

CHAPTER 6

ANALYSIS OF RESULTS

6.1 INTRODUCTION

In this chapter the results of the study are presented and discussed in two sections, i.e. for the correlation analyses and for the sector trend analyses.

The three correlation analyses dealt with are for the following groups of companies for every year from 1994 to 1998:

- The total qualifying population of companies;
- the total population excluding wild points regarding environmental reporting percentages; and
- companies reporting on environmental matters during four to five years of the period of the study.

The following trend analyses are dealt with for every year from 1994 to 1998:

- Environmental responsibility per sector;
- average financial performance for environmentally responsible companies in comparison to average financial performance for companies without an environmental responsibility measure per sector; and
- data plots per sector.

Finally the results are summarised and the conclusion reached on the relationship between environmental responsibility and financial performance is discussed.

6.2 RESULTS OF CORRELATION ANALYSES

The results of the correlation analyses are presented in a tabular format. A table is presented for the correlation between the environmental reporting percentage (ERP) and each financial performance measure for every year from 1994 to 1998, showing the following:

- Correlation coefficient (r)
- Sample size (n)
- P-value (p)

The correlation coefficient (r) is interpreted as follows:

- When r equals 0 there is no correlation.
- The closer r is to +1, the better the positive correlation.
- The closer r is to -1, the better the negative correlation.

For the purposes of this study a positive correlation means that the higher the environmental reporting percentage of a company is, the higher is the financial performance measure. A negative correlation means that the higher the environmental reporting percentage of the company is, the lower is the financial performance measure.

The sample size (n) shows the number of observations; i.e. companies with the particular financial performance measure as well as an environmental reporting percentage.

The p-value gives an indication of how significant the correlation is. It measures the probability of identifying a correlation coefficient if the sample is from a population where there is no correlation. A p-value of 0,05 means that there is a five-percent probability that the correlation is not significant. Likewise a p-value of 0,10 indicates a ten-percent probability that the correlation is not significant. The p-value is strongly influenced by sample size. A larger sample size contributes

more to identifying significant correlation coefficients, should they exist, than a smaller sample size. In the correlation analyses that follow, a p-value of 10% or less is accepted as indicating a significant correlation between ERP and the relevant financial performance measure.

6.2.1 Total qualifying population

Correlation between ERP and ROE

<i>Year</i>	<i>n</i>	<i>r</i>	<i>p</i>
1994	42	0.20	0.175
1995	63	0.24	0.060
1996	61	0.28	0.029
1997	107	0.23	0.018
1998	162	0.02	0.836

Table 6-1

The correlation analysis for 1994 resulted in a small positive correlation coefficient of 0.20 between ERP and ROE. However, the correlation coefficient calculated is not significant as indicated by the p-value of 0.175. The smaller sample size in 1994 compared to the subsequent years could have influenced the p-value, as larger sample sizes contribute to identifying significant correlation coefficients should they exist.

The 1995, 1996 as well as the 1997 correlation analyses resulted in small positive correlation coefficients of 0.24, 0.28 and 0.23 respectively. As is clear from table 6-1, the p-values for each of these correlation coefficients are lower than 10%, which means that these correlation coefficients are significant. The positive correlations for these years indicate that the higher the ERP is for a company, the higher is the ROE for that company.

The correlation coefficient for 1998 is close to nil, but it is not significant as indicated by the high p-value of 0.836. ROE could not be provided by the BFA for

some of the companies for 1998 due to the reasons given in paragraph 5.5.3. The lack of correlation in 1998 could have been influenced by the exclusion of companies for which ROE ratios were not available, that usually have a positive correlation between ERP and a financial performance measure. (The sample size for the correlation analysis between ERP and ROE is 162, while the sample sizes for the correlation analyses between ERP and ROA and between ERP and ROC is 168 and 167 respectively. The correlation analyses between ERP and ROA and between ERP and ROC resulted in small positive correlation coefficients – refer to table 6-2 and table 6-3.)

Correlation between ERP and ROA

<i>Year</i>	<i>n</i>	<i>r</i>	<i>p</i>
1994	47	0.21	0.163
1995	63	0.29	0.020
1996	61	0.28	0.033
1997	109	0.20	0.036
1998	168	0.20	0.009

Table 6-2

The correlation analysis for 1994 resulted in a small positive correlation coefficient of 0.21 between ERP and ROA. However, the correlation coefficient calculated is not significant as indicated by the p-value of 0.163. The smaller sample size in 1994 compared to the subsequent years could have influenced the p-value, as larger sample sizes contribute to identifying significant correlation coefficients should they exist.

The 1995, 1996, 1997 as well as the 1998 correlation analyses resulted in small positive correlation coefficients of 0.29, 0.28, 0.20 and 0.20 respectively. As is clear from table 6-2 the p-values for 1995 to 1998 are all lower than 5%, which means that the correlation coefficients are significant. The positive correlations for these years indicate that the higher the ERP is for a company, the higher is the ROA for that company.

Correlation between ERP and ROC

<i>Year</i>	<i>n</i>	<i>r</i>	<i>p</i>
1994	47	0.22	0.136
1995	63	0.25	0.050
1996	61	0.28	0.028
1997	108	0.18	0.062
1998	167	0.17	0.024

Table 6-3

The correlation analysis for 1994 resulted in a small positive correlation of 0.22 between ERP and ROC. However, the correlation coefficient calculated is not significant as indicated by the p-value of 0.136. The smaller sample size in 1994 compared to the subsequent years could have influenced the p-value, as larger sample sizes contribute to identifying significant correlation coefficients should they exist.

The 1995, 1996, 1997 as well as the 1998 correlation analyses resulted in small positive correlation coefficients of 0.25, 0.28, 0.18 and 0.17 respectively. As is clear from table 6-3, the p-values for each of these correlation coefficients are lower than 10%, which means that these correlation coefficients are significant. The positive correlations for these years indicate that the higher the ERP is for a company, the higher is the ROC for that company.

Correlation between ERP and EVA

<i>Year</i>	<i>n</i>	<i>r</i>	<i>p</i>
1994	32	-0.43	0.014
1995	44	-0.48	0.001
1996	45	-0.36	0.015
1997	72	-0.34	0.003
1998	116	-0.13	0.170

Table 6-4

The correlation analyses between ERP and EVA for 1994, 1995, 1996 and 1997 resulted in negative correlation coefficients of -0.43, -0.48, -0.36 and -0.34 respectively. The relatively strong negative correlation during 1994 and 1995 has weakened in the 1996 and 1997 years. As is clear from table 6-4 the p-values for 1994 to 1997 are all lower than 2%, which means that the correlation coefficients are significant. The negative correlations for these years indicate that the higher the ERP is for a company, the lower is the EVA for that company.

The correlation analysis for 1998 resulted in a very weak negative correlation coefficient of -0.13. However, this correlation coefficient is not significant as indicated by the p-value of 0.17

6.2.2 Total population excluding wild points

Correlation between ERP and ROE

<i>Year</i>	<i>n</i>	<i>r</i>	<i>P</i>
1994	32	0.19	0.298
1995	46	0.24	0.103
1996	53	0.27	0.050
1997	98	0.24	0.019
1998	100	0.05	0.624

Table 6-5

The correlation analysis for 1994 resulted in a small positive correlation coefficient of 0.19 between ERP and ROE. However, the correlation coefficient calculated is not significant as indicated by the p-value of 0.298. The smaller sample size in 1994 compared to the subsequent years could have influenced the p-value, as larger sample sizes contribute to identifying significant correlation coefficients should they exist.

The 1995, 1996 as well as the 1997 correlation analyses resulted in small positive correlation coefficients of 0.24, 0.27 and 0.24 respectively. As is clear from table

6-5, the p-values for each of these correlation coefficients are 10% or lower, which means that these correlation coefficients are significant. The positive correlations for these years indicate that the higher the ERP is for a company, the higher is the ROE for that company. The correlation coefficient for 1998 is close to nil, but it is not significant as indicated by the high p-value of 0.624.

Correlation between ERP and ROA

<i>Year</i>	<i>n</i>	<i>r</i>	<i>p</i>
1994	32	0.18	0.313
1995	46	0.30	0.045
1996	53	0.26	0.063
1997	100	0.21	0.037
1998	103	0.34	0.001

Table 6-6

The correlation analysis for 1994 resulted in a small positive correlation coefficient of 0.18 between ERP and ROA. However, the correlation coefficient calculated is not significant as indicated by the p-value of 0.313. The smaller sample size in 1994 compared to the subsequent years could have influenced the p-value, as larger sample sizes contribute to identifying significant correlation coefficients should they exist.

The 1995, 1996, 1997 as well as the 1998 correlation analyses resulted in small positive correlation coefficients of 0.30, 0.26, 0.21 and 0.34 respectively. As is clear from table 6-6 the p-values for 1995 to 1998 are all lower than 10%, which means that the correlation coefficients are significant. The positive correlations for these years indicate that the higher the ERP is for a company, the higher is the ROA for that company.

Correlation between ERP and ROC

<i>Year</i>	<i>n</i>	<i>r</i>	<i>p</i>
1994	32	0.19	0.292
1995	46	0.26	0.077
1996	53	0.27	0.054
1997	99	0.18	0.071
1998	103	0.21	0.037

Table 6-7

The 1994 correlation analysis resulted in a small positive correlation coefficient of 0.19 between ERP and ROC. However, the correlation coefficient calculated is not significant as indicated by the p-value of 0.292. The smaller sample size in 1994 compared to the subsequent years could have influenced the p-value, as larger sample sizes contribute to identifying significant correlation coefficients should they exist.

The 1995, 1996, 1997 as well as the 1998 correlation analyses resulted in small positive correlation coefficients of 0.26, 0.27, 0.18 and 0.21 respectively. As is clear from table 6-7 the p-values for 1995 to 1998 are all lower than 10%, which means that the correlation coefficients are significant. The positive correlations for these years indicate that the higher the ERP is for a company, the higher is the ROC for that company.

Correlation between ERP and EVA

<i>Year</i>	<i>n</i>	<i>r</i>	<i>p</i>
1994	22	-0.46	0.031
1995	31	-0.48	0.007
1996	37	-0.37	0.019
1997	68	-0.36	0.002
1998	71	-0.08	0.482

Table 6-8

The correlation analyses between ERP and EVA percentage for 1994, 1995, 1996 and 1997 resulted in negative correlation coefficients of -0.46, -0.48, -0.37 and -0.36 respectively. The relatively strong negative correlation during 1994 and 1995 has weakened in the 1996 and 1997 years. As is clear from table 6-8 the p-values for 1994 to 1997 are all lower than 5%, which mean that the correlation coefficients are significant. The negative correlations for these years indicate that the higher the ERP is for a company, the lower is the EVA for that company.

The correlation analysis for 1998 resulted in a very weak negative correlation coefficient of -0.08. However, this correlation coefficient bears is not significant as indicated by the p-value of 0.482.

6.2.3 Companies reporting on environmental matters for four to five years

Correlation between ERP and ROE

<i>Year</i>	<i>n</i>	<i>r</i>	<i>p</i>
1994	30	0.19	0.325
1995	40	0.24	0.132
1996	42	0.28	0.075
1997	44	0.25	0.103
1998	41	0.25	0.122

Table 6-9

The correlation analysis for 1994 resulted in a small positive correlation coefficient of 0.19 between ERP and ROE. However, the correlation coefficient calculated is not significant as indicated by the p-value of 0.325. The smaller sample size in 1994 compared to the subsequent years could have influenced the p-value, as larger sample sizes contribute to identifying significant correlation coefficients should they exist.

The 1995, 1996 as well as the 1997 correlation analyses resulted in small positive correlation coefficients of 0.24, 0.28 and 0.25 respectively. The p-value of 0.132

for 1995 indicates that the correlation is not significant. As is clear from table 6-9, the p-values for 1996 and 1997 are 10% or lower, which means that the correlation coefficients are significant. The positive correlations for these years indicate that the higher the ERP is for a company, the higher is the ROE for that company.

The correlation analyses for 1998 for the total population (refer to 6.2.1) and for the total population excluding wild points (refer to 6.2.2) resulted in correlation coefficients close to nil with respective p-values of 0.836 and 0.624. The correlation coefficient for 1998 for companies reporting on environmental matters for four to five years is also not significant as indicated by the p-value of 0.122. However, it is interesting to note that with the much lower p-value, the result was a small positive correlation coefficient of 0.25. This result is in the same range than that of the other years.

Correlation between ERP and ROA

<i>Year</i>	<i>n</i>	<i>r</i>	<i>p</i>
1994	30	0.19	0.302
1995	40	0.29	0.067
1996	42	0.27	0.087
1997	44	0.20	0.199
1998	44	0.44	0.003

Table 6-10

The correlation analysis for 1994 resulted in a small positive correlation coefficient of 0.19 between ERP and ROA. However, the correlation coefficient calculated is not significant as indicated by the p-value of 0.302. The smaller sample size in 1994 compared to the subsequent years could have influenced the p-value, as larger sample sizes contribute to identifying significant correlation coefficients should they exist.

The 1995, 1996, 1997 as well as the 1998 correlation analyses resulted in small positive correlation coefficients of 0.29, 0.27, 0.20 and 0.44 respectively. As is clear from table 6-10, the p-values for the 1995, 1996 and 1998 correlation coefficients are all lower than 10%, which means that these correlations are significant. The positive correlations for these years indicate that the higher the ERP is for a company, the higher is the ROA for that company. The p-value for 1997 is 0.199, which indicates that the 1997 correlation coefficient is not significant.

Correlation between ERP and ROC

<i>Year</i>	<i>n</i>	<i>r</i>	<i>p</i>
1994	30	0.19	0.311
1995	40	0.27	0.096
1996	42	0.28	0.075
1997	44	0.20	0.185
1998	44	0.36	0.017

Table 6-11

The correlation analysis for 1994 resulted in a small positive correlation coefficient of 0.19 between ERP and ROC. However, the correlation coefficient calculated is not significant as indicated by the p-value of 0.311. The smaller sample size in 1994 compared to the subsequent years could have influenced the p-value, as larger sample sizes contribute to identifying significant correlation coefficients should they exist.

The 1995, 1996, 1997 as well as the 1998 correlation analyses resulted in small positive correlation coefficients of 0.27, 0.28, 0.20 and 0.36 respectively. As is clear from table 6-11, the p-values for 1995, 1996, and 1998 are lower than 10%, which means that the correlation coefficients are significant. The positive correlations for these years indicate that the higher the ERP is for a company, the higher is the ROC for that company. The p-value for 1997 is 0.185, which indicates that the 1997 correlation is not significant.

Correlation between ERP and EVA

<i>Year</i>	<i>n</i>	<i>r</i>	<i>p</i>
1994	21	-0.52	0.017
1995	27	-0.45	0.019
1996	30	-0.37	0.042
1997	31	-0.35	0.051
1998	31	-0.04	0.819

Table 6-12

The correlation analyses between ERP and EVA for 1994, 1995, 1996 and 1997 resulted in negative correlation coefficients of -0.52, -0.45, -0.37 and -0.35 respectively. The relatively strong negative correlation during 1994 and 1995 has weakened in the 1996 and 1997 years. As is clear from table 6-12 the p-values for 1994 to 1997 are 5% or lower, which mean that the correlation coefficients are significant. The negative correlations for these years indicate that the higher the ERP is for a company, the lower is the EVA for that company.

The correlation analysis for 1998 resulted in a very weak negative correlation coefficient of -0.04. However, this correlation coefficient is not significant as indicated by the p-value of 0.819.

6.2.4 Summary and comparison of correlation analyses

6.2.4.1 Correlation between ERP and ROE

Table 6-13 summarises the results of the correlation analyses performed between ERP and ROE for the three groups of companies:

Comparing ERP and ROE for three groups

<i>Year</i>	<i>Total population</i>		<i>Excluding wild points</i>		<i>4 – 5 years green</i>	
	<i>r acceptable</i>	<i>r</i>	<i>r acceptable</i>	<i>r</i>	<i>r acceptable</i>	<i>r</i>
1998	No	0.02	No	0.05	No	0.25
1997	Yes	0.23	Yes	0.24	Yes	0.25
1996	Yes	0.28	Yes	0.27	Yes	0.28
1995	Yes	0.24	Yes	0.24	No	0.24
1994	No	0.20	No	0.19	No	0.19

Table 6-13

When comparing the correlation coefficients obtained between ERP and ROE for the total population for each of the years under review and that obtained for the total population excluding wild points (refer to table 6-13), the results are almost similar. The correlation analyses for both sets of data resulted in small positive correlation coefficients (with a range of 0.23 to 0.28) every year from 1995 to 1997. These correlation coefficients are significant, as is evident from the low p-values (10% or less) and they indicate that the higher the ERP is for a company, the higher is the ROE for that company.

The correlation analyses for 1994 for the total population and for the total population excluding wild points resulted in small positive correlation coefficients of 0.20 and 0.19 respectively, but the p-values indicate that these correlation coefficients are not significant. . The smaller sample size in 1994 compared to the subsequent years could have influenced the p-value, as larger sample sizes contribute to identifying significant correlation coefficients should they exist. The p-values for the total population were better than that of the total population excluding wild points, probably due to the larger sample sizes.

The correlation analyses for 1998 for the total population and for the total population excluding wild points resulted in correlation coefficients close to nil. The respective p-values of 0.83 and 0.62 indicated that the correlation coefficients

are not significant. ROE could not be provided by the BFA for some of the companies for 1998 due to the reasons given in paragraph 5.5.3. The lack of correlation in 1998 could have been influenced by the exclusion of companies for which ROE ratios were not available, that usually have a positive correlation between ERP and a financial performance measure.

The correlation analyses between ROE and the environmental reporting percentage for companies reporting on environmental matters for four to five years, yielded similar results; i.e. a small positive correlation every year from 1994 to 1998 with a range of 0.19 to 0.28. The consequence of working with a smaller sample size resulted in higher p-values. Only the correlation coefficients for 1996 and 1997 have p-values of 10% or less, which indicate that the correlation coefficients are significant. This means that the higher the ERP is for a company, the higher is the ROE for that company.

6.2.4.2 Correlation between ERP and ROA

Table 6-14 summarises the results of the correlation analyses performed between ERP and ROA for the three groups of companies:

Comparing ERP and ROA for three groups

Year	Total population		Excluding wild points		4 – 5 years green	
	<i>r acceptable</i>	<i>r</i>	<i>r acceptable</i>	<i>r</i>	<i>r acceptable</i>	<i>r</i>
1998	Yes	0.20	Yes	0.34	Yes	0.44
1997	Yes	0.20	Yes	0.21	No	0.20
1996	Yes	0.28	Yes	0.26	Yes	0.27
1995	Yes	0.29	Yes	0.30	Yes	0.29
1994	No	0.21	No	0.18	No	0.19

Table 6-14

When comparing the results of the correlation analyses performed between ERP and ROA for the three groups of companies for 1995, 1996 and 1997 it is clear

that a small positive correlation (with a range of 0.20 to 0.30) exists (refer to table 6-14). These correlation coefficients are significant as indicated by the p-values of 10% or less, except for the correlation coefficient of the four to five year green group in 1997. This correlation coefficient has a p-value of 0.199. The meaning of the significant correlation coefficients are that the higher the ERP of a company is, the higher is the ROA of that company.

Although the 1994 correlation coefficients are close to the range mentioned above, their p-values indicate that they are not significant. This is probably due to the smaller sample size in 1994 as discussed under 6.2.4.1 above.

The 1998 correlation coefficient for the total population excluding wild points was much higher than that of the total population (0.34 compared to 0.20). The correlation coefficient for the four to five year green group was even higher at 0.44. For 1998 all the correlation coefficients are significant, as is evident from the low p-values (1% and less). This means that the higher the ERP of a company is, the higher is the ROA of that company.

The reason for the improvement in the correlation coefficient where smaller groups that are more environmentally responsible are analysed can be found in the much bigger sample sizes (n) in 1998 than in the previous years. In 1998 n was 168 for the total population, 103 for the total population excluding wild points, and 44 for the four to five year green group. In 1997 n was only 109 for the total population, 100 for the total population excluding wild points, and 44 for the four to five year green group.

6.2.4.3 Correlation between ERP and ROC

Table 6-15 summarises the results of the correlation analyses performed between ERP and ROC for the three groups of companies:

Comparing ERP and ROC for three groups

<i>Year</i>	<i>Total population</i>		<i>Excluding wild points</i>		<i>4 – 5 years green</i>	
	<i>r acceptable</i>	<i>r</i>	<i>r acceptable</i>	<i>r</i>	<i>r acceptable</i>	<i>r</i>
1998	Yes	0.17	Yes	0.21	Yes	0.36
1997	Yes	0.18	Yes	0.18	No	0.20
1996	Yes	0.28	Yes	0.27	Yes	0.28
1995	Yes	0.25	Yes	0.26	Yes	0.27
1994	No	0.22	No	0.19	No	0.19

Table 6-15

When comparing the results of the correlation analyses performed between ERP and ROC for the three groups of companies for 1995, 1996 and 1997 it is clear that a small positive correlation (with a range of 0.18 to 0.28) exists. These correlation coefficients are all significant as indicated by p-values of 10% or less, except for the correlation of the four to five year green group in 1997. This correlation has a p-value of 0.185. The meaning of the significant correlation coefficients are that the higher the ERP of a company is, the higher is the ROC of that company.

Although the 1994 correlation coefficients falls in the range mentioned above, their p-values indicate that they are not significant. This is probably due to the smaller sample size in 1994 as discussed under 6.2.4.1 above.

The 1998 correlation coefficient for the total population excluding wild points was higher than that of the total population (0.21 compared to 0.17). The correlation coefficient for the four to five year green group was even higher at 0.36. All the 1998 correlation coefficients are significant as is evident from the low p-values (less than 4%). The significant correlation coefficients mean that the higher the ERP of a company is, the higher is the ROC of that company.

The reason for the improvement in the correlation coefficient where smaller groups that are more environmentally responsible are used can be found in the much bigger sample sizes (n) in 1998 than in the previous years. The reduction in sample sizes for ROC was similar to that for ROA as described under 6.2.4.2 above.

6.2.4.4 Correlation between ERP and EVA

Table 6-16 summarises the results of the correlation analyses performed between ERP and EVA for the three groups of companies:

Comparing ERP and EVA for three groups

Year	<i>Total population</i>		<i>Excluding wild points</i>		<i>4 – 5 years green</i>	
	<i>r acceptable</i>	<i>r</i>	<i>r acceptable</i>	<i>r</i>	<i>r acceptable</i>	<i>r</i>
1998	No	-0.13	No	-0.08	No	-0.04
1997	Yes	-0.34	Yes	-0.36	Yes	-0.35
1996	Yes	-0.36	Yes	-0.37	Yes	-0.37
1995	Yes	-0.48	Yes	-0.48	Yes	-0.45
1994	Yes	-0.43	Yes	-0.46	Yes	-0.52

Table 6-16

When the three groups are compared the results per annum are very similar. There is a relatively strong negative correlation in 1994 and in 1995 (highest correlation coefficient -0.52). The negative correlation weakens from -0.48 in 1995 to -0.37 in 1996 and to -0.36 in 1997 (if the highest correlation coefficient is compared). A negative correlation means that the higher the ERP is for a company, the lower is the EVA for that company.

The correlation coefficients for 1998 are very close to nil, but the p-values for these coefficients indicate that they are not significant. As the other years have significant negative correlation coefficients with low p-values, the 1998 results were reconsidered with the assistance of the Department of Statistics. The

increase in the sample size in 1998 ($n = 116$ in 1998, $n = 72$ in 1997), due to more companies with environmental reporting percentages in 1998, brought about that the distribution of the data in 1998 is much closer together than in the other years. This supports the results of the correlation analyses for 1998; i.e. if the distribution of the data is considered there does not seem to be a correlation between EVA and the environmental reporting percentages. This is illustrated in figures 6.1 to 6.5 below:

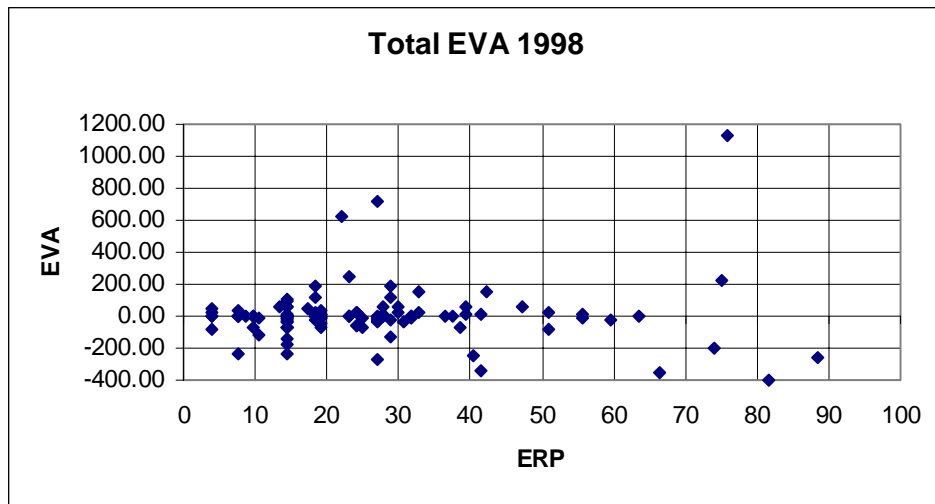


Figure 6.1

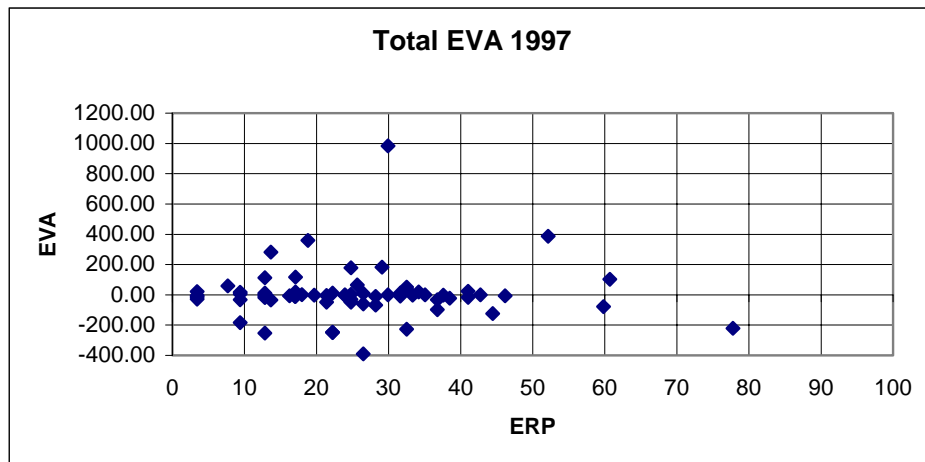


Figure 6.2

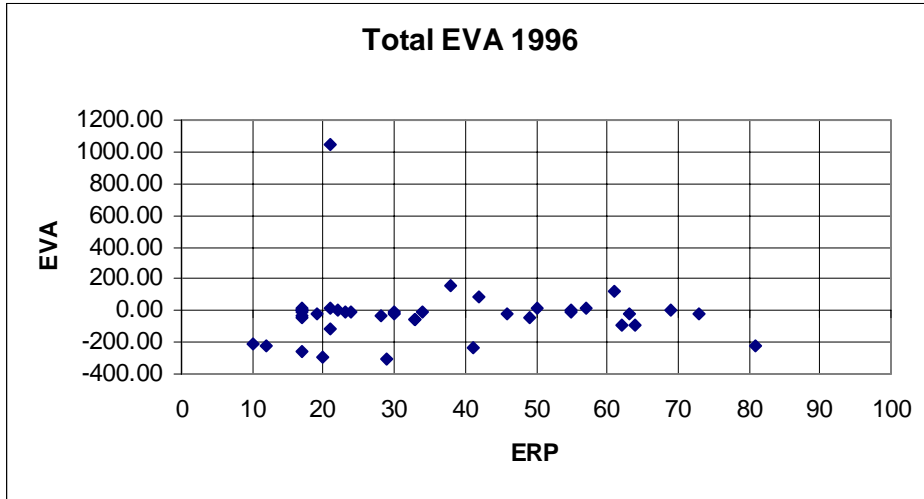


Figure 6.3

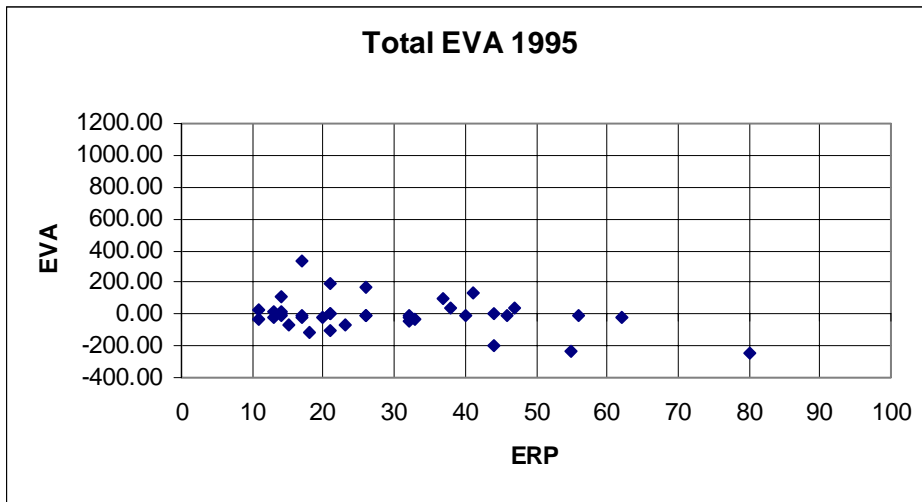


Figure 6.4

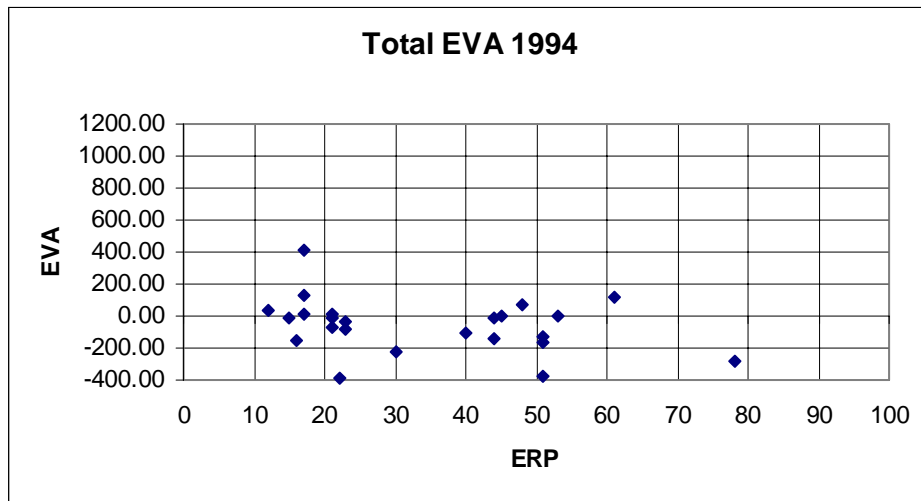


Figure 6.5

6.2.5 Discussion of results of correlation analyses

The correlation analyses for 1994 between ROE, ROA and ROC respectively and the environmental reporting percentage all resulted in small positive correlation coefficients. The range of these correlation coefficients is 0.18 to 0.22 and is very close to the range for 1995, 1996 and 1997. The smaller sample size in 1994 compared to the subsequent years could have influenced the p-value, as larger sample sizes contribute to identifying significant correlation coefficients should they exist. However, the p-values indicate that the correlation coefficients are not significant. Therefore the correlation analyses for 1994 do not contribute any evidence that a relationship exists between ERP and ROE, ROA and ROC respectively.

The correlation analyses for 1995, 1996 and 1997 between ROE, ROA and ROC respectively and the environmental reporting percentage all resulted in small positive correlation coefficients for the total population and the total population excluding wild points. The ranges of these correlation coefficients are as follows:

- 1995 – 0.24 to 0.30
- 1996 – 0.26 to 0.28
- 1997 – 0.18 to 0.25.

These correlation coefficients are significant as indicated by the p-values of 10% and less. This means that there is evidence for 1995 to 1997 that the higher the ERP of a company is, the higher is the financial performance measure (ROE, ROA and ROC) of that company.

The correlation analyses for 1995, 1996 and 1997 between ERP and ROE, ROA and ROC respectively for the four to five year green group also resulted in small positive correlation coefficients, falling into the same ranges as indicated above. However, the p-values exceeded 10% for the correlation analysis between ERP and ROE for 1995, as well as for the correlation analysis between ERP and ROA and between ERP and ROC respectively for 1997. These correlation coefficients

with p-values exceeding 10% are not significant which means that they do not contribute any evidence that a relationship exists between ERP and ROE, ROA and ROC respectively. The four to five year green group has smaller sample sizes than the total population and the total population excluding wild points. The influence thereof could be that significant correlation coefficients are not detected, as larger sample sizes contribute to identifying significant correlations should they exist.

The correlation analyses for 1998 between ERP and ROE for the total population and the total population excluding wild points resulted in correlation coefficients close to nil with high p-values indicating that they are not significant. The correlation analysis for the four to five year green group resulted in a small positive correlation coefficient with a p-value of 12%. Although this p-value is much lower it still exceeds 10% which means the correlation coefficient is not significant. Therefore the correlation analyses for 1998 between ERP and ROE do not contribute any evidence that a relationship exists between ERP and ROE.

The correlation analyses for 1998 between ERP and ROA and between ERP and ROC produced evidence of the benefit of working with smaller groups that are more environmentally responsible or "green":

- The correlation analysis between ERP and ROA for the total population resulted in a small positive correlation coefficient of 0.20. The correlation analysis for the total population excluding wild points resulted in an improved positive correlation coefficient of 0.34. The correlation analysis for the four to five year green group resulted in an even stronger positive correlation of 0.44. These correlation coefficients are significant as is evident from the low p-values of 1% and less, which means that the higher the ERP of a company is, the higher is the ROA of that company.
- The correlation analysis between ERP and ROC for the total population resulted in a small positive correlation coefficient of 0.17. The correlation analysis for the total population excluding wild points resulted in an improved positive correlation coefficient of 0.21. The correlation analysis

for the four to five year green group resulted in an even stronger positive correlation of 0.36. These correlation coefficients are significant as is evident from the low p-values of 4% and less, which means that the higher the ERP of a company is, the higher is the ROC of that company.

The correlation analyses between ERP and EVA for 1994 to 1997 resulted in small negative correlation coefficients. These coefficients are all significant as is evident from the low p-values, ranging from close to nil to a maximum of five percent. This means that the higher ERP is for a company, the lower is EVA for that company. It is noticeable that smaller sample sizes also contributed to increased p-values as in the other correlation analyses, but due to the very low p-values it did not result in the disregard of these results.

The negative correlation coefficients weakened from 1995 to 1996 and again in 1997. This means that the negative correlation between financial performance and environmental responsibility started to reverse.

The correlation analysis between ERP and EVA for 1998 does not contribute any evidence that a relationship exists between ERP and EVA as the high p-values indicate that the correlation coefficients are not significant. The increase in companies with environmental reporting percentages in 1998 resulted in a much closer distribution of data compared to the previous years. If the distribution of the data is considered there does not seem to be a correlation between EVA and the environmental reporting percentages (refer to 6.2.4 above).

The results of the correlation analyses between ERP and EVA does not contradict the results of the correlation analyses between ERP and ROE, ROA and ROC respectively if it is taken into account that EVA was only calculated for industrial companies. This means that the mining companies that have high environmental reporting percentages as well as high profit were excluded from the EVA correlation analyses. It is possible that negative correlation coefficients resulted due to the reduction of the profit for the purposes of calculating EVA by an inflation adjustment as well as by the incorporation of risk.

6.2.6 Summary and conclusion for correlation analyses

The results of the correlation analyses between ERP and ROE, ROA and ROC respectively for 1995 to 1997 indicate that a small positive correlation exists between environmental responsibility and financial performance. The correlation coefficients are in a range of 0.18 to 0.30. These correlation coefficients are significant as is evident from the p-values of 10% or less. This means that the higher the ERP is for a company, the higher is the financial performance measure (ROE, ROA and ROC respectively).

The results of the correlation analyses between ERP and ROA and between ERP and ROC for 1998 also indicate that a small positive correlation exists between environmental responsibility and financial performance. Furthermore, these correlation analyses produced evidence of the benefit of working with smaller groups that are more environmentally responsible or “green” as higher positive correlation coefficients resulted for these groups. The highest correlation coefficient of 0.44 was significant as indicated by an extremely low p-value of close to nil. This means that the higher the ERP is for a company, the higher is the ROA and ROC.

The results as discussed above indicate that the financial performance of a company is higher where the environmental responsibility is higher. However, the positive correlation coefficients are small. This means that the evidence supporting the statement of higher financial performance where environmental responsibility is higher is not very strong.

The correlation analyses between ERP and EVA for 1994 to 1997 resulted in small negative correlation coefficients ranging from -0.52 to -0.34. These coefficients are all significant as is evident from the low p-values, ranging from close to nil to a maximum of five percent. This means that the higher the ERP is for a company the lower is the EVA of that company. The negative correlation coefficients weakened from 1995 to 1996 and again in 1997. The correlation coefficients for 1998 (that are very close to nil) are not significant as is evident from the high p-

values. This means that there is no evidence for 1998 that EVA is higher or lower where ERP is higher or lower. The distribution of the data also indicated that no correlation exists. Therefore it is concluded that the negative correlation between environmental responsibility and financial performance reduced every year from 1995 to 1997 to eventually no correlation in 1998.

The results of the correlation analyses between ERP and ROE, ROA and ROC respectively indicate that a small positive correlation exists between environmental responsibility and financial performance (the higher the environmental responsibility, the higher the financial performance). The results of the correlation analyses between ERP and EVA indicate that a small negative correlation exists between environmental responsibility and financial performance (the higher the environmental responsibility, the lower the financial performance). These apparent contradictory findings are explained by the fact that the EVA analyses were only performed for *industrial* companies, whereas the ROE, ROA and ROC analyses included all the companies as indicated in section 5.3. This emphasises the necessity to examine the individual sectors for trends relating to environmental responsibility and financial performance.

These results are in line with previous research results (discussed in section 2.5). Allen (1994) found that adopting an environmentally responsible strategy significantly enhanced corporate financial performance for all firms except those serving *industrial* customers. Firms supplying industrial customers seemed to be benefiting financially from a strategy of environmental indifference or irresponsibility. Hart & Ahuja (1994), Klassen & McLaughlin (1995) and the IRRC (1995) also found a positive correlation between increased environmental performance and improved financial performance.

6.3 RESULTS OF SECTOR TREND ANALYSES

6.3.1 Environmental responsibility per sector

An average environmental reporting percentage (ERP) per company was calculated as discussed in section 5.6.4.1. (Refer to appendix 5 for the average ERP per company per sector.) The highest and the lowest average ERP, together with the number of companies in the sector, the number of companies with ERP, as well as the number of companies with four to five years of green reporting were used to assess the environmental responsibility per sector.

Table 6-17 summarizes the position relating to environmental responsibility per sector:

Environmental responsibility per sector

<i>Sector no</i>	<i>Sector description</i>	<i>Number of companies</i>	<i>Number with ERP</i>	<i>Highest average ERP</i>	<i>Lowest average ERP</i>	<i>Number in 4 – 5 year group</i>
2	Coal	3	2	76	60	1
6	Diamonds	6	4	56	19	1
14	Gold	15	15	80	34	6
24	Platinum	5	5	82	40	3
28	Metals & minerals	11	8	75	31	2
32	Mining holding & houses	19	14	69	26	5
35	Mining exploration	7	3	29	14	-
39	Private equity funds	7	1	19	19	-
40	Banks	14	2	21	14	-
41	Financial services	19	-			-
42	Life assurance	10	-			-
43	Short-term insurance	6	1	20	20	-

Table 6-17

<i>Sector no</i>	<i>Sector description</i>	<i>Number of companies</i>	<i>Number with ERP</i>	<i>Highest average ERP</i>	<i>Lowest average ERP</i>	<i>Number in 4 – 5 year group</i>
44	Investment trusts	17	1	30	30	-
45	Redevelopment	4	-			-
46	Property	14	2	57	26	1
48	Property unit trusts	11	1	14	14	-
49	Property loan stock	13	3	43	13	-
50	Diversified industrial	15	7	47	12	3
51	Service	9	3	56	13	-
52	Beverages	8	4	36	27	1
53	Hotels & leisure	21	4	22	14	1
54	Building, construction & engineering	29	16	53	14	4
56	Chemicals, oils & plastics	11	6	81	15	4
58	Clothing & textile	16	9	45	14	-
59	Development stage	6	-			-
60	Electronics & electrical	20	6	35	14	-
61	Information technology	25	2	30	21	2
63	Telecommunications	5	2	17	10	-
66	Food	27	17	46	14	5
67	Education & staffing	5	1	24	24	-
68	Furniture & appliances	8	1	41	41	-
69	Media	14	1	11	11	-
71	Packaging & printing	13	6	40	15	2

Table 6-17 (continued)

<i>Sector no</i>	<i>Sector description</i>	<i>Number of companies</i>	<i>Number with ERP</i>	<i>Highest average ERP</i>	<i>Lowest average ERP</i>	<i>Number in 4 – 5 year group</i>
73	Paper	1	1	66	66	1
74	Healthcare	14	3	23	9	1
78	Steel	2	2	74	66	2
80	Retail	60	5	29	12	2
86	Transport	28	10	33	10	3
87	Cash companies	4	-			-
88	Development capital	6	1	28	28	-
89	Venture capital	11	2	26	10	-

Table 6-17 (continued)

6.3.1.1 Sectors with no environmental responsibility percentages

The sectors with no environmental reporting percentages are:

<i>Sector no</i>	<i>Sector description</i>
41	Financial services
42	Life assurance
45	Redevelopment
59	Development stage
87	Cash companies

The reason why these sectors have no environmental reporting is probably due to non-existent stakeholder pressure. Sectors 41 and 42 do not have a direct relation to environmental matters and will not be that much affected by stakeholder pressure. The companies in sectors 45 and 59 are relatively new companies that are giving their attention to building their companies and probably do not regard environmental reporting as that important for their immediate goals.

6.3.1.2 Sectors with little evidence of environmental responsibility

The sectors with little evidence of environmental responsibility are:

<i>Sector no</i>	<i>Sector description</i>
39	Private equity funds
40	Banks
43	Short-term insurance
44	Investment trusts
48	Property unit trusts
49	Property loan stock
53	Hotels & leisure
61	Information technology
63	Telecommunications
67	Education & staffing
68	Furniture & appliances
69	Media
74	Healthcare
80	Retail
88	Development capital
89	Venture capital

Most of the sectors mentioned above only have one or two companies in the sector with an ERP. The average ERP's are also quite low. Sectors 39, 40 and 43 performed very similar. The highest average ERP's were 19%, 21% and 20% respectively. Only 14,3% to 16,7% of the companies in these sectors have an average ERP. These sectors do not have an apparent direct relation to environmental matters and are at present not much affected by stakeholder pressure. However, refer to section 2.3.7 on how easily especially banks and insurers can be affected by environmental claims.

Only one company, representing 5,9% of sector 44, has an ERP. Its average ERP is somewhat higher at 30% as those discussed above. The property-related sectors (48 and 49) have very low average ERP's at around 14%. Only one company in sector 49 has a relatively high average ERP of 43%. Sector 48 has one company, representing 9,1% of the sector, with an ERP. Sector 49 has three companies, representing 23,1% of the sector, with ERP's.

The companies in sector 53 with ERP's represent 19% of the sector. The lowest average ERP is 14% and the highest average ERP 22% for these companies. One of these companies has been reporting on environmental matters for four years. That does not justify this sector to be included in the group of sectors with reasonable evidence of environmental responsibility (section 6.3.1.3).

Sector 61 has two companies, representing 8% of the sector, with ERP's. These average ERP's are relatively low at 21% and 30%. The fact that these two companies have been reporting on environmental matters for four to five years does not justify this sector to be included in the group of sectors with reasonable evidence of environmental responsibility (section 6.3.1.3).

The companies in sector 63 with ERP's represent 40% of the sector. This appears high but as there is only five companies in this sector it is not that good. Furthermore the average ERP's are very low at 10% and 17%. Sector 67 has one company with an average ERP of 24%, representing 20% of the sector.

Sector 68 has one company with an average ERP of 41%, but as this company represents only 12,5% of the sector, this sector is included in this group. Sector 69 has one company with an average ERP of 11%, representing 7,1% of the sector.

Sector 74 has 21,4% companies with ERP's. The lowest average ERP is 14% and the highest 23%. The fact that one of these companies has been reporting on environmental matters for five years does not justify this sector to be included in the group of sectors with reasonable evidence of environmental responsibility (section 6.3.1.3).

The companies in sector 80 with ERP's represent 8,3% of the sector. The lowest average ERP is 12% and the highest average ERP 29%. The fact that two of these companies have been reporting on environmental matters for four years does not justify this sector to be included in the group of sectors with reasonable evidence of environmental responsibility (section 6.3.1.3).

The companies with ERP's in sectors 88 and 89 represent 16,7% and 18,2% respectively of their sectors. The highest average ERP was 28% and 26% for sector 88 and 89 respectively.

6.3.1.3 Sectors with reasonable evidence of environmental responsibility

The sectors with reasonable evidence of environmental responsibility are:

<i>Sector no</i>	<i>Sector description</i>
35	Mining exploration
46	Property
50	Diversified industrial
51	Service
52	Beverages
58	Clothing & textile
60	Electronics & electrical
71	Packaging & printing
86	Transport

Sector 35 is the only mining related sector in this group. The other mining related sectors are included in the group with good evidence of environmental responsibility (section 6.3.1.4). The companies with ERP's in sector 35 represent 42,9% of the sector. However, the average ERP's are low with the highest average ERP at 29% and the lowest average ERP at 14%.

Sector 46 has only two companies in the sector with ERP's, representing 14,3% of the sector. However, the average ERP's are relatively high at 26% and 57%. One of these companies has been reporting on environmental matters for four years.

The companies in sector 50 with ERP's represent 46,7% of the sector. The lowest average ERP is 12% and the highest average ERP 47%. Three companies have been reporting on environmental matters for four to five years.

Companies representing 33,3% of sector 51 have ERP's. The lowest average ERP is 13% and the highest average ERP 56%. The companies in sector 52 with

average ERP's represent 50% of the sector. The lowest average ERP is 27% and the highest average ERP 36%. One of these companies has been reporting on environmental matters for four years.

The companies in sector 58 with ERP's represent 56% of the sector. The lowest average ERP is 14% and the highest average ERP 45%. Companies representing 30% of sector 60 have average ERP's. The lowest average ERP is 14% and the highest average ERP 35%.

The companies in sector 71 with ERP's represent 46,2% of the sector. The lowest average ERP is 15% and the highest average 40%. Two of these companies have been reporting on environmental matters for four to five years.

Companies representing 35,7% of sector 86 have ERP's. The lowest average ERP is 10% and the highest average ERP 33%. Three of these companies have been reporting on environmental matters for four to five years.

6.3.1.4 Sectors with good evidence of environmental responsibility

The sectors with good evidence of environmental responsibility are:

<i>Sector no</i>	<i>Sector description</i>
2	Coal
6	Diamonds
14	Gold
24	Platinum
28	Metals & minerals
32	Mining holding & houses
54	Building, construction & engineering
56	Chemicals, oils & plastics
66	Food
73	Paper
78	Steel

Each of the mining-related sectors (sector 2 to 32) included in this group has a high number of companies with very impressive ERP's. Two of the three

companies in sector 2, representing 66,7%, have average ERP's of 60% and 76% respectively. The company without an average ERP is the holding company of one of the companies that has been reporting on environmental matters for five years.

The companies in sector 6 with ERP's represent 66,7% of the sector. The lowest average ERP is 19% and the highest average ERP 56%. One of these companies has been reporting on environmental matters for five years. The company with the ERP of 19% reported on environmental matters for the first time in 1998. If this company is ignored the next lowest average ERP is 39%.

All of the companies in sector 14 have ERP's. The lowest average ERP is 34% and the highest average ERP 80%. Six of these companies (40%) have been reporting on environmental matters for four to five years.

Sector 24 performed similar to sector 14. All of the companies in sector 24 have ERP's as well. The lowest ERP average is 40% and the highest average ERP 82%. Three of these companies (60%) have been reporting on environmental matters for four to five years.

The companies in sector 28 with ERP's represent 72,7% of the sector. The lowest average ERP is 31% and the highest average ERP 75%. Two of these companies have been reporting on environmental matters for four to five years.

The companies in sector 32 with ERP's represent 73,7% of the sector. The lowest average ERP is 26% and the highest average ERP 69%. Five of these companies have been reporting on environmental matters for four to five years.

Companies representing 55,2% of sector 54 have average ERP's. The lowest average ERP is 14% and the highest average ERP 53%. Four of these companies have been reporting on environmental matters for four to five years.

The companies in sector 56 with ERP's represent 54,5% of the sector. The lowest average ERP is 15% and the highest average ERP 81%. Four of these companies have been reporting on environmental matters for four to five years. If the company with the ERP of 15 is ignored, the next lowest average ERP is 40%.

Companies representing 63% of sector 66 have ERP's. The lowest average ERP is 14% and the highest average ERP 46%. Five of these companies have been reporting on environmental matters for four to five years.

The companies in sector 71 with ERP's represent 46,2% of the sector. The lowest average ERP is 15% and the highest average ERP 40%. Two of these companies have been reporting on environmental matters for four to five years.

Sectors 73 and 78 performed similar to each other as well as to the mining-related sectors in this group. Sector 73 has one company and sector 78 two companies. The company in sector 73 has an average ERP of 66% and has been reporting on environmental matters for five years. The one company in sector 78 has an average ERP of 66% and the other company has 74%. Both companies have been reporting on environmental matters for five years.

6.3.1.5 Sectors selected for further analysis

The sectors selected for further analyses in section 6.3.3 were determined based on the results of the environmental responsibility discussed above in section 6.3.1. The sectors with no ERP's cannot be analysed further as there is not an environmentally responsible group to compare to other groups. Therefore the sectors mentioned in section 6.3.1.1 are excluded from further analyses.

Most of the sectors with little evidence of environmental responsibility (refer to section 6.3.1.2) were not selected for further analyses. These sectors have only one or two companies with ERP's and then the average ERP is very low. Sectors 49, 53, 61, 68, 74 and 80 were selected as they could possibly reveal more evidence if analysed further. These sectors have more companies with ERP's, the

average ERP's are not as low as that of the sectors excluded, and they include companies that have been reporting on environmental matters for four to five years.

All the sectors with reasonable evidence of environmental responsibility (refer to section 6.3.1.3) were selected for further analyses. Most of these sectors have a reasonable number of companies with ERP's. The lowest average ERP's are as low as 10%, while the highest average ERP is 57%.

All the sectors with good evidence of environmental responsibility (refer to section 6.3.1.4) could not be selected for further analyses. Sectors 2, 14, 24, 73 and 78 were not selected, as all the companies in those sectors are environmentally responsible as evidenced by the ERP's. Sectors 6, 28, 32, 54, 56 and 66 were selected for further analyses, as these sectors include many companies with ERP's. The lowest average ERP's are as low as 14%, while the highest average ERP is 81%.

6.3.2 Summary and conclusion for environmental responsibility per sector

Of the 41 sectors considered from 1994 to 1998, five sectors do not have environmental reporting percentages (ERP's) or other evidence relating to environmental responsibility, 16 have little evidence of environmental responsibility, nine sectors have reasonable evidence of environmental responsibility and 11 sectors have good evidence of environmental responsibility. It is encouraging to note that 36 of the 41 sectors have given attention to environmental responsibility by way of environmental reporting. However, less than half of the sectors achieved reasonable or good evidence of environmental reporting.

The sectors with little evidence of environmental responsibility have a small number of companies per sector that have ERP's and the lowest and the highest average ERP's are very low at 10% and 43% respectively. Three of the sectors included four companies that have been reporting on environmental matters for

four to five years. However, this fact could not justify those sectors to be transferred to the group with reasonable evidence of environmental responsibility as their average ERP's are very low and the number of companies with ERP's in those sectors is small.

Most of the financial- and the property-related sectors were included in the group with little evidence of environmental responsibility. Two of the financial-related sectors were included in the group without ERP's and one of the property-related sectors was included in the group with reasonable evidence of environmental responsibility. At present these sectors are not much affected by stakeholder pressure, but the situation can change very suddenly as it did especially in the USA where companies in these sectors were adversely affected by environmental claims resulting from contaminated property (refer to section 2.3.7).

Five of the sectors with reasonable evidence of environmental responsibility include ten companies that have been reporting on environmental matters for four to five years. The sectors included in this group have a reasonable number of companies with ERP's. The highest average ERP is 57% and the lowest 10%.

All the companies in four of the sectors with good evidence of environmental responsibility have ERP's. The other sectors have a high number of companies with ERP's (54,5% and higher). The average ERP's are quite high for this group. The highest average ERP is 81%, although the lowest average ERP is as low as 14%. All the sectors in this group include companies that have been reporting on environmental matters for four to five years. These companies amount to 34.

The outstanding sectors identified were the mining-related sectors (coal, diamonds, gold, platinum, metals & minerals, and mining holding & houses), the steel sector, the paper sector, and the chemical, oils & plastics sector. The food sector and the building, construction & engineering sector also performed well, although their average ERP's are not as high as for the outstanding sectors.

It is striking that the sectors that have good evidence of environmental responsibility are the same sectors that may be regarded as having a direct impact on the environment. These sectors are more likely to be affected by stakeholder pressure from example legislation (refer to section 2.3.2) and the “green consumer” (refer to section 2.3.4).

6.3.3 Average financial performance of environmentally responsible companies in comparison to that of companies without an environmental responsibility measure per sector

The average financial performance measures were calculated for the group of environmentally responsible companies in a sector, as well as for the other group of companies in the sector without environmental reporting percentages as discussed in section 5.6.4.2. (Refer to appendix 5 for the average financial performance measures calculated.)

The sectors selected for further analyses were identified in section 6.3.1.5 above. Table 6-18 shows the sectors analysed, the number of environmentally responsible companies in the sector (represented by companies with ERP's), the number of companies without ERP's and trends identified:

Trends from average financial performance analysis per sector

<i>Sector no</i>	<i>Sector description</i>	<i>Number without ERP</i>	<i>Number with ERP</i>	<i>Trends identified</i>
6	Diamonds	2	4	ERP group performed best
28	Metals & minerals	3	8	ERP group performed best
32	Mining holding & houses	5	14	None
35	Mining exploration	4	3	None
46	Property	12	2	ERP group performed best

Table 6-18

<i>Sector no</i>	<i>Sector description</i>	<i>Number without ERP</i>	<i>Number with ERP</i>	<i>Trends identified</i>
49	Property loan stock	10	3	None
50	Diversified industrial	8	7	Group without ERP's performed best
51	Service	6	3	Group without ERP's performed best
52	Beverages	4	4	ERP group performed best
53	Hotels & leisure	17	4	Group without ERP's performed best
54	Building, construction & engineering	13	16	None
56	Chemicals, oils & plastics	5	6	ERP group performed best
58	Clothing & textile	7	9	ERP group performed best
60	Electronics & electrical	14	6	None
61	Information technology	23	2	None
66	Food	10	17	ERP group performed best
68	Furniture & appliances	7	1	None
71	Packaging & printing	7	6	None
74	Healthcare	11	3	ERP group performed best
80	Retail	55	5	None
86	Transport	18	10	ERP group performed best

Table 6-18 (continued)

6.3.3.1 Sectors where the group with ERP's performed best

Sector 6

The average ROC and the average ROE are higher every year for the group with ERP's compared to the group without ERP's in sector 6. The average ROA is

higher in 1994, 1995 and in 1996 for the group with ERP's compared to the group without ERP's. In 1997 and in 1998 the average ROA are higher for the group without ERP's. This apparent turnaround in performance is caused by one company included in the group with ERP's that have high negative ROA values every year from 1994 to 1998. The BFA did not provide values for ROE and ROC, but indicated that the values are meaningless as discussed in section 5.5.3.

This company is the only company in the sector with negative values. The negative values are much higher in 1998 than in the prior years. This company has an ERP in 1998 only and the ERP is low at 19% if compared to the ERP's of the other companies. If this company is excluded for the purpose of calculating average ROA, the average ROA is higher every year for the group with ERP's compared to the group without ERP's. Even if this company is not excluded from the calculation, the average ROE, ROA and ROC values still indicate that the group with ERP's performed best compared to the group without ERP's in sector 6.

Sector 28

The average ROC, the average ROA and the average ROE are higher every year for the group with ERP's compared to the group without ERP's in sector 28. One of the companies included in the group without ERP's has extremely poor ROC values if compared to that of the sector. Even if this company is excluded from the calculation, the average ROE, ROA and ROC values still indicate that the group with ERP's performed best compared to the group without ERP's.

Sector 46

The average ROC and the average ROE are higher every year for the group with ERP's compared to the group without ERP's in sector 46. The average ROA is also higher every year, except for 1998. In 1998 the average ROA for the group with ERP's is 2% lower than for the group without ERP's. This can be attributed to

one of the green companies that has an ROA of 5,62% in 1998, but has ROA's of 11,08%, 13,77%, 15,59% and 14,59% in 1994, 1995, 1996 and 1997 respectively.

Sector 52

The average ROC and the average ROA are higher every year for the group with ERP's compared to the group without ERP's in sector 52. The average ROE is also higher every year, except for 1998. In 1998 the average ROE for the group with ERP's (18,29%) is almost equal to the average ROE for the group without ERP's (18,59%). The average ROE for the group with ERP's exceeded the average ROE for the group without ERP's from 1994 to 1997 with 5% to 10%. The decrease in average ROE in 1998 can be attributed to one of the green companies that has an ROE of more than 10% less than what it has in 1997 and 1996. The average EVA for the group with ERP's exceeds the average EVA for the group without ERP's every year substantially.

Sector 56

The average ROC, the average ROA and the average ROE are higher every year for the group with ERP's compared to the group without ERP's in sector 56. The average EVA for the group without ERP's are much better than the average EVA for the group with ERP's for 1994, 1995, 1996 and 1998. In 1997 the average EVA for the group with ERP's exceeded the average EVA for the group without ERP's. The reason is that one of the green companies has a positive EVA in 1997, but negative values for EVA in 1994, 1995, 1996 and 1998.

Sector 58

The average ROC and the average ROE are higher every year for the group with ERP's compared to the group without ERP's in sector 58. The average ROA is higher in 1994, 1995, 1996 and in 1997 for the group with ERP's compared to the group without ERP's. In 1998 the average ROA is 1,22% higher for the group without ERP's compared to the group with ERP's. The average EVA for the group

without ERP's are much better than the average EVA for the group with ERP's for 1994, 1996, 1997 and 1998. In 1995 the average EVA for the group with ERP's exceeded the average EVA for the group without ERP's. In this sector the companies in the group with ERP's have higher negative EVA values than the companies in the group without ERP's.

Sector 66

The average ROA and the average EVA are higher every year for the group with ERP's compared to the group without ERP's in sector 66. The average ROC is higher in 1994, 1995, 1996 and in 1997 for the group with ERP's compared to the group without ERP's. In 1998 the average ROC is higher with 1,1% for the group without ERP's compared to the group with ERP's. This can be attributed to one of the companies in the group with the ERP's that has declining ROC values from 1994 to 1998. The negative ROC in 1998 for that company is exceptionally high. The average ROE is higher in 1995 and in 1996 for the group with ERP's compared to the group without ERP's. In 1994, 1997 and in 1998 the average ROE is higher for the group without the ERP's compared to the group with ERP's. This can be attributed to the same company that is mentioned above. The exceptionally high negative values for ROE in 1997 and in 1998 for that company affected the average ROE for the group with ERP's adversely in 1997 and in 1998.

Sector 74

The average ROC is higher every year, except for 1998, for the group with ERP's compared to the group without ERP's in sector 74. The average ROA is higher every year for the group with ERP's compared to the group without ERP's. The average EVA is higher every year, except for 1996 for the group with ERP's compared to the group without ERP's. The average ROE are higher in 1994, 1997 and in 1998 for the group without ERP's compared to the group with ERP's.

Sector 86

The average ROC and the average ROE are higher every year, except for 1998, for the group with ERP's compared to the group without ERP's in sector 86. The average ROA is higher every year for the group with ERP's compared to the group without ERP's. The average EVA is higher in 1995, 1996 and in 1997 for the group with ERP's compared to the group without ERP's. In 1994 and in 1998 the average EVA is higher for the group without ERP's. In 1998 more companies in the group with ERP's performed worse than in the group without ERP's.

6.3.3.2 Sectors where the group without ERP's performed best

Sector 50

The average EVA is higher every year for the group without ERP's compared to the group with ERP's in sector 50. The average ROC and the average ROE are higher in 1994, 1997 and in 1998 for the group without ERP's compared to the group with ERP's. In 1995 and in 1996 the average ROC and the average ROE are higher for the group with ERP's compared to the group without ERP's. This is due to one company in the group without ERP's that has very poor ROC and ROE percentages in those years compared to the other companies in the sector. The average ROA is higher every year, except for 1996, for the group without ERP's compared to the group with ERP's. In 1996 the respective average ROA's for the group without ERP's and the group with ERP's are almost equal.

Sector 51

The average ROC and the average ROE are higher every year, except for 1994, for the group without ERP's compared to the group with ERP's in sector 51. The average ROA is higher every year, except for 1994 and 1996, for the group without ERP's compared to the group with ERP's. The average EVA is higher every year, except for 1998, for the group without ERP's compared to the group with ERP's.

Sector 53

The average ROA, ROE and EVA are higher every year for the group without ERP's compared to the group with ERP's in sector 53. The average ROC is also higher every year for the group without ERP's compared to the group with ERP's, except for 1998 where one of the companies in the group with ERP's improved its performance considerably.

6.3.3.3 Sectors where no clear trends could be identified

For some sectors a comparison between the average ROC, ROA, ROE and EVA for the group without ERP's and for the group with ERP's did not result in the identification of any clear trends. These sectors are indicated with the description "none" in table 6-18 under section 6.3.3.

6.3.4 Data plots of ERP and financial performance measure per sector

The data plots per sector were prepared as discussed in section 5.6.4.3. The purpose of these plots is to provide additional evidence relating to the relationship between environmental responsibility and financial performance. The plots are presented in appendix 6. The following trends were identified from the data plots:

- Positive trend – the higher the ERP, the higher the financial performance measure; i.e. the higher the environmental responsibility, the higher the financial performance and vice versa.
- Negative trend – the lower the ERP, the higher the financial performance measure; i.e. the lower the environmental responsibility, the higher the financial performance and vice versa.
- Zero trend – the financial performance measure neither increases nor decreases as the ERP increases; i.e. environmental responsibility has no relationship to financial performance.
- No trend – the data points are scattered over the data plot without any trend being obvious.

In table 6-19 the sectors for which data plots were prepared are identified, as well as the trends (a positive trend is indicated with “positive”, a negative trend is indicated with “negative”, a zero trend is indicated with “zero”, no trend is indicated with “none” and not applicable (no data plots prepared) with “N/A”):

Trends from data plots per sector

<i>Sector no</i>	<i>Sector description</i>	<i>ERP/ ROC</i>	<i>ERP/ ROA</i>	<i>ERP/ ROE</i>	<i>ERP/ EVA</i>
6	Diamonds	None	Positive	None	N/A
24	Platinum	Positive	Positive	Positive	N/A
28	Metals & minerals	None	None	Zero	N/A
32	Mining holding & houses	Zero	Zero	Zero	N/A
50	Diversified industrial	Zero	Zero	Zero	None
52	Beverages	Zero	Zero	Zero	None
53	Hotels & leisure	Positive	None	Positive	None
54	Building, construction & engineering	Zero	Zero	Zero	None
56	Chemicals, oils & plastics	Zero	Zero	Zero	None
58	Clothing & textile	Zero	Zero	Zero	Zero
60	Electronics & electrical	Positive	Zero	Zero	Zero
61	Information technology	Negative	Zero	Negative	Zero
66	Food	Zero	Zero	Zero	None
71	Packaging & printing	Positive	Zero	Zero	Positive
74	Healthcare	Positive	Positive	Positive	Positive
78	Steel	Zero	Zero	Positive	None
80	Retail	Zero	Zero	Zero	Zero
86	Transport	Zero	Zero	Zero	None

Table 6-19

The sectors that indicated mainly a positive, negative, zero or no trend respectively are discussed below.

6.3.4.1 Sectors with data plots that indicate a positive trend

The data plot below serves as an illustration of a data plot that indicates a positive trend; i.e. the better the environmental responsibility, the better the financial performance and vice versa. Refer to appendix 6 for the other data plots discussed in this section.

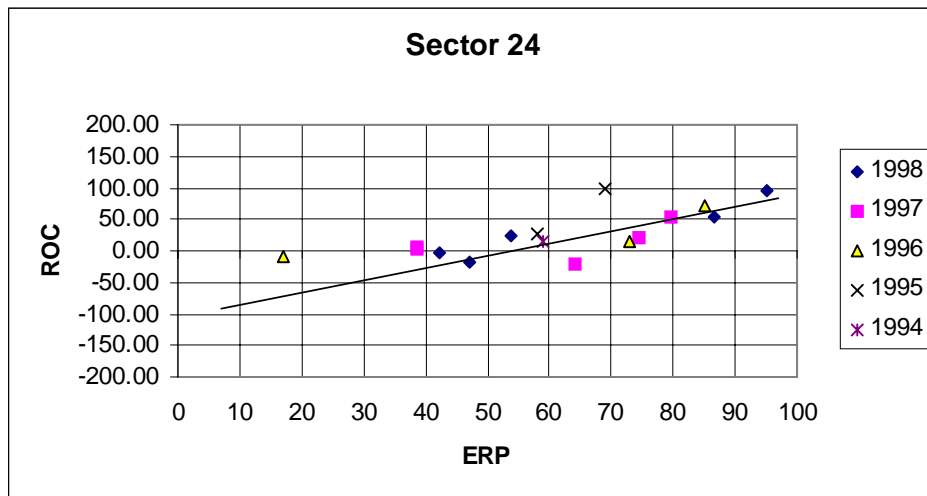


Figure 6.6

Sector 24

The data plots between ERP and ROC, ROA and ROE respectively for sector 24 indicate that there is a positive trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by ROC, ROA, and ROE). The higher the environmental responsibility the higher is the financial performance. Sector 24 could not be included in the comparison between the average performance of environmentally responsible companies and that of companies without ERP's (section 6.3.3) as all the companies in this sector have ERP's. The fact that this sector falls in the group of sectors with good evidence of environmental responsibility (section 6.3.1.4) and that all the companies in the

sector are environmentally responsible support the positive trend indicated by the data plots.

Sector 53

The data plots between ERP and ROC and between ERP and ROE for sector 53 indicate that there is a positive trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by ROC and ROE). The higher the environmental responsibility the higher is the financial performance. No trend is obvious from the data plots between ERP and ROA and between ERP and EVA. However, the data plot that indicates a positive trend is not supported by the comparison between the average financial performance of companies with ERP's and those without in this sector. Sector 53 is one of the sectors where the group without ERP's performed best (refer to section 6.3.3.2).

Sector 71

The data plots between ERP and ROC and between ERP and EVA for sector 71 indicate that there is a positive trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by ROC and EVA). The higher the environmental responsibility the higher is the financial performance. The data plots between ERP and ROA and between ERP and ROE indicate a zero trend; i.e. environmental responsibility has no relationship to the financial performance. From the comparison between the average financial performance of companies with ERP's and those without in this sector, no clear trend could be identified (refer to table 6-18 under section 6.3.3).

Sector 74

The data plots between ERP and ROC, ROA, ROE and EVA respectively for sector 74 indicate that there is a positive trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by ROC, ROA, ROE and EVA). The higher the environmental responsibility the

higher is the financial performance. From the comparison between the average financial performance of companies with ERP's and those without in this sector, no clear trend could be identified (refer to table 6-18 under section 6.3.3).

6.3.4.2 Sectors with data plots that indicate a negative trend

The data plot below serves as an illustration of a data plot that indicates a negative trend; i.e. the better the environmental responsibility, the worse the financial performance and vice versa. Refer to appendix 6 for the other data plots discussed in this section.

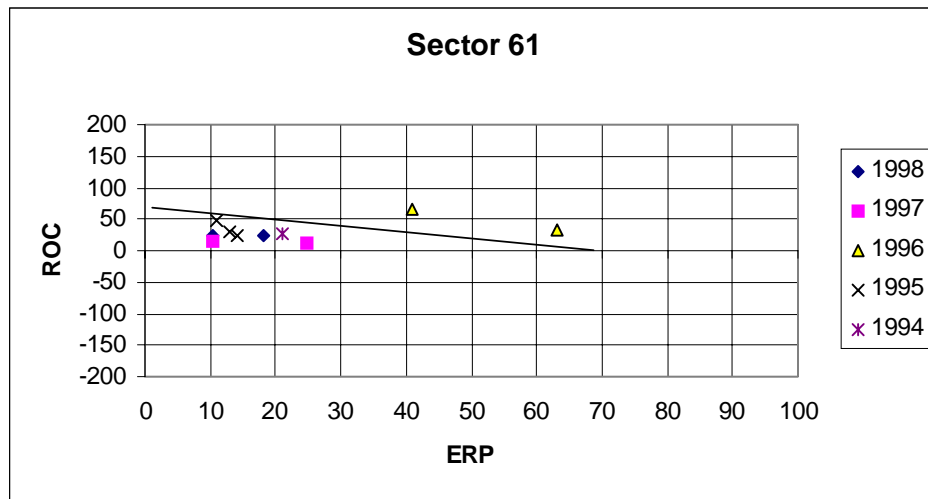


Figure 6.7

Sector 61

The data plots between ERP and ROC and between ERP and ROE for sector 61 indicate that there is a negative trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by ROC and ROE). The higher the environmental responsibility the lower is the financial performance. The data plots between ERP and ROA and between ERP and EVA indicate that there is a zero trend; i.e. environmental responsibility has no relationship to financial performance. From the comparison between the average financial performance of companies with ERP's and those without in this sector, no clear trend could be identified (refer to table 6-18 under section 6.3.3).

6.3.4.3 Sectors with data plots that indicate a zero trend

The data plot below serves as an illustration of a data plot that indicates a zero trend (the financial performance measure neither increases nor decreases as the ERP increases); i.e. environmental responsibility has no relationship to financial performance. Refer to appendix 6 for the other data plots discussed in this section.

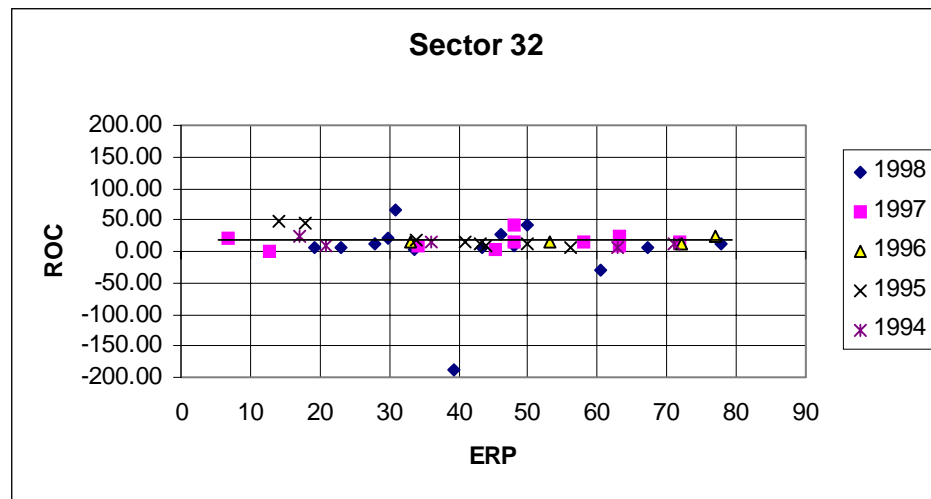


Figure 6.8

Sector 32

The data plots between ERP and ROC, ROA and ROE respectively for sector 32 indicate that there is a zero trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by ROC, ROA and ROE); i.e. environmental responsibility has no relationship to financial performance. From the comparison between the average financial performance of companies with ERP's and those without in this sector, no clear trend could be identified (refer to table 6-18 under section 6.3.3).

Sector 50

The data plots between ERP and ROC, ROA and ROE respectively for sector 50 indicate that there is a zero trend between environmental responsibility (as

indicated by ERP) and financial performance (as indicated by ROC, ROA and ROE); i.e. environmental responsibility has no relationship to financial performance. The data plot between ERP and EVA indicates that there is no obvious trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by EVA). The result of the comparison between the average financial performance of companies with ERP's and those without in this sector indicated that the group without ERP's performed best (refer to section 6.3.3.2).

Sector 52

The data plots between ERP and ROC, ROA and ROE respectively for sector 52 indicate that there is a zero trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by ROC, ROA and ROE); i.e. environmental responsibility has no relationship to financial performance. The data plot between ERP and EVA indicates that there is no obvious trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by EVA). The result of the comparison between the average financial performance of companies with ERP's and those without in this sector indicated that the group with ERP's performed best (refer to section 6.3.3.1).

Sector 54

The data plots between ERP and ROC, ROA and ROE respectively for sector 54 indicate that there is a zero trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by ROC, ROA and ROE); i.e. environmental responsibility has no relationship to financial performance. The data plot between ERP and EVA indicates that there is no obvious trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by EVA). From the comparison between the average financial performance of companies with ERP's and those without in this sector, no clear trend could be identified (refer to table 6-18 under section 6.3.3).

Sector 56

The data plots between ERP and ROC, ROA and ROE respectively for sector 56 indicate that there is a zero trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by ROC, ROA and ROE); i.e. environmental responsibility has no relationship to financial performance. The data plot between ERP and EVA indicates that there is no obvious trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by EVA). The result of the comparison between the average financial performance of companies with ERP's and those without in this sector indicated that the group with ERP's performed best (refer to section 6.3.3.1).

Sector 58

The data plots between ERP and ROC, ROA, ROE and EVA respectively for sector 58 indicate that there is a zero trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by ROC, ROA, ROE and EVA); i.e. environmental responsibility has no relationship to financial performance. The result of the comparison between the average financial performance of companies with ERP's and those without in this sector indicated that the group with ERP's performed best (refer to section 6.3.3.1).

Sector 60

The data plots between ERP and ROA, ROE and EVA respectively for sector 60 indicate that there is a zero trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by ROC, ROA, ROE and EVA); i.e. environmental responsibility has no relationship to financial performance. The data plot between ERP and ROC indicates that there is a positive trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by ROC). The higher the environmental responsibility the higher is the financial performance. From the comparison

between the average financial performance of companies with ERP's and those without in this sector, no clear trend could be identified (refer to table 6-18 under section 6.3.3).

Sector 66

The data plots between ERP and ROC, ROA and ROE respectively for sector 66 indicate that there is a zero trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by ROC, ROA and ROE); i.e. environmental responsibility has no relationship to financial performance. The data plot between ERP and EVA indicates that there is no obvious trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by EVA). The result of the comparison between the average financial performance of companies with ERP's and those without in this sector indicated that the group with ERP's performed best (refer to section 6.3.3.1).

Sector 78

The data plots between ERP and ROC and between ERP and ROA for sector 78 indicate that there is a zero trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by ROC and ROA); i.e. environmental responsibility has no relationship to financial performance. The data plot between ERP and ROE indicates that there is a positive trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by ROE). The higher the environmental responsibility the better is the financial performance. The data plot between ERP and EVA indicates that there is no obvious trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by EVA).

Sector 80

The data plots between ERP and ROC, ROA, ROE and EVA respectively for sector 80 indicate that there is a zero trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by ROC, ROA, ROE and EVA); i.e. environmental responsibility has no relationship to financial performance. From the comparison between the average financial performance of companies with ERP's and those without in this sector, no clear trend could be identified (refer to table 6-18 under section 6.3.3).

Sector 86

The data plots between ERP and ROC, ROA and ROE respectively for sector 86 indicate that there is a zero trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by ROC, ROA and ROE); i.e. environmental responsibility has no relationship to financial performance. The data plot between ERP and EVA indicates that there is no obvious trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by EVA). The result of the comparison between the average financial performance of companies with ERP's and those without in this sector indicated that the group with ERP's performed best (refer to section 6.3.3.1).

6.3.4.4 Sectors with data plots for which no trends could be identified

The data plot below serves as an illustration of a data plot that indicates no trend; i.e. the data points are scattered over the data plot without any trend being obvious. Refer to appendix 6 for the other data plots discussed in this section.

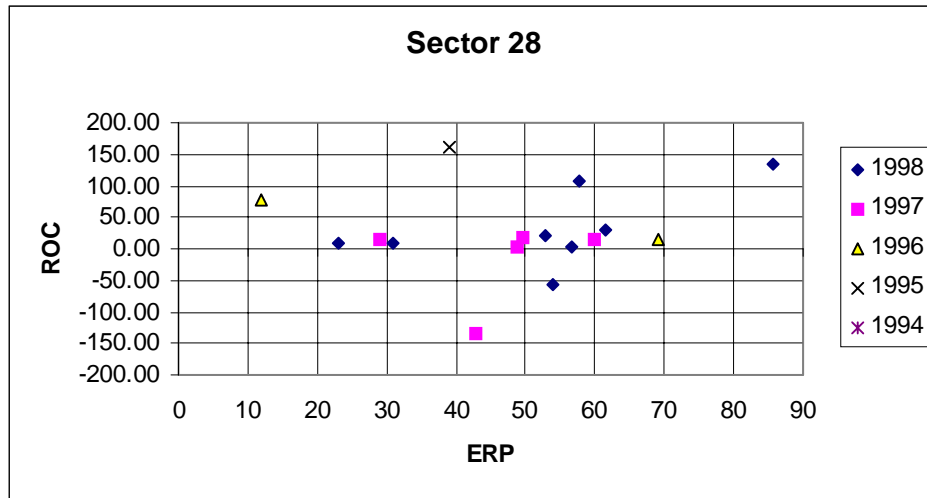


Figure 6.9

Sector 28

The data plots between ERP and ROC and between ERP and ROA for sector 28 indicate that there is no obvious trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by ROC and ROA). The data plot between ERP and ROE indicates a zero trend; i.e. environmental responsibility has no relationship to financial performance. From the comparison between the average financial performance of companies with ERP's and those without in this sector, the group with ERP's performed best (refer to section 6.3.3.1).

Sector 6

The data plots between ERP and ROC and between ERP and ROE for sector 6 indicate that there is no obvious trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by ROC and ROA). The data plot between ERP and ROA indicates that there is a positive trend between environmental responsibility (as indicated by ERP) and financial performance (as indicated by ROA). The higher the environmental responsibility the better is the financial performance. From the comparison between the average financial performance of companies with ERP's and those without in this sector, the group with ERP's performed best (refer to section 6.3.3.1).

6.3.5 Discussion of results of sector trend analyses

Table 6-20 provides an overview of the results of the sector trend analyses and facilitates the discussion thereof presented below (the terms positive, negative, zero, none and N/A have the same meanings as discussed under 6.3.4 above):

Results of sector trend analysis

<i>Sector no</i>	<i>Sector description</i>	<i>Level of environmental responsibility</i>	<i>Trend indicated by average financial performance</i>	<i>Trend indicated by data plots</i>
2	Coal	Good	N/A	N/A
6	Diamonds	Good	ERP group best	Positive/none
14	Gold	Good	N/A	N/A
24	Platinum	Good	N/A	Positive
28	Metals & minerals	Good	ERP group best	Zero/none
32	Mining holding & houses	Good	None	Zero/none
35	Mining exploration	Reasonable	None	N/A
39	Private equity funds	Little evidence	N/A	N/A
40	Banks	Little evidence	N/A	N/A
41	Financial services	No ERP	N/A	N/A
42	Life assurance	No ERP	N/A	N/A
43	Short-term insurance	Little evidence	N/A	N/A
44	Investment trusts	Little evidence	N/A	N/A
45	Redevelopment	No ERP	N/A	N/A
46	Property	Reasonable	ERP group best	N/A
48	Property unit trusts	Little evidence	N/A	N/A
49	Property loan stock	Little evidence	None	N/A

Table 6-20

<i>Sector no</i>	<i>Sector description</i>	<i>Level of environmental responsibility</i>	<i>Trend indicated by average financial performance</i>	<i>Trend indicated by data plots</i>
50	Diversified industrial	Reasonable	Group without ERP best	Zero/none
51	Service	Reasonable	Group without ERP best	N/A
52	Beverages	Reasonable	ERP group best	Zero/none
53	Hotels & leisure	Little evidence	Group without ERP best	Positive/none
54	Building, construction & engineering	Good	None	Zero/none
56	Chemicals, oils & plastics	Good	ERP group best	Zero/none
58	Clothing & textile	Reasonable	ERP group best	Zero
59	Development stage	No ERP	N/A	N/A
60	Electronics & electrical	Reasonable	None	Positive/zero
61	Information technology	Little evidence	None	Negative/zero
63	Telecommunications	Little evidence	N/A	N/A
66	Food	Good	ERP group best	Zero/none
67	Education & staffing	Little evidence	N/A	N/A
68	Furniture & appliances	Little evidence	None	N/A
69	Media	Little evidence	N/A	N/A
71	Packaging & printing	Reasonable	None	Positive/zero
73	Paper	Good	N/A	N/A
74	Healthcare	Little evidence	ERP group best	Positive
78	Steel	Good	N/A	Positive/zero/none
80	Retail	Little evidence	None	Zero
86	Transport	Reasonable	ERP group best	Zero/none

Table 6-20 (continued)

<i>Sector no</i>	<i>Sector description</i>	<i>Level of environmental responsibility</i>	<i>Trend indicated by average financial performance</i>	<i>Trend indicated by data plots</i>
87	Cash companies	No ERP	N/A	N/A
88	Development capital	Little evidence	N/A	N/A
89	Venture capital	Little evidence	N/A	N/A

Table 6-20(continued)

6.3.5.1 Sectors where environmental responsibility indicates an advantage

Thirteen sectors were identified from table 6-20 above that indicate that environmental responsibility is an advantage. In the following nine sectors the group with ERP's performed better than the group without the ERP's when average financial performance was compared (refer to section 6.3.3):

<i>Sector no</i>	<i>Sector description</i>
6	Diamonds
28	Metals and minerals
46	Property
52	Beverages
56	Chemicals, oils & plastics
58	Clothing & textile
66	Food
74	Healthcare
86	Transport

Except for sector 74 the data plots prepared for the above-mentioned sectors did not provide additional evidence to support the hypothesis that the higher the environmental responsibility of a company is, the higher is the financial performance of that company. Sector 6 has one positive data plot. Sectors 6 and 28 were classified as sectors for which no trends could be identified from the data plots (refer to section 6.3.4.4). Sector 46 did not have sufficient data to prepare data plots. Sectors 52, 56, 58, 66 and 86 were classified as sectors with a zero trend, i.e. no relationship exists between environmental responsibility and financial

performance (refer to section 6.3.4.3). However, all the data plots for sector 74 have a positive trend, which means that the higher the environmental responsibility is, the higher is the financial performance.

The following four sectors have positive data plots:

<i>Sector no</i>	<i>Sector description</i>
24	Platinum
60	Electronics & electrical
71	Packaging & printing
78	Steel

For sectors 24 and 78 there are good evidence of environmental responsibility (refer to section 6.3.1.4), but because all the companies in these sectors have ERP's no average financial performance trend analysis could be performed for these sectors. Sector 24 was classified as a sector with a positive trend, i.e. the higher the environmental responsibility, the higher the financial performance and vice versa (refer to section 6.3.4.1). Sector 78 was classified as a sector with a zero trend (refer to section 6.3.4.3), but has one positive data plot.

For sectors 60 and 71 there are reasonable evidence of environmental responsibility. However, no trends could be identified in the average financial performance trend analysis (refer to section 6.3.3). Sector 60 was classified as a sector with a zero trend (refer to section 6.3.4.3), but has one positive data plot. Sector 71 was classified as a sector with a positive trend, i.e. the better the environmental responsibility, the better the financial performance and vice versa (refer to section 6.3.4.1).

It could be argued that the companies in the mining-related sectors (6, 24 and 28), as well as sectors 56 (Chemicals, oils & plastics) and 78 (Steel) are environmentally responsible because their financial performance will be adversely affected by fines if they are not environmentally responsible (stakeholder pressure by government and its agencies – section 2.3.2). From section 2.3.2 it is clear that environmental legislation is improving in South Africa – the mining sectors are now

required to compete on an equal legal footing with other interests for the use of the country's water, land or mineral resources.

Sector 46 (Property) could have been influenced by the devastating effect of Superfund (refer to section 2.3.2 and section 2.3.7) on property-owners, their insurers and their bankers in the U.S.A with regard to the clean-up of already polluted sites.

Sectors 52 (Beverages), 58 (Clothing & textile) and 66 (Food) are probably influenced by the "green consumer" – refer to section 2.3.4. It is possible that the companies with ERP's have better financial performance than the companies without ERP's due to the support of customers who are concerned about the environmental responsibility of the companies that they support. It is striking that the products sold by these sectors have a very direct impact on the consumer that could influence the consumer's "green" conscience.

Sector 60 (Electronics & electrical) could have been influenced by the laws passed by some European governments to make manufacturers and importers responsible for their products when consumers discard electronic products (refer to section 3.3.2.8).

Sector 71 (Packaging & printing) is probably influenced by the world-wide demand for more environmentally friendly packaging (refer to section 2.4.2 under "Enhanced revenues"). Sector 86 (Transport) could be influenced by the pressure to eliminate or neutralize greenhouse gas emissions (refer to section 3.3.2.10).

Whatever the motivation of the companies in the 13 sectors mentioned above to be environmentally responsible, these companies have better financial performance than the companies in the same sectors that chose not to be environmentally responsible (as evidenced by the disclosure of environmental matters in their annual financial statements). It is possible that the companies that have chosen to be environmentally responsible have reaped the benefits of environmental responsibility as described in section 2.4.2.

6.3.5.2 Sectors where environmental responsibility indicates a disadvantage

From table 6-20 above four sectors indicate that environmental responsibility is a disadvantage. In the following three sectors the group without ERP's performed better than the group with ERP's when average financial performance was compared (refer to section 6.3.3):

<i>Sector no</i>	<i>Sector description</i>
50	Diversified industrial
51	Service
53	Hotels & leisure

The data plots prepared for the above-mentioned sectors did not provide additional evidence to support a hypothesis of environmental responsibility being a disadvantage. Sector 50 was classified as a sector with a zero trend (refer to section 6.3.4.3). There was insufficient data to prepare data plots for sector 51. Two of the data plots for sector 53 is slightly positive, while no definite trend could be identified from the other two data plots.

Sector 61 (Information technology) was classified as a sector with a negative trend (refer to section 6.3.4.2). There is little evidence of environmental responsibility (refer to section 6.3.1.2) and no trend could be identified in the average financial performance trend analysis (refer to section 6.3.3).

According to Huckle (1995: 86; 89) the priority given to environmental legislation in South Africa is lower than internationally due to more pressing concerns, such as housing, education and crime reduction. The likelihood of more effective environmental legislation and a stronger relationship between environmental performance and profitability will increase as primary needs are addressed and environmental conservation becomes more of a priority (Huckle 1995: 90).

The National Water Act 36 of 1998 (discussed in section 2.3.2) is an example of stricter environmental legislation in South Africa. This act includes the polluter pays principle that is the basis of the Superfund Act of the U.S.A. and puts pressure on especially the mining-related sectors (refer to section 6.3.5.1).

Contrary to the sectors discussed in section 6.3.5.1, for which stakeholder pressure was identified, the sectors in this section are not subject to the same level of stakeholder pressure. These sectors do not appear to have such a direct impact on the environment or on the consumer as those discussed in section 6.3.5.1 above, and consequently the consumer's "green" conscience does not have an impact here.

Environmental legislation does not really affect these sectors, therefore the companies that spend money to be environmentally responsible have poorer financial performance (refer to section 2.4.1 – disadvantages of environmental responsibility). However, this is probably a short-term phenomenon, as the environmentally responsible companies in these sectors will adjust easier to stricter environmental legislation that is probable in future, while the other companies would have to incur more costs to become compliant.

6.3.5.3 Other sectors

The sectors discussed in this section are those for which there is not enough evidence to identify whether environmental responsibility is an advantage or a disadvantage where financial performance is concerned.

For sectors 2 (Coal), 14 (Gold) and 73 (Paper) no average financial performance trend analysis or data plots could be prepared due to insufficient information. These sectors as well as sector 32 (Mining holding and houses) and sector 54 (Building, construction & engineering) have good evidence of environmental responsibility (refer to section 6.3.1.2), while sector 35 (Mining exploration) has reasonable evidence of environmental responsibility. No trends were identified for sectors 32, 35 and 54 in the average financial performance trend analysis (refer to section 6.3.3). The data plots for sectors 32 and 54 indicated zero trends (refer to section 6.3.4.3), while sector 35 has insufficient data to prepare data plots.

Sectors 49 (Property loan stock), 68 (Furniture & appliances) and 80 (Retail) have little evidence of environmental responsibility and no trends were identified in the

average financial performance trend analysis. No data plots were prepared for sectors 49 and 68 due to insufficient data. A zero trend could be identified from the data plots for sector 80 (refer to section 6.3.4.3).

For fifteen sectors (39, 40, 41, 42, 43, 44, 45, 48, 59, 63, 67, 69, 87, 88 and 89) no average financial performance trend analysis or data plots were prepared (indicated with N/A in table 6.20). Five of these sectors (41, 42, 45, 59 and 87) do not have ERP's (refer to section 6.3.1.1). Ten of these sectors (39, 40, 43, 44, 48, 63, 67, 69, 88 and 89) have such little evidence of environmental responsibility that they were not selected for the average financial performance trend analysis (refer to section 6.3.3). These ten sectors also did not have sufficient data for data plots.

6.3.6 Summary and conclusion for sector trend analyses

The average financial performance measures for the group of environmentally responsible companies in a sector were compared to the other group of companies in the sector without environmental reporting percentages. The sectors selected for this analysis were identified in section 6.3.1.5 (based on the work done relating to environmental responsibility per sector). Data plots per sector were prepared to provide additional evidence relating to the relationship between environmental responsibility and financial performance.

Based on the comparison of average financial performance and the data plots it was found that for the following 13 sectors environmental responsibility is an advantage where financial performance is concerned:

<i>Sector no</i>	<i>Sector description</i>
6	Diamonds
24	Platinum
28	Metals and minerals
46	Property
52	Beverages
56	Chemicals, oils & plastics
58	Clothing & textile

60	Electronics & electrical
66	Food
71	Packaging & printing
74	Healthcare
78	Steel
86	Transport

For almost all of the above-mentioned sectors stakeholder pressure could be identified. Whatever the motivation of the companies in these sectors to be environmentally responsible, these companies have better financial performance than the companies in the same sectors that chose not to be environmentally responsible (as evidenced by the disclosure of environmental matters in their annual financial statements). It is possible that the companies that have chosen to be environmentally responsible have reaped the benefits of environmental responsibility as described in section 2.4.2.

Based on the comparison of average financial performance and the data plots it was found that for the following four sectors environmental responsibility is a disadvantage where financial performance is concerned:

<i>Sector no</i>	<i>Sector description</i>
50	Diversified industrial
51	Service
53	Hotels & leisure
61	Information technology

These sectors are not subject to the same level of stakeholder pressure than the sectors for which environmental responsibility is an advantage. These sectors do not appear to have such a direct impact on the environment or on the consumer as those discussed in section 6.3.5.1 above, and consequently the consumer's "green" conscience does not have an impact here.

Environmental legislation does not really affect these sectors, therefore the companies that spend money to be environmentally responsible have a poorer financial performance (refer to section 2.4.1 – disadvantages of environmental responsibility). However, this is probably a short-term phenomenon, as the

environmentally responsible companies in these sectors will adjust easier to stricter environmental legislation that is probable in future, while the other companies would have to incur more costs to become compliant.

For fifteen sectors no average financial performance trend analysis or data plots were prepared due to no or very little evidence of environmental responsibility. If these sectors become more environmentally responsible in future and report on environmental matters in their annual financial statements, it would assist future researchers to establish the relationship between environmental responsibility and financial performance more accurately.

6.4 FINAL SUMMARY AND CONCLUSIONS

The review of the related literature identified the following stakeholders interested in environmental reporting:

- Society
- Governments and their agencies
- Local communities
- Customers
- Suppliers and other trading partners
- Employees
- Investors, lenders and insurers
- Accountants and auditors.

These stakeholders are placing increasing pressure on companies to be environmentally responsible. Specific pressures towards environmental responsibility were discussed in section 3.3.1, while pressures can also be identified from the discussion of the stakeholders interested in environmental reporting in section 2.3. Pressures to be environmentally responsible include the following:

- Society is placing increasing emphasis on the importance of the environment.
- Internationally, as well as in South Africa, there are moves towards stricter (e.g. the polluter pays principle) and even retrospective environmental legislation. Laws that allow criminal action against individuals put pressure on senior executives to take responsibility for their company's actions.
- Local communities seek some degree of reassurance that they are not exposed to significant environmental risk due to a company's operations.
- Environmental performance constitute one positive element among the many characteristics upon which customers base their purchasing decision. "Green consumerism" is switching from brand loyalty to company loyalty.
- South Africa's foreign trade partners are using environmental standards to generate trade barriers. European businesses have a growing sensitivity to competition from developing countries that they perceive to be unregulated.
- Employees wish to work for ethical and responsible companies.
- Many investors only want to lend their financial support to companies that behave in an environmentally responsible manner. Banks increasingly require of companies to provide environmental assessments before they will grant a loan. It is increasingly difficult and expensive to obtain insurance cover against causing environmental damage.
- Accountants and auditors are increasing awareness by selling advice on e.g. mergers and acquisitions work where environmental issues might affect the future profitability of businesses; valuations of land and capital equipment that might become obsolete faster than expected when environmental regulations or market demand change; or environmental performance reports.

Companies have gone through a dramatic transformation in their approach to environmental responsibility: From avoiding compliance with regulatory controls during the 1960s and 1970s to reacting to regulatory requirements and attempting to minimize the costs of compliance during the 1980s to taking control of their environmental problems and even turning them into competitive opportunities during the 1990s. The progress made by such companies (discussed in section 3.3.2) include the following areas:

- Environmental management systems and audits thereof
- Environmental risk assessment
- Environmental reporting
- Full cost environmental accounting
- Total quality management
- Pollution prevention
- Demand-side management
- Design for environment
- Product stewardship
- Clean technology
- Responsible care (Initiative for chemical industry)
- “Green alliance” partnerships between businesses and environmental groups.

The benefits of environmental responsibility lie in the following:

- A decrease in cost of operations, e.g. by using recycled items as inputs, decreasing excess packaging.

- Enhanced revenues, e.g. able to attract a growing segment of the world population that is demanding environmentally friendly products.
- A decrease in cost of capital, e.g. a more environmentally responsible firm will receive a higher credit rating.
- A decrease in regulatory risks, e.g. an environmentally responsible company will adapt easy to new legislation while competitors will have to bear the additional costs of complying.

The disadvantage of environmental responsibility occurs when a company chooses to exceed regulatory compliance and more efficient and/or cheaper technology is introduced after the company has invested in a large outlay of funds for equipment. Competitors that chose to merely comply are producing a product that is cheaper to manufacture.

The results of the correlation analyses between ERP and ROE, ROA and ROC respectively indicate that a small positive correlation exists between environmental responsibility and financial performance. The financial performance of a company is higher where the environmental responsibility is higher. However, the positive correlation coefficients are small. This means that the evidence supporting the hypothesis of “the higher the environmental responsibility of a company is, the higher is the financial performance” is not very strong.

The results of the correlation analyses between ERP and EVA indicate that a small negative correlation exists between environmental responsibility and financial performance. The financial performance of a company is lower where the environmental responsibility is higher. However, the negative correlation coefficients weakened from 1995 to 1996 and again in 1997. The result of the correlation analysis between ERP and EVA for 1998 indicated that no correlation exists between environmental responsibility and financial performance. Therefore it is concluded that the negative correlation between environmental responsibility and financial performance reduced every year from 1995 to 1997 to eventually no

correlation in 1998. The EVA analyses were only performed for industrial companies (refer to section 5.5.2).

The results of the correlation analyses are in line with previous research results (discussed in section 2.5). Allen (1994) found that adopting an environmentally responsible strategy significantly enhanced corporate financial performance for all firms except those serving *industrial* customers. Firms supplying industrial customers seemed to be benefiting financially from a strategy of environmental indifference or irresponsibility. Hart & Ahuja (1994), Klassen & McLaughlin (1995) and the IRRC (1995) also found a positive correlation between increased environmental performance and improved financial performance.

However, the South African study of Huckle (1995) found that the profitability of a company in the industrial or mining sectors of the JSE is unrelated to the level of environmental responsibility demonstrated by that company. Reasons why the results of this research are not in line with Huckle's finding are as follows:

- Huckle's study was limited to industrial and mining companies, while this study included all companies listed on the JSE (refer to section 5.3). Where the EVA analyses limited this study to industrial companies the result was a negative correlation that means that the financial performance of a company is lower where the environmental responsibility is higher, especially in 1995. The sector trend analyses for the mining sectors indicated a positive correlation, i.e. the financial performance of a company is higher where the environmental responsibility is higher. It is possible that the negative element of the industrial companies cancelled the positive element of the mining companies in the combined correlation analysis of Huckle.
- Huckle (1995: 83 – 84) stated that the goal of profitability would be achieved through efforts in areas other than environmental responsibility until environmental legislation becomes more sophisticated and provides strong financial motivation for companies to behave in an "environmentally correct" manner. His opinion was that if such a change in legislative philosophy

occurred, a relationship between environmental responsibility and profitability would be more readily established. South Africa is following the international trend to improve environmental legislation (refer to section 2.3.2). The government recognized the limitations of existing legislation in the White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity (1997). The National Water Act 36 of 1998 is an example of stricter South African legislation that clearly includes the polluter pays principle as established under the Superfund Act of the United States.

The individual sectors were examined for trends relating to environmental responsibility and financial performance. In order to select sectors for the average financial performance analysis, the environmental responsibility per sector was investigated.

Of the 41 sectors considered from 1994 to 1998, five sectors do not have environmental reporting percentages (ERP's) or other evidence relating to environmental responsibility, 16 have little evidence of environmental responsibility, nine sectors have reasonable evidence of environmental responsibility and 11 sectors have good evidence of environmental responsibility. It is encouraging to note that 36 of the 41 sectors have given attention to environmental responsibility by way of environmental reporting. However, less than half of the sectors achieved reasonable or good evidence of environmental reporting.

The outstanding sectors identified were the mining-related sectors (coal, diamonds, gold, platinum, metals & minerals, and mining holding & houses), the steel sector, the paper sector, and the chemical, oils & plastics sector. The food sector and the building, construction & engineering sector also performed well, although their average ERP's are not as high as for the outstanding sectors.

Almost all of the sectors for which environmental responsibility resulted in an advantage relating to financial performance, experience stakeholder pressure, especially from environmental legislation and the green consumer. Whatever the

motivation of the companies in these sectors to be environmentally responsible, these companies have better financial performance than the companies in the same sectors that chose not to be environmentally responsible (as evidenced by the disclosure of environmental matters in their annual financial statements). It is possible that the companies that have chosen to be environmentally responsible have reaped the benefits of environmental responsibility as described in section 2.4.2. Allen (1994) found that enhanced financial performance of environmentally responsible firms appears to be attributable to stakeholder-agency considerations (refer to section 2.5).

The sectors for which environmental responsibility resulted in a disadvantage relating to financial performance are not subject to the same level of stakeholder pressure than the sectors for which environmental responsibility is an advantage. These sectors do not appear to have such a direct impact on the environment or on the consumer. Environmental legislation does not really affect these sectors, therefore the companies that spend money to be environmentally responsible have a poorer financial performance (refer to section 2.4.1 – disadvantages of environmental responsibility). However, this is probably a short-term phenomenon, as the environmentally responsible companies in these sectors will adjust easier to stricter environmental legislation that is probable in future, while the other companies would have to incur more costs to become compliant.

Of the 41 sectors considered from 1994 to 1998, environmental responsibility resulted in an advantage relating to financial performance for 13 sectors (six with good, six with reasonable and one with little evidence of environmental responsibility). For five sectors with good environmental responsibility and one with reasonable environmental responsibility no trends were clear or insufficient information was available. For four sectors (two with reasonable and two with little evidence of environmental responsibility) environmental responsibility resulted in a disadvantage relating to financial performance. For three sectors with little evidence of environmental responsibility no trends were clear or insufficient information was available. For the remaining 15 sectors no average financial

performance trend analysis or data plots were prepared due to no or very little evidence of environmental responsibility.

If the sectors with no or very little evidence of environmental responsibility become more environmentally responsible in future and report on environmental matters in their annual financial statements, it would assist future researchers to establish the relationship between environmental responsibility and financial performance more accurately.