0.05435	0.08929	-0.02071	-0.04076	0.00904	-0.00693	0.14954	0.11081	0.10200
SIGNIF	0.2998	0.7985	0.5375	0.3124	0.8151	0.6452	0.9184	0.9371	0.0870	0.2042	0.2427
ROCE	0.11020*	0.06095	0.09899	0.10179	0.12014	0.09272	0.10415	0.12785	0.13758	0.16233	0.13805
SIGNIF	0.0001	0.4909	0.2625	0.2473	0.1734	0.2903	0.2346	0.1440	0.1157	0.0629	0.1144
EPS	-0.08838*	0.38236*	-0.42826*	0.29985*	-0.11381	-0.06076	-0.07067	0.02194	0.02871	-0.04629	0.00014
SIGNIF	0.0013	0.0001	0.0001	0.0005	0.1921	0.4872	0.4189	0.8021	0.7429	0.5968	0.9987
DPS	0.09947*	0.00604	0.09519	0.18240	0.19173	0.15523	0.22104	0.21990	0.10578	0.10118	0.10574
SIGNIF	0.0003	0.9450	0.2757	0.0356	0.0270	0.0744	0.0106	0.0110	0.2256	0.2465	0.2258
TOT DEBT RAT	0.05665	-0.02761	-0.01705	0.00997	0.08089	0.08041	0.07686	0.12439	0.14078	0.10760	0.08749
SIGNIF	0.0388	0.7524	0.8455	0.9093	0.3547	0.3575	0.3792	0.1537	0.1060	0.2176	0.3166
TOT ASSET T/O	0.26834*	0.26384*	0.27613*	0.30404*	0.25809*	0.23713	0.25202*	0.30200*	0.30145*	0.29099*	0.28754*
SIGNIF	0.0001	0.0035	0.0023	0.0007	0.0043	0.01070	0.0071	0.0013	0.0012	0.0019	0.0022

TABLE 7.4 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
CURRENT RATIO	0.01965	0.03183	-0.03432	0.04624	0.02342	-0.01488	0.01001	0.04579	0.03811	0.04138	0.00568
SIGNIF	0.4740	0.7161	0.6950	0.5972	0.7890	0.8650	0.9089	0.6007	0.6632	0.6363	0.9485
NOPBT/CE	0.11262*	0.04516	0.09732	0.12972	0.10345	0.10213	0.08770	0.13954	0.15423	0.17481	0.12634
SIGNIF	0.0001	0.6214	0.2843	0.1544	0.2509	0.2610	0.3328	0.1237	0.0859	0.0493	0.1728
NOPBT/SALES	-0.23215*	-0.24640*	-0.36991*	-0.30606*	-0.30640*	-0.28549*	-0.30278*	-0.28570*	-0.21501	-0.17544	0.28494*
SIGNIF	0.0001	0.0077	0.0001	0.0008	0.0007	0.0026	0.0012	0.0029	0.0248	0.0694	0.0037
NOPAT/SALES = MARGIN	-0.25895*	-0.21580	-0.26702*	-0.33670*	-0.37033*	-0.40065*	-0.36115*	-0.31542*	-0.23659	-0.23845	0.31433*
SIGNIF	0.0001	0.0179	0.0032	0.0002	0.0001	0.0001	0.0001	0.0007	0.0120	0.0117	0.0007
EBIT/SALES	-0.06681	-0.15781	-0.20803	0.14485	-0.12621	-0.07968	-0.08617	0.02591	0.08995	0.03237	0.03205
SIGNIF	0.0232	0.0839	0.0226	0.1145	0.1678	0.3973	0.3642	0.7872	0.3456	0.7359	0.7384
SALES GROWTH	0.02461	-0.04421	0.00593	-0.03188	-0.10924	-0.01919	-0.00532	0.05874	0.05472	0.05489	0.02702
SIGNIF	0.4035	0.6302	0.9487	0.7296	0.2330	0.8387	0.9554	0.5403	0.5666	0.5672	0.7783
RET PROFIT/CE	-0.01385	-0.05083	0.03085	-0.00478	-0.01038	-0.02043	-0.04602	0.00095	0.09455	0.02973	0.03013
SIGNIF	0.6139	0.5612	0.7244	0.9565	0.9056	0.8154	0.5989	0.9914	0.2790	0.7341	0.7306
SALES/CE	0.22040*	0.22276	0.24430*	0.24988*	0.21653	0.22268	0.18878	0.26795*	0.26397*	0.24740*	0.25073
SIGNIF	0.0001	0.0141	0.0072	0.0059	0.0171	0.0168	0.0452	0.0045	0.0049	0.0088	0.0079

TABLE 7.4 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
SALES/NWC	0.04937	0.11290	0.07075	0.06293	0.12174	0.07826	-0.01797	0.08563	0.05203	0.05754	0.05396
SIGNIF	0.1114	0.2425	0.4711	0.5137	0.2073	0.4320	0.8577	0.3898	0.6054	0.5716	0.5958
SALES/F.ASSET	0.02139	0.09405	0.25387*	0.24969*	0.26289*	0.25744*	0.20033	0.04926	0.25576*	0.24156	0.22532
SIGNIF	0.4678	0.3048	0.0051	0.0060	0.0036	0.0055	0.0334	0.6077	0.0067	0.0106	0.0174
WACC	-0.16695*	-0.16941	-0.17432	-0.16498	-0.18484	-0.19200	-0.18297	-0.23874*	-0.25368*	-0.24337*	-0.22095
SIGNIF	0.0001	0.0521	0.0456	0.0587	0.0339	0.0274	0.0357	0.0058	0.0033	0.0049	0.0109
TOT OWN INT/CE	0.07737*	0.10776	0.09024	0.10718	0.08858	0.08415	0.07410	0.11339	0.13786	0.09697	0.14128
SIGNIF	0.0048	0.2170	0.3016	0.2195	0.3106	0.3355	0.3966	0.1938	0.1135	0.2668	0.1048
TOT LT LOAN/CE	0.01312	-0.04481	-0.01790	0.02325	0.01867	0.03848	0.04539	0.09151	0.05243	0.05760	0.03350
SIGNIF	0.6326	0.6085	0.8379	0.7905	0.8311	0.6601	0.6039	0.2948	0.5489	0.5102	0.7018
ST LOAN/CE	0.09812*	0.10310	0.09108	0.03015	0.08694	0.10204	0.08710	0.09729	0.15771	0.15170	0.16007
SIGNIF	0.0003	0.2376	0.2971	0.7305	0.3197	0.2425	0.3188	0.2652	0.0698	0.0813	0.0657
INVEST RATE											
∆ CE/NOPAT	0.01538	0.00696	0.03460	0.03872	0.03689	0.00885	0.03105	0.05006	0.03544	0.07469	0.05203
SIGNIF	0.5837	0.9386	0.6982	0.6656	0.6817	0.9204	0.7321	0.5716	0.6901	0.4002	0.5660
TAX RATE	0.00810	0.01402	0.03829	0.00731	0.00135	0.10345	0.02612	0.07588	0.06489	0.06042	0.02067
SIGNIF	0.7765	0.8782	0.6742	0.9363	0.9881	0.2548	0.7733	0.4042	0.4722	0.4998	0.8242

TABLE 7.4 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
OPR LEV	0.01544	-0.09747	0.04521	0.07742	0.07656	0.06571	0.00423	-0.14371	0.15175	0.08528	0.01060
SIGNIF	0.6125	0.3001	0.6269	0.4172	0.4203	0.5013	0.9665	0.1496	0.1187	0.3871	0.9175
FIN LEV	0.01195	-0.03303	-0.02330	0.21581	0.06315	-0.01383	0.08221	0.02654	-0.03375	0.01544	0.12342
SIGNIF	0.6713	0.7218	0.7948	0.0140	0.4932	0.8794	0.3620	0.7671	0.7020	0.8621	0.1668
DISCOUNT STD EVA						0.02882	0.02987	0.03262	0.02892	0.03526	0.04572
SIGNIF						0.7419	0.7338	0.7104	0.7404	0.6881	0.6027

* Indicates significance at the 0.01 (1%) level

Return on assets and return on equity both had very low positive correlations with standardized MVA, with only one significant correlation coefficient. It is interesting to note that the positive correlation of ROA turned negative during the last two years under review (1995 to 1996). As found in the previous correlation analysis, it seemed that these ratios bore very little relation to a company's market value, which confirmed the theory as discussed in the literature study.

The opposite to these low correlations was found in the relatively high negative correlation coefficients between standardized MVA and earnings per share. The low correlation with dividend per share was positive. Although the correlation coefficients for the total 10 year period were low (-0.09 for EPS and 0.10 for DPS, but significant), in both cases they became increasingly more negative towards the end of the period under review (1996). In the case of EPS it increased from -0.05 (1988) to -0.38 (1996) with the correlation coefficients from 1994 to 1996 significant at the 1% level. The correlation coefficient of DPS became lower and ended at 0.01 during 1996. Earnings and dividends did not matter, according to these empirical results, a finding which was supported by arguments advanced in the theory.

Both the total debt ratio and the current ratio bore little or no relation to a company's market value. However, the total asset turnover had a consistently positive correlation coefficient of approximately 0.30 (higher than without inflation adjustments) over the entire 10 year period with all correlation coefficients significant at the 1% level. The positive correlation coefficients obtained from this variable supported the fact that, from a fundamental analysis point of view, total asset turnover had a definite influence on the market value of a company.

Three different profitability ratios correlated with standardized MVA were net operating profit before tax (NOPBT), net operating profit after tax (NOPAT) and earnings before interest and tax, all expressed as a percentage of sales. These ratios all displayed negative correlations with standardized MVA, especially during the period from 1992 to 1996, when the correlation coefficients varied between

-0.14 and -0.27, with quite a number larger than -0.30. The correlation coefficients of NOPBT divided by sales and NOPAT divided by sales were significant from 1992 to 1996. Once again, this finding was the opposite of the positive correlations with "ordinary" MVA.

Neither net operating profit (NOPBT) nor retained profit expressed as a percentage of capital employed had any correlation with the market value of a company. Only one correlation coefficient was significant, namely the correlation coefficient for the total 10 year period for NOPBT divided by capital employed (0.11).

Three balance sheet efficiency ratios were also correlated with standardized MVA. Capital employed, net working capital as well as fixed assets were expressed as a percentage of sales. Of these, fixed asset turnover did not provide as high a positive correlation with inflation adjustments as previously without inflation adjustments. A higher positive correlation coefficient was found with sales divided by capital employed, which turned out to be consistently above 0.22 and significant at the 1% level. A possible explanation for this phenomenon might be the fact that capital employed was used in the standardization of MVA, and hence the positive correlation coefficients, especially with inflation adjustments.

The weighted average cost of capital (WACC) displayed a relatively low negative correlation coefficient (-0.17 for the total 10 year period, but significant at the 1% level), whilst the company cash tax rate showed a low positive correlation coefficient of 0.01 for the total 10 year period with no significant appearances. According to the results of this study, both these ratios had a relative small influence on standardized MVA.

Total owners' interest, total long-term loan capital and total short-term loan capital expressed as a percentage of capital employed had low positive correlation coefficients with standardized MVA, indicating that the financing structure of a company had little or no effect on its market value, as found in the previous analyses.

Both the operating and financial leverage respectively had a low positive correlation coefficient with standardized MVA (0.02 and 0.01 for the total 10 year period and not significant at the 1% level). Therefore, according to the results of this study, these ratios had a relative small effect on standardized MVA.

7.2.6 Concluding remarks

One of the most important determinants of a company's MVA is the share price. It has been said that the single most important determinant of share prices is investor mood - whether positive or negative. If a great number of investors descent on the market, all theoretical principles, complex and logical calculations, even reason, are thrown overboard. Share prices are then driven by emotions. Although it is difficult to quantify exactly how large a part of share prices is determined by these illogical (and sometimes unnecessary) investor actions, one must acknowledge that they do play a significant role in setting share prices.

Another possible reason for the relatively low correlation coefficients might lie in the composition of the sample used for the empirical analyses. The EVA values used in the study were from a sample of companies where both positive and negative EVA values were found. If a company is destroying value (a negative EVA value), one may expect the share price (as represented by MVA) to react in a different way from when a company produces positive EVA values. It is against this background that one must evaluate, compare and summarize the results of the correlation analyses, especially the fact that the highest correlation coefficients obtained were in the region of 0.4.

The highest consistent positive correlation coefficient obtained (in the order of 0.4) was between MVA and EVA **with** inflation adjustments to the data. The very same pattern was obtained with discounted EVA. In **Table 7.5** (overleaf) the correlation coefficients between MVA and the various variables for the total 10 year period are presented. If one observes the ranking of the correlation coefficients of unstandardized or **normal** EVA with MVA, it is clear that when inflation adjustments

TABLE 7.5 CORRELATION OF MVA WITH THE FOLLOWING VARIABLES FOR THE TOTAL 10 YEAR PERIOD UNDER REVIEW

	Unstandardised without inflation adjustment		Unstandardised with inflation adjustment		Standardised without inflation adjustment		Standardised with inflation adjustment	
EVA	-0.22626*	(26)	0.15585*	(2)	0.04180	(7)	0.03951	(12)
ROA	0.04564	(6)	0.10647*	(3)	0.01175	(16)	0.07552*	(8)
ROE	0.00946	(14)	0.06005	(7)	-0.01510	(18)	0.02864	(13)
ROCE	0.00496	(16)	0.01711	(17)	0.08952*	(5)	0.11020*	(4)
EPS	0.09741*	(4)	0.09763*	(4)	-0.14920*	(25)	-0.08838*	(24)
DPS	0.11168*	(3)	0.16888*	(1)	-0.14097*	(23)	0.09947*	(5)
TOT DEBT RAT	0.03668	(8)	0.05530	(9)	0.03873	(8)	0.05665	(9)
TOT ASSET T/O	-0.06390	(24)	0.05064	(10)	0.24895*	(1)	0.26834*	(1)
CURRENT RATIO	-0.02009	(19)	-0.01291	(24)	0.01651	(14)	0.01965	(16)
NOPBT/CE	0.00312	(17)	0.03429	(13)	0.10240*	(3)	0.11262*	(3)
NOPBT/SALES	0.11817*	(1)	0.01040	(22)	-0.17194*	(27)	0.23215*	(26)
NOPAT/SALES = MARGIN	0.11430*	(2)	0.03412	(25)	-0.14580*	(24)	0.25895*	(27)
EBIT/SALES	0.09048*	(5)	0.09183*	(5)	-0.11273*	(22)	0.06681	(23)

TABLE 7.5 CONTINUED

	Unstandardised without inflation adjustment		Unstandardised with inflation adjustment		Standardised without inflation adjustment		Standardised with inflation adjustment	
SALES GROWTH	-0.02062	(20)	0.01222	(23)	0.02541	(10)	0.02461	(14)
RET.PROFIT/CE	0.02932	(10)	0.05824	(8)	-0.03152	(20)	-0.01385	(22)
SALES/CE	-0.06483	(25)	0.02455	(16)	0.20276*	(2)	0.22040*	(2)
SALES/NWC	0.01111	(13)	0.02945	(14)	0.04895	(6)	0.04937	(10)
SALES/F.ASSETS	-0.01401	(18)	-0.00559	(20)	0.02480	(11)	0.02139	(15)
WACC	0.04280	(7)	-0.00812	(21)	-0.158828*	(26)	-0.16695*	(25)
TOT OWN INT/CE	-0.02410	(21)	0.08554*	(6)	-0.07414*	(21)	0.07737*	(7)
TOT LT LOAN/CE	0.01263	(12)	0.02606	(15)	-0.01318	(17)	0.01312	(19)
ST LOAN/CE	-0.03073	(22)	0.01038	(19)	0.09884*	(4)	0.09812*	(6)
INVEST RATE								
4 CE/NOPAT	0.00906	(15)	0.01248	(18)	0.01199	(15)	0.01538	(18)
TAX RATE	0.01970	(11)	0.04270	(12)	0.02832	(9)	0.00810	(21)
OPR LEV	-0.04631	(23)	0.05187	(26)	0.02083	(12)	0.01544	(17)
FIN LEV	0.02969	(9)	0.04759	(11)	0.01866	(13)	0.01195	(20)
DISCOUNTED EVA	0.53417*	(27)	0.34974*	(27)	0.02400	(19)	0.04572	(11)

* Indicates significance at the 0,01 (1%) level and number in bracket indicates ranking.

to the data were made, EVA's ranking improved from second last (26th) (without inflation adjustments) to second best (2nd) (with inflation adjustment to data). Possible reasons for this were advanced in the discussion above, but this finding supported the theory on this matter. The correlation coefficient ranking of **standardized** EVA with MVA without and with inflation adjustments to data did not differ much. In fact, the ranking decreased from 7th to 12th when inflation adjustments to the data were introduced. The ranking of **discounted** EVA with MVA was, in all four cases, at the lower end of the spectrum in comparison to the other variables, with a slight improvement when **standardization** was introduced. It was arguably the standardization process of MVA and EVA that caused this improvement in ranking in comparison to the unstandardized data.

Slightly lower positive correlations were found between MVA and ROA, ROE, EPS and DPS. These correlation coefficients were higher when data **with** inflation adjustments were utilized. It seemed that, in some ways contrary to the theory, these "well known" ratios were set in the mind of investors and that they were used in determining share prices, or market value. On the basis of this study, this cannot be disputed. Without a doubt, these ratios did have an influence on share prices and the market value of a company in the study. It is, however, doubtful whether these ratios are the best indication, expression or inputs in the calculation of shareholder value.

Positive correlations between MVA and the three profitability ratios were also obtained, although inflation adjustments to the data caused a decrease in the correlation coefficients. The positive influence of these profitability ratios on EPS and DPS supported the positive correlation coefficients obtained between MVA and EPS and DPS respectively.

Variables which expressed asset efficiency and the financing structure of the company displayed very little or no correlation with market value. The same results were obtained with the rest of the variables, especially WACC and the company tax rate.

The correlations sought between **standardized MVA** and the other variables, especially standardized EVA, provided disappointing results. Very low (positive and negative) correlation coefficients were obtained. With hindsight, it seems that the standardization of both MVA and EVA had its own niche application: comparison between (vastly) different individual companies over a number of years rather than a correlation based on a sample of companies, as was done in this research . Such comparisons fall beyond the scope of this study, but they do provide an interesting topic for further research.

7.3 STEPWISE REGRESSION ANALYSES

7.3.1 Background

A stepwise regression procedure using various independent variables with EVA as dependent variable were used in these analyses. **All** variables that were included in the **results** as presented in Tables 7.6 to 7.10 were significant at the 15% (0.1500) level.

As in the case of the correlation analyses above, the reader is reminded of the various variables that were used in the calculation of EVA. The fact that only variables or ratios that could be obtained from a company's published financial statements, as well as the problem with external variables that could not be quantified, limited the analyses in a way.

As explained in Section 7.1 above, the stepwise regression procedure determined the variable that explained EVA the best and repeated the process with the next variable until the 15% significance level was reached, after which no more regression coefficients for the variables were calculated. It was therefore necessary to observe just how many times a variable featured in the eleven different procedures (10 individual years plus the total for the 10 year period under review). Thereafter the actual regression coefficients of the individual variables could be analyzed as well as their ranking in relation to each other.

A quick glance over the five tables containing the results (Table 7.6 to Table 7.10) reveals that, on average, relatively low total regression coefficients were obtained. Although, in a small number of instances, a total regression coefficient of 1 or close to 1 was obtained, the average seemed to oscillate between 0.48 and 0.53. Possible explanations for this have been advanced above, but also emerge in the discussion that follows.

7.3.2 EVA without inflation adjustments to data

A summary of the results of this regression analysis is contained in **Table 7.6** (overleaf).

Out of a possible eleven appearances of each of the independent variables used in the regression, the weighted average cost of capital (WACC) featured ten times, sales divided by capital employed nine times, return on capital employed (ROCE) eight times, the investment rate six times and retained profit divided by capital employed five times. A number of other variables recurred two or three times, whilst the debt to equity ratio, total owners' interest divided by capital employed and the financial leverage occurred only once. Sales divided by net working capital and short-term borrowings divided by capital employed did not feature in this analysis at all. In total, 66 appearances were recorded.

From this analysis, it seems that WACC and ROCE must be seen as prominent drivers of EVA. In the eight times (out of the eleven possible times) that ROCE featured, six times it explained between 9% and 22% of the variance in EVA with an explanation of 9% for the total 10 year period under consideration. WACC, on the other hand, featured ten times, but explained only between 2% and 10%, with an explanation of 2.1% for the total 10 year period.

Of the seven profitability ratios, sales divided by capital employed occurred nine times and varied from 2% to a maximum of nearly 13% with an explanation of 1% for the total 10 year period under review. Retained profit divided by capital

TABLE 7.6 **REGRESSION COEFFICIENTS (r^2) OF THE FOLLOWING VARIABLES WITH EVA (WITHOUT INFLATION ADJUSTMENTS TO DATA)**

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
ROCE	0.089(1)	0.089(2)	0.044(3)	0.024(5)			0.122(1)	0.174(1)	0.222(1)		0.105(1)
NOPBT/CE		0.113(1)			0.039(5)					0.109(1)	
NOPBT/SALES	0.028(2)		0.052(2)							0.024(5)	
NOPAT/SALES				0.023(6)					0.096(2)		
EBIT/SALES		0.031(4)	0.027(5)								
SALES GROWTH		0.023(6)	0.016(6)		0.036(6)						
RET PROTIT/CE	0.005(5)		0.040(4)		0.043(3)				0.059(4)	0.020(6)	
SALES/CE	0.010(4)	0.033(3)	0.128(1)	0.056(3)	0.100(1)	0.019(4)		0.023(4)		0.057(3)	0.057(3)
SALES/NWC											
SALES/AVE TOT FIXED ASSETS	0.004(7)					0.080(1)	0.040(2)			0.017(8)	
WACC	0.021(3)	0.026(5)		0.014(7)	0.053(2)	0.063(2)	0.031(3)	0.047(2)	0.073(3)	0.104(2)	0.072(2)

TABLE 7.6 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
DEBT TO EQUITY RATIO				0.029(4)							
TOT OWNERS INTEREST/CE										0.018(7)	
TOT LONG TERM CAP/CE	0.004(8)									0.026(4)	0.029(5)
TOT ST BORR + BANK OD/CE											
INVET RATE: CHA IN CE/NOPAT	0.004(8)		0.027(5)	0.189(1)	0.022(7)			0.039(3)			0.036(4)
CO TAX RATE	0.004(6)				0.042(4)						0.020(6)
OPRERAT LEV				0.169(2)		0.026(3)					
FIN LEVE			0.015(7)								
TOTAL r^2	0.169	0.315	0.349	0.504	0.335	0.188	0.193	0.283	0.450	0.375	0.319

Number in bracket indicates ranking

employed occurred five times whilst the others occurred only two or three times. Net operating profit before tax divided by capital employed weighed in on two of its three appearances with 11%, whilst net operating profit after tax divided by sales (the margin) occured meaningfully only once at 9,6%. As can be seen from Table 7.6, the contribution of the other profitability ratios was approximately 2% when they occured.

It is clear that the various profitability ratios (income statement ratios) played a relatively important role in explaining EVA and must therefore be seen as important drivers of EVA.

As the "return variables" in all cases consisted of a profit margin, an asset turnover ratio and a leverage factor, it was observed from the results that it was especially the profit margin that was important as an EVA value driver, and not the asset turnover ratio or the leverage factor. This statement can be made based on the low regression coefficients (r^2) found in this study for the asset turnover ratios and the leverage factors.

The investment rate (change in capital employed divided by NOPAT) can be another important indicator of a company's EVA. This variable occurred six times in the eleven procedures. Although the regression coefficient for the total 10 year period was very small at 0.4%, it appeared in the other periods to be quite constant at 3% with one large contribution of 19%.

The balance sheet ratios or variables that were entertained in this regression procedure performed quite badly, as can be observed from Table 7.6. Sales divided by net working capital did not feature once, while sales divided by fixed assets occurred only four times, once meaningfully at 8%. Total owners' interest, long-term loan capital and short-term loan capital were all respectively expressed as a portion of total capital employed. Out of a possible 33 occurrences of the three variables, they appeared only four times, with no appearance by short-term loan capital. The other appearances were relatively low. An explanation for this might

be that although capital employed as an amount is central in the EVA calculation, profitability ratios and WACC weighed more.

What was also surprising in this analysis is that the company cash tax rate appears only three times. In one of the cases, it explained 4% and in the other case 2% of EVA. One must, therefore, recognize that the cash tax rate, according to this study, could not be viewed as an important driver of EVA and hence of shareholder value.

The operating and financial leverage occurred only three times in total, with the operating leverage once doing so meaningfully at 17%.

This regression analysis must also be discussed in terms of the cumulative regression coefficients as recorded per year to give some indication of the total explanation of variance in EVA for that year.

If one observes the total of the regression coefficients at the 15% significance level, there were five years when the total for that particular year was between 30% and 40%, one year between 40% and 50% and one year above 50%. The 66 occurrences that were recorded implies that on average six of the total nineteen variables appeared in any particular year. The years where only three or four variables occurred also recorded the lowest cumulative regression coefficients. For further analysis purposes, the year above 50% (1994) can be disregarded due to the fact that the operating leverage made its only meaningful contribution of 17% during that year.

Although the cumulative regression coefficient for the total 10 year period for the **total** data base was only 17%, it is worthwhile to look at the nine variables that this total of 17% consisted of, due to the fact that these variables represented the most popular occurrences. ROCE explained 9%, other profitability ratios 4.4% (with net operating profit before tax divided by sales 3%), WACC 2% and the balance was made up of relatively small contributions of three other variables.

The cumulative regression coefficient of **1989** was 45%. ROCE represented 22%, NOPAT divided by sales 9.6%, retained profit divided by capital employed 6% and WACC 7.3%.

If one observed a year like **1993**, the fact that no regression coefficient for the all-important ROCE was found immediately draws one's attention. However, some other profitability ratios were there to support the total explanation (r^2) of 33.5%. Four different profitability ratios provided a total of 21.8% explanation of the variance in EVA, with sales divided by capital employed providing a 10% explanation. WACC contributed 5.3%, the investment rate 2.2% and the company tax rate 4.2%.

One can analyze another couple of years, but at this stage an important pattern already started to emerge. This was discussed already in this section: profitability ratios weighed in heavily, WACC contributed relatively significantly and the balance sheet ratios do not appear to did to well at all. These preliminary findings were in line with the theoretical calculations and "make-up" of EVA as set out in the literature.

The regression analysis must also be discussed in terms of the ranking between the various independent variables to the dependent variable, EVA. From Table 7.6 it was observed that ROCE was ranked first and NOPBT divided by sales second in the total for the 10 year period under review. ROCE also ranked first during 1987 to 1991. The weighted average cost of capital ranked second or third during most of its appearances, with a ranking of third during the total of the 10 year period under review. The balance sheet ratios obtained the lowest rankings, both during the individual years as well as for the total 10 year period.

The analyses and discussion of the regression procedures was enriched if one introduced the important factor of inflation, which is discussed in the next section.

7.3.3 EVA with inflation adjustments to data

A summary of the results of this regression analysis is contained in **Table 7.7** (overleaf).

Out of a possible eleven appearances of each of the independent variables used in the regression, return on capital employed (ROCE) featured eleven times, the margin (NOPAT divided by sales) nine times, earnings before interest and tax (EBIT) divided by sales seven times, the investment rate, WACC and the company tax rate five times each, whilst net operating profit before interest and tax occurred six times. Sales growth and short-term borrowings divided by capital employed occurred once only. Total owners' interest and long-term loan capital, both divided by capital employed, did not feature in this analysis at all. The rest of the variables occurred two, three or four times.

In total, 69 appearances were recorded, only slightly more than the 66 of the previous regression analysis without inflation adjustments.

As explained in the previous section and in the literature on this matter, ROCE and the margin (NOPAT divided by sales) are amongst other variables very prominent in the determination of EVA. In the eleven times that it featured, ROCE explained in ten cases between 9% and 21% of the variance in EVA with an explanation of 14% for the total 10 year period under review. This appearance was much more consistent, as well as with a higher regression coefficient (r^2), than the previous analysis where no inflation adjustments to the data were made. The margin featured nine times with a regression coefficient of between 7% and 26% and an explanation of 6.8% for the total 10 year period under review.

Of the six remaining profitability ratios in this analysis, net operating profit before tax divided by capital employed occurred six times with a highest factor of 8% and the rest in the region of 3% or 4%. More or less the same pattern was found with EBIT divided by sales, where a highest regression coefficient of 11% was followed

TABLE 7.7 **REGRESSION COEFFICIENTS (r^2) OF THE FOLLOWING VARIABLES WITH EVA (WITH INFLATION ADJUSTMENTS TO DATA)**

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
ROCE	0.139(1)	0.211(1)	0.178(1)	0.094(3)	0.152(1)	0.134(1)	0.039(4)	0.174(1)	0.213(2)	0.090(2)	0.177(2)
NOPBT/CE	0.007(6)			0.014(7)		0.044(5)	0.078(3)			0.034(7)	0.033(7)
NOPBT/SALES			0.096(2)	0.016(6)			0.022(7)				
NOPAT/SALES	0.068(2)			0.134(2)	0.072(2)	0.060(4)	0.140(1)	0.116(2)	0.258(1)	0.174(1)	0.183(1)
EBIT/SALES	0.003(9)	0.017(6)				0.078(2)	0.112(2)	0.039(3)		0.058(4)	0.044(3)
SALES GROWTH		0.028(4)									
RET PROTIT/CE	0.005(7)						0.025(6)			0.068(3)	0.035(6)
SALES/CE	0.003(9)	0.019(5)		0.013(8)					0.029(3)		
SALES/NWC										0.016(8)	0.039(4)
SALES/AVE TOT FIXED ASSETS	0.004(8)						0.026(5)				
WACC	0.021(4)		0.016(3)	0.028(5)	0.030(3)			0.027(4)			

TABLE 7.7 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
DEBT TO EQUITY RATIO						0.033(7)			0.017(4)		
TOT OWNERS INTEREST/CE											
TOT LONG TERM CAP/CE											
TOT ST BORR + BANK OD/CE		0.040(3)									
INVES RATE: CHA IN CE/NOPAT	0.015(5)			0.196(1)		0.036(6)				0.042(6)	0.036(5)
CO TAX RATE	0.055(3)			0.045(4)		0.063(3)				0.044(5)	0.018(8)
OPRERAT LEV	0.004(8)	0.052(2)									
FIN LEVE											
TOTAL r^2	0.324	0.367	0.290	0.540	0.254	0.448	0.442	0.356	0 517	0.526	0.565

Number in bracket indicates ranking

by 8% and 6% with the rest lower. As can be seen from Table 7.7, the contribution of the other profitability ratios was, approximately 2% when they occurred, except in one or two cases where 10% and 7% were obtained.

Both the investment rate (change in capital employed divided by NOPAT) and the weighted average cost of capital were important indicators of a company's EVA. These variables both occurred five times each in the eleven procedures. Although the explanation during the total 10 year period was 1.5% and 2.1% respectively, the individual appearance appeared to be quite constant at 3%. The investment rate made one big contribution of 20% in 1994. The same rate of occurrences as well as size of regression coefficient (r^2) was found in the previous regression analysis where no inflation adjustments were made to the data.

As was the case in the previous analysis, the balance sheet ratios or variables that were entertained in this regression procedure performed quite badly, as can be observed from Table 7.7. Both sales divided by net working capital and sales divided by fixed assets occurred only twice, with no real meaningful regression coefficients. Total owners' interest and long-term loan capital were respectively expressed as a portion of total capital employed. Out of a possible 22 occurrences from these two variables, they appeared not once. The debt to equity ratio appeared twice and short-term loan capital divided by capital employed occurred once only. The regression coefficients obtained were lower than in the previous analysis where no inflation adjustments to the data were made.

What was interesting in this analysis compared to the previous analysis (without inflation adjustments to data) was the fact that the company cash tax rate appeared five times, up from the previous three times. It explained 5.5% of the variance of EVA during the total 10 year period under consideration, also well up from the previous analysis's regression coefficients without inflation adjustments.

The operating leverage occurred only twice, whilst the financial leverage did not occur at all.

As was done in the previous regression analysis, this regression analysis must also be discussed in terms of the cumulative regression coefficients as recorded per year to give an indication of the total explanation of variance in EVA for an individual year and for the total 10 year period, but now with inflation adjustment to the data.

If one observes the cumulative regression coefficients (r^2), there were only two years when the total regression coefficient was below 30%. In three years it was between 30% and 40%, in two years between 40% and 50%, and in four cases above 50%. The regression coefficients obtained in this analysis were much higher than when the data had no inflation adjustments made to them. The 69 occurrences recorded were only slightly higher than in the previous analysis (66), and also implied that on average six of the total nineteen variables appeared in a year. The two years where only three variables occurred also recorded the lowest cumulative regression coefficients.

The cumulative regression coefficient of the **total** data base for the total 10 years under consideration was more than 32%, which was nearly double the regression coefficient of the previous regression analysis without inflation adjustments to the data. The number of variables that occurred during the total 10 year period under review increased by two to eleven. It is worthwhile to observe these eleven variables, due to the fact that these variables represented the most popular occurrences. ROCE explained 14%, other profitability ratios nearly 9% (with net operating profit before tax divided by sales 7%), WACC 2%, the company tax rate 5.5% whilst the balance were made up of relatively small contributions of three variables.

The cumulative regression coefficients of **1989** were nearly 52%. ROCE represented 22%, NOPAT divided by sales (the margin) 26%, sales divided by capital employed 3% and the debt equity ratio nearly 2%. If one compares this with the regression analysis where no inflation adjustments were made to the data, it is in essence the margin that increased from the previous regression coefficient

of 10% to the current explanation of 26%. The inflation adjustment to the data caused this variable to increase in importance, not only in this year, but for the total 10 year period under review as well.

If one observes a year such as **1992**, one observed that four various profitability ratios explained 31.6% of the variance in EVA, the investment rate 3.6%, the company tax rate 6.3% and the debt to equity ratio 3.3%.

More or less the same pattern was found when one analysed another couple of years.

The pattern identified in the previous regression analysis in Section 7.3.2 was confirmed: profitability ratios weighed in heavily, the company tax rate and WACC contributed relatively significantly and the balance sheet ratios did not appear to do well at all.

What further enhances this finding is the fact that the regression coefficients (r^2) **with** inflation adjustments to the data were significantly higher than those without inflation adjustments. This phenomenon will be discussed in more detail in the conclusion to this subsection.

The regression analysis must also be discussed in terms of the ranking between the various independent variables to the dependent variable, EVA. From Table 7.7 it may be observed that ROCE was ranked first and NOPBT divided by sales second in the total for the 10 year period under review. These two variables also achieved the highest number of first and second rankings during the individual years. This was exactly the finding of the previous analysis where no inflation adjustments to the data were made. The company tax rate was ranked third and WACC fourth during the total 10 year period under review. According to the results of this regression analysis, it was the balance sheet ratios that obtained the lowest rankings, both during the individual years and the total 10 year period.

The analyses and discussion can now be extended by analysing another form of EVA, namely standardized EVA.

7.3.4 Standardized EVA without inflation adjustments to data

A summary of the results of this regression analysis is contained in **Table 7.8** (overleaf).

Out of a possible eleven appearances of each of the independent variables used in the regression of the variables, return on capital employed (ROCE) featured in all of the eleven possible appearances, the weighted average cost of capital (WACC) featured nine times, total owners interest divided by capital employed seven times, sales divided by capital employed five times, the operating leverage also five times and the financial leverage six times. A number of other variables recurred once or twice, whilst the debt to equity ratio recurred four times. Three of the profitability ratios, including the margin, did not feature in this analysis at all. A total of 64 appearances were recorded, which was, for all practical purposes, similar to the 66 of the regression analysis of "normal" EVA.

For analysis purposes, 1987, and to a lesser extent 1988, could be disregarded due to the fact that 1987 was the base year of standardization. The total regression coefficient (r^2) of 1 during that year also supported this argument.

In the eleven times that it featured, ROCE explained, in 10 cases, between 13% and 25% of the variance in EVA with an explanation of 14.2% during the total 10 year period under review. WACC, on the other hand, featured nine times, but with a regression coefficient of between 2% and 5%, with an explanation of 1.5% during the total 10 year period under review. In the case of ROCE, a better explanation of **standardized** EVA than that of **ordinary** EVA was provided, but in the case of WACC, less.

TABLE 7.8 **REGRESSION COEFFICIENTS (r^2) OF THE FOLLOWING VARIABLES WITH STANDARDIZED EVA (WITHOUT INFLATION ADJUSTMENTS TO DATA)**

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
ROCE	0.142(1)	0.130(1)	0.194(1)	0.248(1)	0.180(1)	0.145(1)	0.130(2)	0.131(2)	0.189(1)	0.157(2)	0.875(1)
NOPBT/CE	0.004(7)			0.032(6)	0.030(4)	0.032(3)					
NOPBT/SALES											
NOPAT/SALES											
EBIT/SALES											
SALES GROWTH	0.009(4)			0.062(2)				0.171(1)		0.818(1)	
RET PROTIT/CE					0.027(5)		0.056(3)			0.001(6)	
SALES/CE	0.002(9)			0.041(3)	0.022(6)		0.034(5)			0.002(5)	
SALES/NWC											
SALES/AVE TOT FIXED ASSETS										0.004(4)	
WACC	0.015(3)		0.054(4)	0.027(7)	0.044(3)	0.045(2)	0.032(6)		0.026(6)	0.012(3)	0.125(2)

TABLE 7.8 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
DEBT TO EQUITY RATIO	0.003(8)						0.160(1)	0.055(3)	0.042(4)		
TOT OWNERS INTEREST/CE	0.030(2)		0.056(3)	0.024(8)	0.058(2)	0.045(2)	0.043(4)		0.031(5)		
TOT LONG TERM CAP/CE	0.003(8)										
TOT ST BORR + BANK OD/CE	0.007(5)			0.034(5)							
INVES RATE: CHA IN CE/NOPAT		0.052(2)									
CO TAX RATE	0.005(6)										
OPRERAT LEV		0.018(3)	0.060(2)			0.024(4)			0.044(3)	0.001(6)	
FIN LEVE	0.002(9)		0.024(5)	0.039(4)	0.019(7)			0.019(4)	0.067(2)		
TOTAL	0.222	0.200	0.388	0.507	0.380	0.291	0.455	0.376	0 399	0.995	1.000

Number in bracket indicates ranking

Of the seven profitability ratios, sales divided by capital employed occurred five times with a very low regression coefficient of 0.2% for the total 10 year period under consideration. Sales growth occurred four times, once relatively high at 17%. Retained profit divided by capital employed occurred three times. Three profitability ratios, namely net operating profit before tax, net operating profit after tax and earnings before interest and tax, all divided by sales, did not appear at all. As argued before, various profitability ratios played a relative important role in explaining EVA. According to the results of this study, the same cannot be said of standardized EVA. The fact was that only ROCE occurred meaningfully, with very few other profitability ratios in support.

The investment rate (change in capital employed divided by NOPAT) can be another important indicator of a company's EVA. As may be expected from the findings of the previous paragraph, this variable occured only once and according to the results of this study appeared not to play a significant role in explaining standardized EVA.

The balance sheet ratios or variables entertained in this regression procedure performed quite badly with the exception of one, namely total owners' interest divided by capital employed, as can be observed from Table 7.8. This variable occurred seven times and its regression coefficient ranged in value from 3% to 5%. The fact that this variable appeared regularly during this analysis of standardized EVA (more than in the case of normal EVA) can be explained by the fact that capital employed plays a bigger role in the determination and calculation of standardized EVA than in "normal" EVA, mainly due to the standardization process.

Sales divided by net working capital did not feature once, whilst sales divided by fixed assets occurred only once. The debt to equity ratio appeared four times, once meaningfully at a regression coefficient of 16%.

The other occurrences of the balance sheet ratios were very low. As was found in the case of normal EVA, an explanation for this might be that although capital

employed as amount was central in the EVA calculation, ROCE and WACC weighed more.

What was also surprising in this analysis was that the company cash tax rate appeared only once and did not appear to play a role at all. According to the results of this study it played a relatively small part in the explanation of EVA as well as of standardized EVA, compared with other variables.

The operating and financial leverage occurred much more frequently than in the previous regression analyses, namely five and six times respectively. The explanation that they provided in the variance of standardized EVA varied mostly between 2% and 4% with two regression coefficients of 6%. The reason for their appearance was quite difficult to establish. It might lie in the fact that these variables are also, in essence, profitability ratios and, whilst such a bad performance was found from the other profitability ratios, it was these that kicked in to support ROCE in the total explanation of standardized EVA.

This regression analysis must also be discussed in terms of the cumulative regression coefficients recorded per year to indicate the total explanation of standardized EVA for a particular year.

As mentioned above, both 1987 and 1988 can be disregarded in the analysis. If one observed the total of the regression coefficients (r^2) of the remaining nine periods, there were six years when the cumulative regression coefficient was above 30% and three years when it was between 20% and 30%. On average, there were six variables per individual year and eleven variables in the total 10 year period under consideration.

Although the cumulative regression coefficient for the **total** data base for the total 10 year period under consideration was only 22%, it is worthwhile to have a look at the eleven variables that it consisted of, due to the fact that these variables represented the most popular occurrences. ROCE explained 14%, other

profitability ratios 1.5%, WACC 1.5% and the balance made up of relatively small contributions by the remaining variables.

The cumulative regression coefficient of **1993** was 38%. ROCE represented 25%, NOPBT divided by capital employed 3%, sales growth 6%, sales divided by capital employed 4%, WACC 3%, total owners' interest divided by capital employed 6% and the financial leverage 2%. There seemed in this year to be some balance between the profitability and the balance sheet variables.

One can analyse another couple of years, but, at this stage, a pattern different to that of the analysis of normal EVA has already started to emerge: profitability variables counted less and the balance sheet variables did better. It seemed that a better balance between these two types of ratios was found with standardized EVA. Once again, a prudent and solid explanation for this seemed difficult to find at this stage.

The regression analysis must also be discussed in terms of the ranking between the various independent variables to the dependent variable, standardized EVA. From Table 7.8 it may be observed that ROCE was ranked first during nearly all the individual years, as well as in the total 10 year period under consideration. NOPBT divided by sales was, contrary to previous findings where it ranked second, not ranked at all due to the fact that it did not record any appearances. Total owners' interest divided by capital employed was ranked second and WACC third during the total 10 year period under consideration. According to the results of this regression analysis, it was a mixture of the balance sheet ratios and the income statement ratios that obtained the rest of the rankings, during the individual years as well as for the total 10 year period.

The analyses and discussion can be enriched if one introduced the important factor of inflation, which is discussed in the next section.

7.3.5 Standardized EVA with inflation adjustments to data

A summary of the results of this regression analysis is contained in **Table 7.9** (overleaf).

Out of a possible eleven appearances of each of the independent variables used in the regression, return on capital employed (ROCE) featured in all of the eleven possible cases, the weighted average cost of capital (WACC) featured eight times, both net operating profit before tax divided by capital employed and sales growth five times with total owners' interest divided by capital employed occurring four times.

The rest of the variables recurred once or twice, whilst two of the profitability ratios, as well as the investment rate did not feature in this analysis at all. In total, 51 appearances were recorded, which was the lowest number in all four regression analyses.

As was argued in the previous analysis of standardized EVA without inflation adjustments to the data, for analyses purposes, 1987, and to a lesser extent 1988, could be disregarded due to the fact that 1987 was the base year of standardization. The total regression coefficient (r^2) of 1 during 1987 once again supported this argument.

In the eleven times that it featured, ROCE explained in ten cases between 10% and 38% of the variance in EVA with an regression coefficient of 12.1% during the total 10 year period under review. WACC, on the other hand, featured eight times, but with a regression coefficient of between 2% and 5% with an explanation of 2.5% during the total 10 year period under review. Both these variables explained more or less the same variance as was found in the previous analysis where no inflation adjustments to the data were made. In the case of ROCE, a better explanation than that of ordinary EVA was provided, but in the case of WACC less.

TABLE 7.9 **REGRESSION COEFFICIENTS (r^2) OF THE FOLLOWING VARIABLES WITH STANDARDIZED EVA (WITH INFLATION ADJUSTMENTS TO DATA)**

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
ROCE	0.121(1)	0.384(1)	0.209(1)	0.133(1)	0.092(1)	0.126(1)	0.106(1)	0.128(1)	0.130(1)	0.227(2)	0.887(1)
NOPBT/CE	0.017(3)		0.040(3)	0.058(2)	0.060(2)	0.106(2)					
NOPBT/SALES											
NOPAT/SALES							0.023(5)				
EBIT/SALES											
SALES GROWTH	0.004(5)		0.016(6)				0.023(5)	0.045(3)		0.734(1)	
RET PROTIT/CE							0.059(2)			0.005(4)	
SALES/CE										0.004(5)	
SALES/NWC		0.011(6)			0.023(4)						
SALES/AVE TOT FIXED ASSETS			0.017(5)							0.003(6)	
WACC	0.025(2)	0.056(2)	0.053(2)	0.020(4)	0.022(5)		0.056(3)			0.021(3)	0.113(2)

TABLE 7.9 CONTINUED

	PERIOD										
	Total 10 year period	96	95	94	93	92	91	90	89	88	87
DEBT TO EQUITY RATIO							0.022(6)				
TOT OWNERS INTEREST/CE	0.017(3)		0.025(4)	0.024(3)			0.030(4)				
TOT LONG TERM CAP/CE		0.021(4)						0.048(2)	0.046(2)		
TOT ST BORR + BANK OD/CE											
INVET RATE: CHA IN CE/NOPAT											
CO TAX RATE	0.006(4)										
OPRERAT LEV		0.017(5)	0.025(4)								
FIN LEVE	0.002(6)	0.025(3)			0.024(3)						
TOTAL r^2	0.192	0.514	0.385	0.235	0.221	0.232	0.319	0.221	0.176	0.994	1.000

Number in bracket indicates ranking

Of the seven profitability ratios, net operating profit before tax divided by capital employed occurred the most (five times) with a regression coefficient that varied between 11% and 2% and an explanation of 1.7% during the total 10 year period under review. Sales growth occurred four times with low regression coefficients. The other ratios appeared once, twice or not at all with low explanation factors if they did appear.

As in the analysis of standardized EVA without inflation adjustments, according to this study, the profitability ratios in this case did not appear to play an important role in explaining standardized EVA. The fact that only ROCE occurred meaningfully, with very few other profitability ratios in support, can be attributed once again to the exclusive or specialised nature of standardized EVA in ccmparison to ordinary EVA.

The investment rate (change in capital employed divided by NOPAT) can be amongst other variables another important indicator of a company's EVA. In line with the findings of the previous paragraph, this variable never occurred and appeared not to play a significant role.

The balance sheet ratios or variables tested in this regression procedure performed quite badly, with the exception of the same variable in the analysis without inflation adjustments, namely total owners' interest divided by capital employed, as can be observed from Table 7.9. This variable occurs four times and ranged in value around 2% with an explanation of 1.7% for the total 10 year period under review. Both the number of appearances and the regression coefficient itself was less than in the case of standardized EVA without inflation adjustments. Both sales divided by net working capital and sales divided by fixed assets occurred twice. The total long-term capital divided by capital employed ratio appeared three times.

The other occurrences of the balance sheet variables were very low. As was found in the case of the previous regression analyses, according to the results of this study, an explanation for this might be that, although according to literature, capital

employed as amount is central in the EVA calculation, ROCE and WACC weighed more.

What was also surprising in this analysis was that the company cash tax rate appeared only once and according to the results of this study did not appear to play any role at all in explaining standardized EVA with inflation adjustments to data.

The operating and financial leverage occurred less than in the analysis of standardized EVA without inflation adjustments. The explanation that they provided in the variance of standardized EVA varied mostly around 2%. Once again, the reason for their appearance was quite difficult to establish. It might be the fact that these variables are also, in essence, profitability ratios and, whilst such a bad performance was found from the other profitability ratios, it was these that support ROCE in the total explanation of standardized EVA. In addition to this, the inflation adjustments to them implied a smaller role in the regression analysis.

As in the previous cases, this regression analysis must also be discussed in terms of the cumulative regression coefficients recorded per individual year to give an indication of the total explanation of standardized EVA for a particular year.

As mentioned above, both 1987 and 1988 were disregarded in the analysis. If one observes the total of the regression coefficients of the remaining nine periods, there were three years when the total regression coefficient was above 30% and six years when it was between 20% and 30%. On average, there were fewer than six variables per individual year.

Although the cumulative regression coefficient of the **total** data base for the total 10 year period under consideration was only 19%, it is worthwhile to have a look at the seven variables that it consisted of, due to the fact that these variables represented the most popular occurrences. ROCE explained 12%, other profitability ratios 2%, WACC 2,5% and the balance was made up of relatively small contributions of the remaining variables. All in all, a slightly smaller

explanation factor was obtained than in the case of the previous analyses without inflation adjustments to data.

The cumulative regression coefficient of **1995** was 38.5%. ROCE represented 21%, net operating profit before tax divided by capital employed 4%, sales growth and sales divided by fixed assets 2% each, WACC 5%, total owners' interest divided by capital employed 3% and the operating leverage 2%. There seemed, in this case, to be some balance between the profitability (income statement) and the balance sheet ratios.

One can analyse another couple of years, but at this stage, the patterns that were identified after discussion of the previous regression analyses have already been confirmed: it seems that a better balance between the profitability ratios and the balance sheet ratios was struck in the case of standardized EVA than with ordinary (unstandardized) EVA. Once again, a prudent and solid explanation for this seems difficult to find at this stage.

The regression analysis must also be discussed in terms of the ranking between the various independent variables to the dependent variable, standardized EVA. From Table 7.9 it was observed that ROCE was ranked first during nearly all the individual years, as well as in the total 10 year period under consideration. WACC was ranked second and NOPBT/Sales third during the total 10 year period under consideration.

7.3.6 Concluding remarks

Four different stepwise regression analyses were performed. Their individual results have been discussed, and, to a lesser extent, compared and contrasted to each other. A comparison of the results supports, clarifies or dismisses patterns, trends or conclusions that can be drawn from these in collaboration with the theoretical principles as discussed in this study.

If one observed the regression analyses of EVA as dependent variable with various other independent variables, the importance of the operating profitability variables and margins from the income statement was confirmed. ROCE seemed to be the single most important variable. This finding is not only supported by constantly high regression coefficients (r^2) , but also by the fact that ROCE had the highest occurrence in the eleven periods compared with the other variables.

When inflation adjustments to the data were introduced, it was especially ROCE, and to a lesser extent the other profitability ratios, whose appearances increased even more. ROCE, together with two or three additional other profitability ratios explained a substantial part of the variance (as explained by r^2) in a company's EVA. This viewpoint is strongly supported by the literature study on EVA and even by other (economic) models of measuring shareholder value as discussed in Chapter 3 and Chapter 4 of this study.

The balance sheet variables did not provide as big an explanation of EVA as the profitability variables. When inflation adjustments to the data were introduced, their occurrences and relevance appeared to fade even more. The specific compositions of capital employed also did not feature in the regression analyses.

The investment rate (change in capital employed divided by net operating profit after tax) as well as sales divided by capital employed featured a minimum of five times each in the regression analyses.

Although capital employed played an important role in the theoretical and practical quantification of EVA, the results of this study show that capital employed cannot be constituted an important driver of EVA.

There are two other variables that are worth mentioning, namely the weighted average cost of capital (WACC) and the company cash tax rate. Although the appearance of WACC decreased when inflation adjustments were introduced, those of the tax rate increased, but disappointingly enough to only five times. Fact of the

matter is, however, that these two variables provided a constant, although relatively low, explanation of EVA. The theory places especially WACC in the centre of the EVA calculation. Both the company tax rate and WACC can make meaningful contributions in explaining EVA and neither can be ignored in the recommendations that will be made in the next chapter.

As mentioned previously, standardized EVA has a niche application, namely comparing different companies with each other over a period of time. Its use in this regression analyses was to find additional support for the findings and conclusions of "ordinary" EVA. Standardized EVA therefore, had a limited use for the purposes of this study.

Most of the findings, patterns and conclusions on variables, ratios and their grouping as discussed above, also applied to the regression analyses of standardized EVA. The company tax rate was the exception with only one occurrence in each of the two regression analyses.

In **Table 7.10** (overleaf) the regression coefficients of EVA as dependent variable and the other independent variables for the total 10 year period is presented. If one observes the ranking of the regression coefficients, it is clear that ROCE was the winner: in four out of four times it appeared with the highest ranking. There was no variable that ranks second consistently, but WACC ranked third in three out of the four times. The balance sheet ratios rank consistently at the lower end of the spectrum.

In the next chapter, ways in which management can apply value-based management is discussed. Variables that are included in the discussion are advanced as meaningful value drivers and are supported by the findings of all four regression analyses.

TABLE 7.10 REGRESSION COEFFICIENTS (r^2) OF THE FOLLOWING VARIABLES WITH EVA AND STANDARDIZED EVA (FOR THE TOTAL 10 YEAR PERIOD UNDER REVIEW)

	Unstandardized without inflation adjustments	Unstandardized with inflation adjustments	Standardized without inflation adjustments	Standardized with inflation adjustments
ROCE	0.089 (1)	0.139 (1)	0.142 (1)	0.121 (1)
NOPBT/CE		0.007 (6)	0.004 (7)	0.017 (3)
NOPBT/SALES	0.028 (2)			
NOPAT/SALES		0.068 (2)		
EBIT/SALES		0.003 (9)		
SALES GROWTH			0.009 (4)	0.004 (5)
RET PROTIT/CE	0.005 (5)	0.005 (7)		
SALES/CE	0.010 (4)	0.003 (9)	0.002 (9)	
SALES/NWC				
SALES/AVE TOT FIXED ASSETS	0.004 (7)	0.004 (8)		
WACC	0.021 (3)	0.021 (4)	0.015 (3)	0.025 (2)

TABLE 7.10 CONTINUED

	Unstandardized without inflation adjustments	Unstandardized with inflation adjustments	Standardized without inflation adjustments	Standardized with inflation adjustments
DEBT TO EQUITY RATIO			0.003 (8)	
TOT OWNERS INTEREST/CE			0.030 (2)	0.017 (3)
TOT LONG TERM CAP/CE	0.004 (8)		0.003 (8)	
TOT ST BORR + BANK OD/CE			0.007 (5)	
INVET RATE: CHA IN CE/NOPAT	0.004 (8)	0.015 (5)		
CO TAX RATE	0.004 (6)	0.055 (3)	0.005 (6)	0.006 (4)
OPRERAT LEV		0.004 (8)		
FIN LEVE			0.002 (9)	0.002 (6)
TOTAL	0.169	0.324	0.222	0.192

Number in bracket indicates ranking

7.4 CONCLUSION

In a study of this nature, the specific subject is discussed and analysed firstly by means of the relevant literature available. The literature or theoretical principles must be supported by an empirical investigation. It is now appropriate not only to finally compare the theory with the empirical findings, but also to pave the way for one of the most important parts in the whole process: recommendations concerning the implementation of the findings of the empirical results.

Theory predicted that there should be a high relationship between MVA and EVA. One can state that MVA is equal to the sum of all future discounted EVA. Although relatively low correlation coefficients were obtained (the reasons were discussed above), the highest correlation was found between MVA and discounted EVA **with** inflation adjustments to the data.

Other variables that also provided meaningful correlations were those that the theory predicted to be favourites of investors when share prices are set: return on equity (ROE), return on assets (ROA) and earnings per share (EPS). Although these variables are not the best measures of shareholder wealth, they, and a host of other (sometimes strange and not quantifiable) variables, are involved in determining a company's market value.

Once these important relationships between MVA and the specific variables as value drivers of EVA have been confirmed, it is time to analyse EVA as dependent variable within the framework of a stepwise regression analysis with a number of independent variables, and establish the value drivers it consists of.

There are a large number of variables that can determine a company's EVA. Unfortunately, this study was bound by the limitations of the information provided in the companies' annual financial statements. This limitation was imposed due to practical considerations. Some variables that could play a role in explaining a company's EVA should be found in the accountants' working papers used to

compile the financial statements. One is thinking here about ratios such as electricity use per period per machine, or administration costs per product or per division. This type of information does not appear in the published annual financial statements of a company. The results obtained from this study merely serve to point out to the management of a company the main variables or value drivers that have been identified to determine shareholder value. It is the task of management to analyse these main variables further and to apply it to specific operational activities.

As mentioned in Section 7.2.6 of this study, there can be another important reason for the relatively low correlation and regression coefficients obtained in this study. In a study which reveals some similarities to this study, Grant (1997:44) also undertook a regression analysis of EVA. However, his sample of companies consisted only of the top 50 wealth creators, as measured by their EVA. Another sample consisted of the 50 worst companies in terms of their EVA. In comparison, the sample used in this study did not discriminate against a company on the basis of its EVA (the selection criteria are dealt with in Chapter 6 of this study). If one uses a sample of companies with a dependent variable that is "homogenous" in the sense that it is positive, it is safe to assume that the results, in this case correlation and regression coefficients, will be higher than with a sample that contains a mixture of positive and negative EVA or MVA values.

It is against this background that the results of the stepwise regression procedures must be evaluated. Although the regression coefficients were not as high as one might expect, important relations and indications were observed. Profitability variables (income statement ratios), especially return on capital employed, played an important role in the explanation of a company's EVA. This relation increased when inflation adjustments to data were made. Although the balance sheet variables featured less, some of them provided meaningful contributions. A company's weighted average cost of capital (WACC) and its cash tax rate made relatively sizeable contributions in the determination of EVA. These findings were supported by the regression analyses of standardized EVA. The majority of these

findings could be substantiated from the theoretical principles as discussed in the earlier parts of this study.

The results of the empirical findings are used in the next chapter, where recommendations are formalized and applied to operational activities as well as to management decisions and actions in the quest for increasing and optimizing shareholder value.

CHAPTER 8

VALUE-BASED MANAGEMENT

8.1 INTRODUCTION

Chapters 2 to 5 of this study were devoted to a literature study of the issues under discussion, namely a comparison among the accounting-based and economic-based models of determining shareholder value, as well as identifying those variables that determine shareholder value. Chapter 6 spelt out the research methodology, whilst Chapter 7 dealt with the empirical results obtained from the statistical analyses.

It is now necessary to use the empirical results as a basis for recommendations which can be used by management to optimize decision-making.

Value-based management is an approach to management where the company's overall aspirations, analytical techniques, and management processes are all aligned to help the company to maximize its value by focusing management decision-making on the key drivers of value.

The results from the empirical study can now firstly be tested against the hypotheses set out in Chapter 6. Once this has been done, recommendations on how the variables determining shareholder value can be managed and applied to increase the value of a company for its shareholders can be made. Possible results from these actions by management also are discussed.

8.2 CONCLUSIONS FROM EMPIRICAL RESULTS

8.2.1 Hypotheses testing

The first set of hypotheses (as set out in Section 6.4 of this study) to be tested is that of the correlation between MVA and EVA.

The hypotheses containing **standardized** EVA or **standardized** MVA will not be tested, as it has been argued in Chapter 7 that these two variables are, due to their specific nature and niche application of comparing different companies with each other, not applicable to this study. This argument is supported by the results of this study.

If one turns to the other hypotheses, a low (negative) correlation was found between MVA and EVA without inflation adjustments to the data. Possible explanations based on the literature study were advanced. This hypothesis therefore tested positively.

The contrary was found with regard to the correlation between MVA and EVA **with** inflation adjustments to the data. Of all the independent variables tested, the second highest positive correlation was found to exist between MVA and EVA. This was supported by literature on the subject as discussed in this study. The fact that a positive correlation coefficient was obtained also means that this hypothesis tested positively.

The next hypotheses to be tested was that between MVA and **discounted** EVA. There was a low (negative) correlation between MVA and discounted EVA without inflation adjustments to data. This is in line with the low correlation coefficients obtained between MVA and ordinary EVA, and is also supported by literature on this subject. This hypothesis therefore also tested positively.

As was found in the correlation between MVA and ordinary EVA with inflation adjustments, a high correlation coefficient existed between MVA and discounted EVA when the data was adjusted for inflation. In fact, these correlation coefficients were the highest obtained in the analyses. This finding is also supported by the literature which states that MVA is equal to the discounted value of all future EVA. The hypothesis therefore tested positively.

The second set of hypotheses to be tested dealt with the variables that determine EVA, and comprised the stepwise regression analyses.

The variables that explained or contributed the most to EVA were, firstly, a number of profitability ratios (of which ROCE provided the highest explanation), and, secondly, the investment rate (change in capital employed divided by net operating profit after tax). The weighted average cost of capital (WACC) as well as the company tax rate also explained a significant portion of EVA. The balance sheet ratios or variables did not provide significant explanations of a company's EVA.

It can therefore be concluded that the hypothesis tested positive: it is especially the income statement variables that drive or explain EVA and not as much the balance sheet variables.

It must, however, be stressed again that any external analyst has to accept a number of limitations in attempting to do empirical analyses of this nature. The fact that only the published annual financial statements are available to allow one to calculate the necessary inputs for the statistical analyses, limits one, preventing one from analysing certain variables further. The management of a company can, as internal analysts, analyse further the main ratios or variables that they have been pointed to by the results of this study. By doing so, they can arrive at ratios that represent more specific operational activities, and which are not contained in the annual financial statements and therefore in this study.

8.2.2 Conclusions

Since the hypotheses as set out in Section 6.4 of this study have been tested, it is now appropriate to finally reflect on the results of the empirical analyses.

MVA is a method to quantify the value that has been added or subtracted from the total capital employed by a company's shareholders. It is an external performance measure which uses the share market as a basis. EVA is the internal performance

yardstick used to quantify the shareholder wealth that has been created or destroyed by the operating activities of the company and its management.

The literature study has indicated the close relationship between these two variables. Both MVA and EVA consist of a number of building blocks or variables which determine their value. A great deal of "number crunching" is necessary to calculate their values.

A correlation between these two variables can actually be expected to exist after all these theoretical explanations. The empirical analyses provided the proof. The correlation coefficient 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. The second highest correlation coefficient was obtained between MVA and normal EVA. Slightly lower positive correlations were also obtained between MVA and more traditional corporate performance measures such as return on assets (ROA), return on equity (ROE), earnings per share (EPS) and dividends per share (DPS).

From the above, one can conclude that a relatively high relationship exists between a company's (discounted) EVA and MVA. Other traditional measures cannot be disregarded, however, although they are accounting-based measures subject to the accountants' treatment of their calculated values. The fact that they are positively correlated with MVA is proof of the fact that shareholders and thus the market do regard them as indicators of value created by a company from its operating activities.

Once it has been determined that EVA is arguably the best indicator of the market value that has been created or destroyed by management, it is logical to analyse 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, then the profitability ratios,

(income statement ratios), namely return on capital employed (ROCE), net operating profit after tax divided by sales (the margin) and earnings before interest and tax divided by sales provided the best explanation. The investment rate (change in capital employed divided by net operating profit after tax), WACC and the company tax rate also provided significant contributions. No meaningful results were obtained from various balance sheet ratios.

The results obtained from the empirical results either support the theory or possible explanations for them could be provided. Using these results and interpretations as a basis, the final step in this study can be attempted: recommendations to management on managing and creating shareholder wealth in the most efficient way.

8.3 RECOMMENDATIONS

8.3.1 Introduction

The recommendations derived from the empirical results of this study are presented in a "value-based management framework". There are a number of ways in which one can express or explain the concept of value-based management. It is important to recognize that there are some basic principles that can be found in any system of value-based management.

Weston and Copeland (1992: 709) provided the following four sequential steps as part of a value-based management system:

(a) Diagnostic scan:

* this is done by top management;
* it involves a "quick and dirty" analyses; and
* it establishes key hypotheses.

(b) Restructuring:

* value the company and each business unit;
* establish strategic and operating improvements; and
* understand financial engineering opportunities.

(c) Value-based planning:

* build into the annual cycle;
* establish dialogue between all levels of employees;
* understand value drivers of total operating activities;
* separate factors under management control from external factors; and
* allocate capital based on value-creation potential.

(d) Value-based compensation:

* tie compensation to value created.

The objective of value-based planning is not merely to value business units, but to help managers understand how their actions affect the value of the company, and to focus continually, through the value drivers, on value-creating opportunities.

In Section 8.3.2 aspects regarding the variables which determine value, as well as incentives to encourage managers to use these variables, are discussed.

8.3.2 Recommendations based on the study

The relevance of the variables that determine shareholder value were discussed in Chapter 7 as well as in the earlier parts of Chapter 8. The recommendations based on the results from this study entail a discussion of what management can do to improve the identified value drivers.

All decisions taken in a company that affect these variables eventually affect the wealth of shareholders. Moreover, management should specifically set out on a

mission to re-assess these value drivers in order to make them more value-enhancing. Thereafter, strategies and actions to continually manage the value drivers should be second nature to management.

The variables that undoubtedly have the biggest impact on shareholder value are the various income statement or profitability ratios. Return on capital employed (ROCE) is the most important, and a number of other profitability ratios also contribute to a significant degree. In order to improve profitability margins in a company, it is recommended that the following actions be undertaken:

(a) Increase the gross profit margin by lowering the cost of sales through more efficient production, optimizing inputs and substituting inputs without affecting product quality.

(b) Reduce operating expenses by calculating and monitoring (reducing) ratios of the various operating costs to output (sales). As is indicated later, these ratios are not only industry-specific, but depend on the specific operating activities of the company.

(c) Achieve relevant economies of scale for each of the value activities.

(d) Introduce mechanisms to improve the rate of learning, for example standardization, product design modifications and improved scheduling.

(e) Find cost-reducing linkages with suppliers based on suppliers' product design, quality, packaging and order processing.

(f) Find cost-reducing opportunities within the product distribution channels.

(g) Eliminate overheads that do not add value to the product.

It must be stated that only variables that determine shareholder value as expressed at "company level" are dealt with here. This is especially applicable in the case of the profitability ratios. In order to be more effective, profitability ratios need to be broken right down to an "operating" or "grassroots level". At this level, cost inputs such as the optimal size of delivery truck, fuel consumption or machines and labour utilization can be utilized to improve profitability ratios.

However, the specific "grassroots" profitability ratios depend entirely on the type of operations that the specific company is engaged in. It falls beyond the scope of this study to go into detail in this regard. The study can simply point the manager in the direction of analysing and implementing those relevant ratios that contribute to the profitability ratio at company or shareholder level.

Another variable that makes a significant contribution towards shareholder value is the weighted average cost of capital (WACC). In order to increase shareholder wealth, WACC must be lowered and the following recommendations in this regard can be made:

(a) Target an optimal capital structure.

(b) Select least-cost debt and equity instruments.

(c) Reduce business risk factors in a manner consistent with overall company strategy.

At this stage, a few comments on decreasing WACC are in order.

A number of the various factors that determine a company's WACC are not under the control of management, but are in the hands of the monetary and fiscal policy-makers of the country. These are factors such as the general interest rate level and the tax rate. Management can, however, through negotiation and by making use of all relevant incentives that might exist, achieve lower interest and tax rates

which in turn have a positive effect on a company's WACC.

Recall that traditional accounting calculations of a company's net profit after interest and tax do not take the total charge for the use of capital, namely WACC, into consideration, but only the interest payable on debt. The cost of equity is usually the biggest portion of a company's WACC. Although this sub-variable is more difficult to influence (decrease) through management's actions, the mere fact that management is aware that WACC's use is not only to evaluate capital investment projects, but that WACC has a sizable influence on company shareholder wealth creation, goes a long way towards achieving value-based management. It has been demonstrated that WACC can, to some, extent be influenced in order to have a positive influence on the wealth that management can create for shareholders.

The company tax rate is another variable that has an influence on a company's EVA, and therefore on shareholder value. According to the results of this study in Chapter 7 it was found that the company tax rate is of significant importance (as represented by r^2) in explaining EVA.

Although the company tax rate is set by the fiscal authorities (in essence the government), there are a number of ways in which a prudent company can minimize its tax burden. This can entail complicated tax schemes and structures that include offshore companies in tax havens. Most listed companies have professional tax managers that can concentrate on this issue. It falls beyond the scope of this study to discuss this matter in detail. What is recommended, however, is that a company's management or the responsible employees must see to it that all available tax incentives and deductions are used to the fullest possible extent.

Although the balance sheet ratios or variables provided by far the least explanation of a company's EVA, efficient management of both working and fixed capital investment can contribute towards more overall efficiency in operations and

enhanced shareholder value.

The following actions are recommended for working capital investment:

(a) Minimize cash balances.

(b) Manage accounts receivable to reduce the average number of days debt outstanding.

(c) Minimize investment in inventory without impairing the required level of customer service. Increase inventory turnover.

(d) Make maximum use of non-interest-bearing current liabilities such as creditors and taxes. Obtain best terms with suppliers in this regard.

The following actions are recommended for fixed capital investment :

(a) Promote policies to increase utilization of fixed assets.

(b) Obtain productivity-increasing assets by means of prudent project or investment evaluation techniques, such as net present value.

(c) Sell unused or under-utilized fixed assets if possible.

(d) Obtain assets at the lowest possible cost, for example, lease versus purchase.

(e) Set levels of utilization or returns on assets employed.

Once again, the specific actions that a company can undertake to ensure better asset management depend on the industry the company is operating in, as well as on the company's specific operating activities.

8.4 CONCLUSION TO THE STUDY

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 EVA in particular, have distinct advantages in determining value created (or destroyed) by the management of a company.

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, was set out. The results of the empirical analyses were reported and compared with the theoretical principles. Recommendations on how the results that emerged can be used in practice were made.

Finally, some comments can be made on the variables which determine shareholder value (value drivers) and on possible pitfalls to avoid when using them in practice.

Although the key variables were identified by means of the statistical analyses above, the value drivers need to be broken down to grassroots level. These value drivers depend on each company's unique situation and identifying them can be a process that requires some trial and error. Operating margins can be split up according to product, geography or consumer segment. If a company is struggling to match the skills of its sales force against a given customer segment, better results might be obtained if such a ratio is measured on a geographic basis.

The key value drivers are not static. They must be reviewed periodically. In many cases, the company's reporting systems are not equipped to supply the necessary information, but a manager who has the necessary knowledge, abides by value maximization principles and above all, has the **incentive** to identify and manage those variables, can go a long way towards implementing the necessary information systems.

The value drivers can also not be considered in isolation. A price increase might have a large impact on value through an increased profit margin, but not if it results in a substantial loss of market share. A scenario analysis can be employed to understand the interfaces among value drivers. It falls beyond the scope of this study to pursue this matter further, however.

It must also be remembered that adopting a value-based mindset and finding the value drivers gets one only half way. Managers must establish processes that bring this value mindset to life in the daily activities and decision-making of the company. Value-based thinking must be embraced by line management as an improved way of making decisions. For value-based management to work, it must eventually involve all decision-makers throughout the company.

Four key management processes that collectively guide and govern value-based management in an organization, are the following:

* strategy development;

* target setting;

* budgets; and

* performance measurement with incentive systems as reward.

In most cases it is to the advantage of shareholders (with little agency cost involved) that management have an incentive scheme to induce them to adopt value-based management and actively manage those variables that determine shareholder value. Such an incentive scheme can be based on value created as measured by the EVA of a company over a period of time. Management can be remunerated (or penalised) on the basis of value created (or destroyed).

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