Financial performance of environmentally responsible South African listed companies

HC Wingard
Department of Applied
Accountancy
University of South Africa

Q Vorster
Department of Accounting
and Finance
University of Pretoria

Abstract

The problem investigated is whether there is a positive relationship between the environmental responsibility and the financial performance of South African listed companies. The financial performance measures ROE, ROA, ROC and EVA were individually correlated with the environmental reporting percentages (i.e. the measure for environmental responsibility) for all the companies. Based on the results of the correlation analyses, it is concluded that there is a positive relationship between the environmental responsibility and the financial performance of South African listed companies; i.e. the higher the level of environmental responsibility of a company, the better its financial performance.

Key words

Environmental responsibility
Financial performance
Correlation analysis

1   Introduction

For centuries business was done without due consideration for the environment. However, during the 1970s and the 1980s the environmental catastrophes of Bhopal, Chernobyl and the Exxon Valdez captured the public's attention. This caused the realisation that there are ecological limitations for humans concerning the use of natural resources.

Traditionally, environmental issues and concerns have been viewed as a constraint to businesses. This view has resulted in environmental

managers relying heavily on a reactive, compliance-based approach to justify change. (Metcalf, Williams, Minter & Hobson 1996:7.)

During the 1990s businesses began to realise that efficient environmental management can open new opportunities to increase profits. According to Jones (1996: 54), many businesses are finding that environmental attention brings rewards. Such rewards can derive from increased competitiveness through improved profitability, from "licenses to operate"; whether from inclusion on important customers' lists of approved suppliers or, literally, from the regulatory agencies, and from a generally enhanced corporate image.

Competitiveness in the global marketplace increasingly depends on demonstrating effective environmental management and product design to purchasers of products and services, whether these buyers are secondary manufacturers, retailers, government agencies or consumers. One key to future marketplace success therefore lies in developing mechanisms to evaluate environmental impact, implementing improvement strategies and communicating environmental performance and improvements to stakeholder audiences. Companies stand to gain from these actions in real financial terms, through improved production and operating efficiencies, reduced liability exposure, enhanced customer relations and increased business opportunities. (Brown, Ward & Titus 1996:3.)

Environmental standards are the result of public concern over the impact that industry has on the environment – both locally and globally. The general public is demanding that companies all over the world should take responsibility for their actions. ISO 14000 is an attempt to harmonise the environmental requirements for all industries throughout the world. It is a voluntary standard, but companies that choose not to meet the international standards may effectively create trade barriers. (Pratt 1997:68.)

Internationally the integration of environmental impact into management decisions is increasingly being regarded as good for society and also good for business. Companies that do not commence with this integration will incur higher costs and miss out on potential revenues and competitive advantage (Epstein 1996:58). South African business has realised the importance of environmental responsibility. This realisation is illustrated by the trend towards more environmental reporting (De Villiers & Vorster 1997:37). However, the South African society has not yet reached the point at which it is regarded as essential to integrate environmental considerations into everyday business.

The problem investigated is whether there is a positive relationship between the environmental responsibility and the financial performance of South African listed companies. The hypothesis stated is that there is a positive relationship between the environmental responsibility and the

financial performance of South African listed companies, i.e. the higher the level of environmental responsibility of a company, the better its financial performance.

In the following sections, a review of the related literature is presented and the issues discussed of how the environmental responsibility of companies should be determined and measured and what measures of financial performance should be used. Thereafter the research methodology and the results are presented. Finally the conclusion reached regarding the above-mentioned hypothesis is discussed.

2 Review of the related literature

Conventional accounting does not meet all the expectations of stakeholders with regard to environmental reporting. The upward trend in environmental costs has led to a push for better environmental accounting. (Buhr 1994:37.) Enterprises that have learned more about their own costs by implementing environmental accounting practices have identified opportunities to improve environmental and economic performance (Quellette 1996:SR16).

Conventional accounting is developing to include environmental considerations. However, this evolutionary process will not be enough to be fully responsive to the change in culture that comes about with greater environmental sensitivity, and therefore totally new developments are also necessary. (Gray 1993:305.)

The following stakeholders that have an interest in environmental reporting were identified by means of a comparison of AC000 (SAICA 1990) and the studies undertaken by Allen (1994) and by Aspinwall & Company (1997):

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

Over time, new social expectations arise and new activities are considered to be socially desirable. Society is increasingly emphasizing the importance of the environment and the management of the environment in a more responsible manner. (Dunlap & Scarce 1991; Buhr 1994.)

The changing social conscience and social expectations have been translated into more stringent environmental laws. At present, the environmental legislation in South Africa is not as stringent as, for example, the United States. The South African government has recognized some of the limitations of prevailing legislation and is taking steps to remedy the situation (RSA 1997). The mining sector recently felt the effect of changes in South African environmental legislation, which is moving in the direction of international environmental legislation. The National Water Act No. 36 of 1998 applies the principle of "polluter pays" (RSA 1998). The mining sector is being required to compete on an equal legal footing with other interests when it comes to demands placed on the use of the country's water, land or mineral resources (Dixon 1998:2-3).

Local communities demand a high level of environmental performance from their industrial neighbours and seek some degree of reassurance that they are not being exposed to significant environmental risk (Welford & Gouldson 1993:9).

The demands of customers have a decided influence on companies in respect of improving their environmental performance. "Green consumers" are switching from brand loyalty to company loyalty (Schmidheiny & Zorraquin 1996:62). Companies are being motivated to improve their environmental performance by the prospect of enhancing their competitive position (Denton 1994).

In their attempts to improve their overall environmental performance, many companies are exercising their rights, both as purchasers and as vendors, by demanding that all of the companies in their supply chain should seek to minimize their environmental impact (Welford & Gouldon 1993:8). It is important for South African exporters to adhere to environmental standards in order to gain access to international markets (Huckle 1995:32).

In addition to employees' concerns regarding their working and living environment, they also want to work for ethical and responsible companies (Welford &Gouldson 1993:9).

Investors, lenders and insurers require much the same type of information about the environmental risk that a particular company faces. The quality of a company's environmental management can attract investors, convince lenders to grant loans and ensure that insurance can be obtained. (Welford & Gouldson 1993; Schmidheiny & Zorraquin 1996.)

Accountants and auditors are increasingly facing demands for the inclusion of environmental information in the accounts of both companies and countries. The accounting profession is revealing a great deal of energy and creativity in its attempts to have financial accounting reflect

to a greater extent the types of environmental realities that already affect business or may soon do so. Accountants and auditors who fail to present the correct information may in future have to pay for their mistakes. (Schmidheiny & Zorraquin 1996.)

Previous studies that examined the relationship between environmental performance and financial performance have rendered inconsistent results. The reasons that Ullmann (1985) offers for the inconsistency are a lack of theory, inappropriate definition of key terms and deficiencies in the available empirical databases. Belkaoui & Karpik (1989) suggested that a multicollinearity effect might explain the observation in other studies of either a positive, negative or nil correlation between financial performance and social disclosure. According to Allen (1994), the results of previous research have been mixed as a result of the short time intervals studied, lack of control variables and questionable or insufficient dependent variables. According to Klassen (1995), efforts to evaluate performance at the organisational level suffer from a limited view of both environmental performance and business performance.

3 Environmental responsibility

A significant environmental incident could result in severe financial loss for a company. Companies should decide on the level of environmental responsibility to be adopted to minimize environmental costs. Environmental costs include costs related to the prevention and remedying of environmental incidents. Expenditure related to prevention is usually of a capital nature, such as investment in pollution control equipment that is depreciated over the expected useful life of the equipment. If a significant environmental incident occurs, profit is reduced immediately as a result of lost production and sales, fines and clean-up costs and the costs of litigation and of a public relations campaign to counter negative publicity.

The disadvantages of environmental responsibility may arise when an environmentally responsible company exceeds regulatory compliance. One of the greatest risks of this strategy is the possibility of more efficient and/or cheaper technology being introduced after the company has made a large outlay of funds for equipment. Another possibility is that regulations do not become more stringent and/or the benefits of cheaper daily operations do not exceed the outlay. (Allen 1994:69.)

The benefits of environmental responsibility include a decrease in the cost of operations as a result of improved production yields, decrease in costs associated with employees, minimization of material and energy used, decrease in excess packaging and decrease in waste that requires safe disposal (Allen 1994:70-71). Enhanced revenues as a result of environmental responsibility may be achieved through improved competitiveness, better product quality, marketing based on

environmental responsibility, attracting of business partners in respect of distribution and supply of complementary products or services as well as through attracting more competent board members. An environmentally responsible company may also prosper through the reduction of its cost of capital while simultaneously increasing its access to funds. (Allen 1994:74-75.)

An environmentally responsible company has less regulatory risks and need not be concerned that non-compliance could result in lost production, fines, negative publicity, a subsequent public relations campaign and costly litigation. New regulations could oblige competitors to bear additional costs that may lead to the decline of their competitiveness in the market. (Allen 1994:76-77; Ranger 1993:44.)

According to Walden and Schwartz (1997), environmental responsibility is not easy to define, because of the diverse interpretations of the principle. In this regard, DesJardins (1998) has identified the classical model, the neo-classical model and the sustainable development model. The classical model incorporates legal constraints while the neo-classical model includes moral constraints as part of its limits. The neo-classical model may be criticised for its continued reliance on consumer demand in setting environmental limits to business conduct. Unconstrained demand will not resolve the dilemma created by poverty, population growth and destruction of the environment. The sustainable development model seeks to combine the natural constraints, established by ecological laws, with the minimum of moral constraints placed upon business activity.

The widely accepted general standard of environmental soundness is "sustainability", which is defined by the World Commission on Environment and Development as "to meet the needs of the present without compromising the ability of the future generations to meet their own needs" (Enderle &Tavis 1998:1134). Environmental responsibility manifests itself in a strategy, which the management of a company decides to follow, regarding the level of environmental performance it wishes to attain. The levels can range from mere compliance with legal requirements to the following of sustainable development principles (Veroutis & Aelion 1996).

Increasing stakeholder pressures on companies and their employees to be environmentally responsible have led to considerable progress being made by companies in the area of environmental responsibility. According to Berry and Rondinelli (1998), multinational corporations have gone through a dramatic transformation in their approaches to environmental protection – 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 to turning them into competitive opportunities during the 1990s.

The following studies were considered in order to determine how environmental responsibility should be measured:

Abbott and Monsen (1979) attempted to develop a social involvement disclosure scale based on a content analysis of annual reports. They found that the self-reported social disclosure method of measuring corporate social involvement has, despite its drawbacks, significant advantages as a technique for measuring corporate social responsibility.

Ingram and Frasier (1980) used content analysis to measure the content of each firm's environmental disclosure. Their methodology of content analysis involves the selection of analytical categories within the content material.

Wiseman (1982) constructed an indexing procedure to evaluate the contents of the annual report for environmental disclosures. The rating of the disclosures was based on the presence or absence and degree of specificity of each of the information items.

Van Niekerk (1998) considered the methods used by researchers who wanted to assess the information in annual financial statements objectively, including that of Ingram & Frasier and of Wiseman. She compiled a control list, based on a control list developed by Bogiages and Vorster (1993), to assess the environmental information that companies disclose in their annual financial statements. Van Niekerk developed a scale to assess the quality of the environmental information that was gathered by means of the control list.

4 Financial performance

Profitability is a key component of financial performance. From the management's point of view, profitability reflects the effectiveness with which management has employed both the total assets and the net assets that are recorded on the balance sheet. Effectiveness is assessed by relating net profit to the assets utilised in the generation of the profit. From the owners' point of view (the shareholders in the case of a company), profitability means the returns achieved, through the efforts of management, on the funds invested by the owners. (Helfert 1991:99;102.)

There was an era when market share was the best predictor and guarantor of profitability. However, in the past decade, the classic rules of strategy have broken down in a fundamental way. Large, well-known companies had exceptional success in gaining market share, but did not enjoy the profitability that was supposed to follow. In recent years, several of these companies have reversed their strategic thinking about market share and profitability. They have initiated radical changes to

their business design and in the process have achieved some of the success that had been eluding them. (Slywotzky 1998:12.)

According to Slywotzky (1998), success in today's marketplace depends on how profit is really made in an industry, where the "profit zone" is (i.e. that area within a specific industry in which profit is permitted) and how the business model should be designed in order to reach and operate in the profit zone. Profitability should be interpreted in terms of each individual company's circumstances. Companies that have become almost constantly customer-centric and profit-centric are known as "reinventors". They change their business design every five years and expect that process to continue. (Slywotzky 1998: 14-15.)

According to Capon, Farley and Hoenig (1996), a variety of key factors, drawn from several research traditions, appear to work together to produce better-than-average performance. The following causal factors stand out in terms of the consistency with which they affect alternative measures of performance:

- Competing in relatively concentrated markets with a high market share (environment);
- competing in growing markets (environment);
- large investment in research and development, especially for the development of new products and services (strategy);
- high involvement in markets outside of the US (strategy);
- low debt levels (strategy); and
- an entrepreneurial atmosphere (organisation) that supports a strategy of innovation. (Capon *et al* 1996:185.)

Measures of financial performance take a variety of forms. These measures differ from one another on several dimensions, and many issues are involved in the choice of the particular financial measure to employ. For example, measures may be absolute, return-based, internal, external, a level for a single period, a mean or a growth rate over several years, or vary about a mean or a trend. (Capon *et al* 1996:7.)

The following measures are often used to measure financial performance and were considered in the determination of the most appropriate measures of financial performance for the purposes of this study:

- Profit margin
- Return on assets
- Return on equity
- Earnings per share
- Price/earnings ratio
- Excess value
- Return on capital
- Economic value added

(Helfert 1991; Ross, Westerfield, Jordan & Firer 1996; Allen 1994; Stewart 1990; Epstein & Young 1999.)

5   Research methodology

For the purposes of this study, annual financial statements for the periods ending from 1994 to 1998 were investigated. Only listed companies were included, because their published annual financial statements are freely available. Only companies listed on the JSE during the calendar years 1994, 1995, 1996, 1997, and 1998 were included, provided that they were still listed at the time of selection. In order to include all possible environmentally responsible companies, the investigation was not limited to particular sectors of the JSE.

The control list and the judgement scale used by Van Niekerk (1998) are objective measures that were developed from previous empirical research and were selected for use in this study to determine environmentally responsible companies. The Department of Accounting and Finance at the University of Pretoria provided the data for the environmental responsibility measure expressed as points after the judgement scale had been applied to the information collected by means of the control list. The points per company were divided by the total number of possible points to calculate an environmental reporting percentage. The environmental reporting percentage (ERP) of each company was used as the indicator of that company's level of environmental responsibility.

It is acknowledged that the environmental reporting of a company might not necessarily reflect the actual level of its environmental responsibility. Future research should address the issue of how the environmental performance levels of companies should be determined in order to establish actual environmental responsibility.

An advantage of using more than one measure of financial performance is that the various measures can serve to validate one another. The following measures of financial performance were selected for the purposes of this study:

- Return on equity (ROE) = Profit after taxation / Average total owners' interest × 100;
- return on assets (ROA) = Normal profit before interest and taxation / Average total assets × 100;
- return on capital (ROC) = Profit after taxation / Average total capital employed × 100; and
- economic value added (EVA) = (Return on total capital - Weighted average cost of capital) × Capital.

The following were the reasons for selecting these measures:

- Most studies that used accounting numbers used ROE as the performance measure. Eighty percent of the studies that used accounting numbers selected ROE as a measure.
- Sixty percent of the studies that used accounting numbers selected ROA. Almost all the studies undertaken since the mid-eighties included ROA as a performance measure.
- ROC was not used often in previous studies. However, Stewart (1990) suggested the use of EVA to improve on ROC and regarded it to be a very important performance measure.
- EVA was selected, because this measure incorporates a long-term view, inherently incorporates risk and is not susceptible to the accounting and financing distortions of all other measures of profitability (Stewart 1990:153).

The Bureau of Financial Analysis (BFA) provided the data for the financial performance measures. Data for the ROE, ROA and ROC ratios were obtained from the standard BFA ratio service. The BFA specifically calculated EVA for the purposes of this study.

The following general definitions and techniques were used in the calculation of the ratios:

- The average values of the current and previous years were used in a number of ratios, especially where balance sheet values were related to income statement items.
- "Normal profit" was defined as the profit excluding any profit or loss of an extraordinary nature.
- Intangible assets, e.g. goodwill, as well as deferred tax were excluded when these ratios were calculated.
- Where group annual financial statements were presented, the ratios were based on group results.

For the purposes of calculating ROE, equity (or total owners' interest) represents the total interest of the ordinary and preference shareholders in the holding company plus the outside shareholders' interest in the ordinary and preference shares of the subsidiaries. For calculating ROA, total assets are the sum of total fixed assets, total long-term investments and total current assets. Income from investments is included in normal profit before interest and taxation. For calculating ROC, total capital employed is total owners' interest plus total long-term loan capital.

The EVA values, as calculated by the BFA, were limited to industrial companies only. The reason for this limitation is that the annual financial statements of mining and investment companies do not provide the type of financial information required.

The Department of Statistics at the University of Pretoria performed the correlation analyses for the purposes of this study. The purpose of the

correlation analyses was to determine whether a correlation exists between the environmental reporting percentages (i.e. resulting measure of environmental responsibility) and the financial performance measure, and to establish what the nature of the correlation is.

Correlation analyses were performed for the following groups of companies for each 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 in four to five years of the period of the study.

To qualify for the correlation analyses a company was required to have an environmental reporting percentage as well as a financial performance measure in the same year. The financial performance measures ROE, ROA, ROC and EVA were individually correlated with the environmental reporting percentages for all the companies, regardless of the JSE sector of the companies.

Correlation analyses per sector were attempted, because it was envisaged that such analyses could contribute meaningful information to the study. Unfortunately, these analyses were meaningless as a result of the limited number of observations per sector.

6   Results

The results of the correlation analyses are summarised in tables 1, 2, 3 and 4 below. In these tables, "r" represents the correlation coefficient, and the p-value (explained below) indicates whether or not the correlation is significant.

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 a company's environmental reporting percentage, the higher its financial performance measure. A negative correlation means that the higher a company's environmental reporting percentage, the lower its financial performance measure.

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 in which 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 the identification of significant correlation coefficients, should they exist, than a smaller sample size. In tables 1 to 4, a p-value of 10% or less is accepted as indicating a significant correlation between ERP and the relevant financial performance measure.

Table 1: Comparison of ERP and ROE for three groups

	Total population		*Excluding wild points*		*4 – 5 years green*	
Year	*p*	*r*	*p*	*r*	*p*	*r*
1998	0.836	0.02	0.624	0.05	0.122	0.25
1997	0.018*	0.23	0.019*	0.24	0.100*	0.25
1996	0.029*	0.28	0.050*	0.27	0.075*	0.28
1995	0.060*	0.24	0.100*	0.24	0.132	0.24
1994	0.175	0.20	0.298	0.19	0.325	0.19

* Significant

Table 2: Comparison of ERP and ROA for three groups

	Total population		*Excluding wild points*		*4 – 5 years green*	
Year	*p*	*r*	*p*	*r*	*p*	*r*
1998	0.009*	0.20	0.001*	0.34	0.003*	0.44
1997	0.036*	0.20	0.037*	0.21	0.199	0.20
1996	0.033*	0.28	0.063*	0.26	0.087*	0.27
1995	0.020*	0.29	0.045*	0.30	0.067*	0.29
1994	0.163	0.21	0.313	0.18	0.302	0.19

* Significant

Table 3: Comparison of ERP and ROC for three groups

	Total population		*Excluding wild points*		*4 – 5 years green*	
Year	*p*	*r*	*p*	*r*	*p*	*r*
1998	0.024*	0.17	0.037*	0.21	0.017*	0.36
1997	0.062*	0.18	0.071*	0.18	0.185	0.20
1996	0.028*	0.28	0.054*	0.27	0.075*	0.28
1995	0.050*	0.25	0.077*	0.26	0.096*	0.27
1994	0.136	0.22	0.292	0.19	0.311	0.19

* Significant

Table 4: Comparison of ERP and EVA for three groups

	Total population		Excluding wild points		4 – 5 years green	
Year	p	r	p	r	p	r
1998	0.170	-0.13	0.482	-0.08	0.819	-0.04
1997	0.003*	-0.34	0.002*	-0.36	0.051*	-0.35
1996	0.015*	-0.36	0.019*	-0.37	0.042*	-0.37
1995	0.001*	-0.48	0.007*	-0.48	0.019*	-0.45
1994	0.014*	-0.43	0.031*	-0.46	0.017*	-0.52

* Significant

For 1994, the correlation analyses 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 from 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, because larger sample sizes contribute to the identification of significant correlation coefficients, if 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 there is a relationship between ERP and ROE, ROA and ROC respectively.

For 1995, 1996 and 1997, the correlation analyses 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 for 1995 to 1997 there is evidence that the higher the ERP of a company, the higher its financial performance measure (ROE, ROA and ROC).

For 1995, 1996 and 1997, the correlation analyses 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, for 1995, the p-values exceed 10% for the correlation analysis between ERP and ROE, 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, because larger sample sizes contribute to the identification of significant correlations, if they exist.

For 1998, the correlation analyses 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 that the correlation coefficient is not significant. Therefore the correlation analyses between ERP and ROE for 1998 do not contribute any evidence that there is a relationship 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, the higher its ROA..

• 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, the higher its ROC.

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, which range from close to nil to a maximum of five percent. This means that the higher the ERP for a company, the lower its EVA. It is also noticeable that smaller sample sizes contributed to higher p-values as in the other correlation analyses, but as a consequence of the very low p-values, the results were not disregarded.

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

The correlation analysis between ERP and EVA for 1998 does not contribute any evidence that there is a relationship between ERP and EVA, because the high p-values indicate that the correlation coefficients are not significant. The increase in the number of companies that had 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 appear to be a correlation between EVA and the environmental reporting percentages.

7 Summary and conclusion

The results of the correlation analyses between ERP and ROE, ROA and ROC respectively indicate that there is a small positive correlation between environmental responsibility and financial performance. The financial performance of a company is better when its environmental responsibility is at a higher level. However, the positive correlation coefficients are small. This means that the evidence supporting the hypothesis of "the higher the environmental responsibility of a company, the higher its financial performance" is not very strong.

The results of the correlation analyses between ERP and EVA indicate that there is a small negative correlation between environmental responsibility and financial performance. The financial performance of a company is poorer when its environmental responsibility is at a higher level. 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 indicates that there is no correlation between environmental responsibility and financial performance. It is therefore concluded that the negative correlation between environmental responsibility and financial performance reduced every year from 1995 to 1997 to eventually reach a nil correlation in 1998.

The result 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 borne in mind that EVA was only calculated for industrial companies whereas ROE, ROA and ROC were calculated for all listed companies. This selection means that the mining companies that have high environmental reporting percentages as well as high profits were excluded from the EVA correlation analyses. It is possible that the negative correlation coefficients were the result of the reduction of profit for the purposes of calculating EVA by an inflation adjustment as well as by the incorporation of risk.

The results of the correlation analyses are in line with previous research findings. Allen (1994) found that the adoption of an environmentally responsible strategy significantly enhanced corporate financial performance for all firms except those that serve *industrial* customers. Firms that supply industrial customers appear to benefit financially from a strategy of environmental indifference or irresponsibility. Hart & Ahuja (1994), Klassen & McLauglin (1996) and the IRRC (1995) also found a positive correlation between increased environmental performance and improved financial performance.

However, the South African study undertaken by 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. The following are the reasons why the results of this research are not in line with Huckle's finding:

- Huckle's study was limited to industrial and mining companies, while this study included all companies listed on the JSE. Whereas the EVA analyses limited this study to industrial companies, the result was a negative correlation, which means that the financial performance of a company is poorer when the environmental responsibility is stronger, especially in 1995.
- 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 towards the improvement of environmental legislation. The government recognised 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 No. 36 of 1998 is an example of stricter South African legislation, which clearly includes the "polluter pays" principle as established in the Superfund Act of the United States.

Based on the results of the correlation analyses, it is concluded that there is a positive relationship between the environmental responsibility and the financial performance of South African listed companies, i.e. the stronger the environmental responsibility of a company, the better its financial performance. Although the evidence supporting the above-mentioned hypothesis is not very strong, it is clear that the correlation analyses indicate that the hypothesis is true. It is, however, important to note that this conclusion is based on the results in total.

Causality (cause-and-effect) could not be addressed as a result of insufficient environmental information (insufficient periods of environmental reporting). Consequently, no formal deduction can be made that a higher level of environmental responsibility contributes to better profitability. However, this does not rule out the possibility that it could be true.

This study is the first in South Africa to conclude that there is a positive relationship between the environmental responsibility and the financial performance of a company. The South African study undertaken by Huckle (1995) found that the profitability of a company in the industrial or mining sector of the JSE is unrelated to the level of environmental responsibility demonstrated by the company. His opinion was that if such a change in legislative philosophy occurred, a relationship between environmental responsibility and profitability would be more readily established. There is evidence that South Africa is following the international trend towards improving environmental legislation. This improvement in legislative philosophy contributed to the finding in this study.

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