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Reexamining the Expected Effect of Available Resources and Firm Size on Firm Environmental Orientation: An Empirical Study of UK Firms

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ABSTRACT. An emergent body of literature examined why some firms apply some environmental initiatives while other firms do not take responsibility for their natural environment? Thus, firm environmental orientation (responsiveness and performance) are linked in the literature to several variables. Unfortunately, the relationship between firm environmental orientation and either available resources or firm size showed mixed results and inconclusive evidence. Therefore, the aim of this paper is to show empirically how available resources and firm size can explain differences in firm environmental responsiveness and environmental performance. Econometric results of environmental responsiveness using the logistic regression model demonstrated that firm size does appear to add something unique in explaining differences in environmental responsiveness while available resource can be safely dropped from the model. However, econometric analysis of environmental performance using the maximum-likelihood random effects model showed strong evidence that available resources and firm size are significant predictors of firm environmental performance.

KEY WORDS: available resources, environmental orientation, environmental performance, environmental responsiveness, firm size, logistic regression, nested models, random effects model

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ABBREVIATIONS: AIC: Akaike Information Criterion; BIC: Bayesian Information Criterion; BIE: Business in the Environment; BMAC: Britain Most Admired Company; CER: Community and Environmental Responsibility; DEFR: Department for Environment, Food and Rural Affairs; FAME: Financial Analysis Made Easy; LR: likelihood ratio; PIRC: Pension and Investment Research Consultants; RRC: raising rivals' costs; RESET: regression specification error test; SIC: standard industrial classification

Introduction

According to the Raising Rivals' Costs (RRC) theory, firms have different strategies to increase the cost of their competitors. One of these strategies is to use differentiation and create unique reputation that cannot be easily imitated (McWilliams et al., 2002). Thus, by investing in superior environmental responsiveness and performance, a firm builds up a stock of reputational capital. The possibility that firms can develop a competitive edge over rivals by investing in environmental responsiveness and performance has been made increasingly likely over recent years by changes in consumer behavior and attitudes towards the environment (Fombrun and Shanley, 1990; McWilliams and Siegel, 2001; Peattie and Charter 1997). The scope for firms to do this, however, will be limited by firms' characteristics and the nature of their product and market (McWilliams and Siegel, 2001), as firms in the same industry context are found to respond differently to similar external pressures (Bhambri and Sonnenfeld, 1988).

Increasing pressure on firms to be more environmentally oriented has triggered a stream of literature

that wants to explore how firms' characteristics affect their response to the environmental demand. Examples of factors that have been suggested include available resources, firm size, research and development, capital intensity and corporate governance. Unfortunately, the impact of available resources and firm size on firm environmental orientation showed mixed results. In fact, some key reasons make reexamining the effect of available resources and firm size on firm environmental orientation is something really vital. First, the impact of available resources and firm size has been tested in previous work using one single measure: environmental responsiveness or environmental performance. Second, some of those studies that have found that firm size has no effect on firm environmental orientation also have demonstrated that available resources affect firm environmental–social orientation positively (e.g., Judge and Douglas, 1998; Waddock and Graves, 1997). Third, studies that reported a positive impact of firm size also revealed a non-significant effect of available resources on firm environmental performance (e.g., Toms, 2002).

Therefore, the aim of this paper is to fill this gape by reexamining empirically how available resources and firm size can explain differences in firm environmental responsiveness and environmental performance (i.e., environmental orientation) in a way that can enhance our understanding of mixed results in previous work.

Environmental orientation and available resources

Clearly the perceived costs and benefits of investment in environmental orientation by firms are of relevance. However, the question of why some firms choose to base their environmental strategy solely on regulatory compliance, whereas other firms choose to allocate resources to environmental orientation far beyond those required by legislation has attracted several researchers. Different arguments and explanations are suggested. For instance, authors such as Christie et al. (1995) and Zhuang and Synodinos (1997) found that insufficient resources, lengthy pay back period and the high cost of pollution prevention schemes were key factors preventing the successful implementation of environmental initiatives. Other researchers (Preston and O'Bannon, 1997; Waddock and Grave, 1997) argued that the available resources to the firm determine its corporate social–environmental performance. Thus, better financial performance can lead to available resources that may persuade firms to enhance their environmental responsiveness as well as performance.

To date, previous studies have argued that the amount of resources available to the firm will determine its organizational capacity in applying the appropriate environmental strategy and consequently its environmental responsiveness and performance. This argument, in fact, has been hypothesized in previous work as the greater the resources that are available to the firm, the greater the expected gains from firm's environmental orientation: as the available resources will not limit the firm's strategic choice and the chosen environmental strategy (Russo and Fouts, 1997; Sharma, 2000).

Unfortunately, empirical testing of this argument has revealed inconsistent evidence. While Henriques and Sadorsky (1996) found no significant impact of available resources on firm environmental responsiveness, Hammond and Slocum (1996) and Waddock and Graves (1997) revealed that available resources have a significantly positive impact on corporate social–environmental performance. Waddock and Graves (1997) suggested that their result could be explained by "slack theory". That is, better financial performance may lead to slack resources that may encourage firms to invest more to improve their social–environmental performance or "doing well by doing good" (Waddock and Graves, 1997, p. 312).

In a similar vein, Judge and Douglas (1998) found empirical support for the hypothesis that the level of integration of environmental issues into the strategic planning process and available resources are positively correlated. Likewise, Stanwick and Stanwick (1998b) concluded that those firms that have been judged to be environmentally responsive are more likely to have more resources. Nevertheless, Stanwick and Stanwick (2000) found a non-linear relationship between available resources and environmental orientation, with the highest level of environmental commitment being shown by firms with moderate available resources.

In the UK context, Chapple et al., (2001) established evidence that voluntary investment in environmental initiatives is related positively to capital intensity and the intensity of industry exports, whereas available resources and market share are negatively associated with the voluntary compliance decision. Conversely, Toms (2002) did not find significant evidence that firm available resources affect corporate environmental performance.

Environmental orientation and firm size

Firm size is also seen as a relevant factor that could determine firm environmental orientation for several alternatives arguments. First, large firms are likely to have more resources and that enhances a firm's ability to possess and process environmental information, which in turn gives the firm more competitive advantages (Russo and Fouts, 1997; Sharma, 2000). Second, firm size may reflect the legitimacy principle, or to what extent the firm is visible to the public and this is because a large firm is either seen as industry leader (Henriques and Sadorsky, 1996), or is likely to have more environmental risk (Cohen et al., 1995). Third, it is argued also that firm size could moderate the relationship between environmental strategy and stakeholder orientation (Buysse and Verbeke, 2003). Finally, firm size has been related to the existence of scale economies inherent in environmentally oriented investments (Chapple et al., 2005; McWilliams and Siegel, 2000).

Consequently, firm size is considered to be an important determinant in forcing firms to be more environmentally oriented. However, empirical findings have yielded mixed conclusions regarding the impact of firm size. For instance, Pava and Krausz (1996) pointed out that large firms tend to be more socially responsive. While Stanwick and Stanwick (1998a) demonstrated that firm size affects corporate social–environmental performance positively, Stanwick and Stanwick (1998b) found that small firms are more environmentally responsive. Alternatively, Orlitzky (2001) concluded that social–environmental performance could help both large and small firms. Also, Roy et al. (2001) showed that large firms have the ability to reduce their environmental impact as well as they tend to be more structured than small firms in their environmental response. They state ''firms with an environmental policy appeared to be larger'' (Roy et al., 2001, p. 260).

Similar evidence is found in the UK context. Toms (2000) concluded that firms that have achieved good environmental performance tend to be larger in size and non-family controlled. The Department for Environment, Food and Rural Affairs (DEFR) (2001) survey revealed that large firms have the ability and resources that enable them to spend more on environmental protection, as about 65% of total environmental expenditure came from large firms. The survey found that large firms spend more on environmental protection to maintain their reputation in the market. This positive significant relationship was proved and attributed in Moore (2001) to the fact that large firms are more likely to suffer if they do less in social and environmental issues.

Other studies presented opposing evidence that firm size has no significant effect on firm environmental orientation. While McGuire et al., (1988) and Roberts (1992) documented a non-significant positive relationship between firm size and firm social–environmental orientation, Waddock and Graves (1997) found a non-significant negative relationship using three different proxies for firm size (i.e., total assets, total sales and total number of employees). Also, Rojsek (2001) concluded that there is no significant difference between small and large firms in their perception of obstacles that affect environmental performance.

However, the results of Bowen (2002) showed that available resources and firm visibility are the significant factors in determining firm environmental orientation. Bowen states, ''It is not size *per se* that promotes environmental responsiveness, but elements of an organization's visibility and the resources available to it may result from its size'' (Bowen, 2002: pp. 123–124). Thus, if firm size is controlled for, the important issue is becoming the impact of firm resources on firm environmental performance. This divergence in the literature has led Karagozoglu and Lindell (2000) to argue that more studies are needed to examine carefully the effect of firm size as a determinant of firm environmental orientation.

Data and variables

Dependent variables

Despite the growing of environmental concern among business organizations, some main concepts such as corporate environmental commitment, environmental orientation, environmental responsiveness, environmental performance, environmental entrepreneurship and greening are still searching for distinctive and definite meanings. This dilemma is exemplified in McDonagh and Prothero (1997) ''Any study considers environmental issues is a complex one, and attempting to define terms such as ''ecology'' or ''environmentalism'' in one or two sentences is not an easy task.'' (McDonagh and Prothero, 1997, p. x). Similarly in Cramer (1998) it was stated that ''Environmental management is a young discipline: so young, in fact, that there is not yet even an agreed definition of the object of the research'' (Cramer, 1998, p. 162). Further, in Roarty (1997) it was said ''A growing number of companies would claim to be ''green'', although defining a ''green'' company is difficult and depends on the criteria adopted'' (Roarty, 1997, p. 249). Equally, Eden (1996) showed that the ''green business'' concept has become an ambiguous term that was defined differently in the literature and it has a general rather an explicit definition.

In this context, authors have proposed different operational definitions and terminologies that are either broad to include everything or narrow to concentrate on a specific task to the extent that we have now a list of various terminologies that all refer to one aim, which is protecting the natural environment. Examples of those prevailing proxies for social and environmental commitment are the pollution database of the Toxic Release Inventory (TRI) (Hamilton, 1995), the Council on Economic Priorities (CEPs) (Spicer, 1978), the Kinder, Lydenberg, Domini (KLD) index (Graves and Waddock, 1997) and the Fortune Corporate Reputation Index (Fryxell and Wang, 1994).

Therefore, although environmental performance and environmental responsiveness have different meanings, they have been used interchangeably in some previous work. While environmental responsiveness refers to the strategic positioning of the firm claim towards its environment responsibility (i.e., its environmental strategy), environmental performance expresses actually what the firm did. In this paper, I have tackled the two sides of firm environmental orientation: environmental responsiveness and environmental performance.

In the literature, researchers such as Henriques and Sadorsky (1996), through a self-reported survey, employed a binary variable that takes the value of unity if the firm has environmental policy and zero if it has not to reflect environmental responsiveness. Therefore, a similar binary variable is used to refer to environmental responsiveness to be able to compare empirical findings in the current study with previous work. The main source of firm environmental responsiveness, in this paper, is the survey of the Pensions and Investment Research Consultants Ltd (PIRC). The survey was based on information provided in 1999 and published in 2000 and covered 674 firms. Obviously, using a binary variable has some consequent biases such as discarding some important information in the data, as it does not allow respondents to express mild answers (Tabachnick and Fidell, 2001). On reflection, the binary variable is compared with a self-reporting measure that is available for approximately 96 firms of the study sample: the ranking of firms in the survey of Business in the Environment (BIE), which was also published in 2000. The BIE survey evaluates environmental performance in different dimensions for various samples of firms constituting. The correlation between the BIE measure and the binary variable that represents environmental responsiveness is 0.365 ($p < 0.001$), which provides a substantial reassurance about the dependability of the binary variable.

On the other hand, firm environmental performance is measured by the mean annual Community and Environmental Responsibility (CER) score in the *Management Today*'s Britain Most Admired Company (BMAC). To date, the disclosure of social and environmental data is still voluntary in the UK rather than compulsory, as in the USA. For example, Toms (2000 and 2002) as well as Edwards (1998) document the limitations in published data on environmental performance in the UK relative to the USA. As a result, the *Management Today* is the only source in the UK that oers a continuous dataset

of firm environmental recorder. Therefore, I have followed other researches (e.g., Toms 2002) and used the assessment of managerial peers as a proxy for firm environmental performance.

This annual survey of the BMAC covers the ten companies with the largest market capitalization in each of 26 UK sectors. The Chief Executive of each firm is asked to evaluate the other nine firms in his or her sector on a number of dimensions, one of which is CER. The evaluations consist of rankings on a scale of zero (poor performance) to ten (excellent performance). The published scores are the arithmetic means of the nine rankings attributed to each firm. By comparing the PIRC list with the database of BMAC for the last 5 years before publishing the PIRC report (1995–1999), the study was able to match the data for 173 firms in both surveys.

One of the arguments that can be debated against using the CER score is that it reflects what managerial peers think about a firm's environmental performance and, as such, is not a direct measure of performance. For example, the assessments reflect the views of just one class of stakeholders (Logsdon and Wartick, 1995) and perceptions may be different amongst, for example, unions or consumers. In other words, the assessments may more accurately illustrate how well firms market their environmental credentials than how well the firms actually perform. Notwithstanding this, it can be argued that the CER scores are particularly useful in that external perceptions of environmental performance are likely to be of more concern to the firm itself than actual performance.

Therefore, a more substantive concern with using CER scores is that they can only act as a proxy for underlying environmental performance. This raises the possibility of measurement error, with well-known repercussions for the consistency of regression estimates. One approach which has been used with some success in different contexts is to estimate a ''multiple-indicators, multiple-causes'' (MIMIC) model (see, for example, Siegel, 1997). A similar approach in the corporate social responsibility context is the system approach or multiple outputs and indicators, which capture all stages of the system, such as codes, process and outcomes (see, for example, Mitnick, 2000). Since alternative measures of environmental performance for UK firms do not exist, I will not able to pursue, for example, the MIMIC approach or the system approach here.

In the light of some of these concerns, the *Management Today*'s measure is compared with the ranking of firms in the survey of the BIE. The correlation coecient between the BIE measure and the CER scores is 0.59 ($p < 0.001$). This correlation presents a considerable reassurance about the reliability of the CER scores.

The study controls for the perception problem by including controls for intangible assets and environmental responsiveness. The rationale for this is that the ranking of a firm's environmental performance by peers may be affected by the way the firm has been able to present an image to the public through advertising. Further, without advertising, consumers who are interested in environmentally friendly products may not be aware of these products and how they differ from those of other firms (McWilliams and Siegel, 2001). Therefore, advertising can be seen as a market signal of a firm's environmental responsiveness and that may affect its environmental reputation. Furthermore, the study controls for the impact of environmental responsiveness, as a signal of firm environmental concern, in all models that test the impact of available resources and firm size on firm environmental performance.

Although I have discussed some relevant arguments against the using of the *Management Today* database to measure environmental performance, dierent evidence and arguments are presented that validate the using of this measure. For instance, the high and significant correlation that is found between the *Management Today* dataset and the BIE database.

Independent variables

The main two independent variables are available resources and firm size. Return on assets, computed by dividing firm profits before tax by its total assets, is used a proxy for available resource (Waddock and Graves, 1997) as it mainly reflects operating results and not capital structure decisions (Schamlensee, 1989, p. 960). Different proxies are used in the literature to measure firm size: total number of

employees, total assets and total sales. The distribution of firm size is unlikely to be normally distributed. This problem is addressed in the literature and researchers (e.g., Waddock and Graves, 1997; McWilliams and Siegel, 2000) often use the natural logarithm of firm size rather than the original dataset as a proxy for the firm size. Following that, the natural logarithm of total number of employees is used as a proxy for firm size. Experimenting with the other two proxies, total assets and total sales, does not alter the key results reported in this paper. Data for independent variables and control variables are taken from the Datastream and Financial Analysis Made Easy (FAME) databases.

Control variables

A series of variables will be included in empirical models to control for other potential influences on environmental responsiveness and performance. Control variables that have been used in the literature are firm leverage, advertising, capital intensity, firm age and industry effect. Leverage is used in the literature (e.g., Waddock and Grave, 1997) as a proxy for the risk. It is used to reflect management's risk tolerance that influences its attitude towards social activities and measured by ratio of total debt to total assets. Firms use advertising to signal their environmental orientation to their consumers and therefore advertising is considered a key determinant of firm environmental responsiveness and performance (McWilliams and Siegel, 2001). Following literature (e.g., Chapple et al., 2001) the ratio of total intangible assets to total sales is used to capture the effect of the advertising. Capital intensity is also included as a control variable for the expected relationship between capital intensity and environmental investment decision (Chapple et al., 2001; Rust and Rothwell, 1995). Capital intensity measured as the ratio between payment in fixed assets and the firm's total assets.

Firm age is also controlled for as management problems and principles are rooted in time (Greiner, 1972). Further, controlling for firm age is becoming important on the base that the more developed the firm, the greater is the likelihood that problems associated with path dependency will hinder strategic change in the firm (Henderson and Clark, 1990). Controlling for industry effects is also important as product differentiation may depend on the market itself and the industry to which the firm belongs. For instance, in industries such as food and cosmetics where products are highly differentiated it may be more likely to find significant concern with environmental attributes (McWilliams and Siegel, 2001). Consequently, the study supplements the models by experimenting with the inclusion of dummy variables for each two-digit standard industrial classification (SIC) code.

Model selection and empirical results

Econometric estimates of environmental responsiveness are reported in Table I. As the dependent variable is a binary variable that takes the value of unity or zero, the logistic regression model is used to predict the probability that developing an environmental policy (as a proxy for firm environmental responsiveness) will be determined by available resources and firm size with controlling for other variables as stated above. An unrestricted model has been set up in which available resources and firm size are included as explanatory variables (as well as controls variables). Also, two restricted models nested within this are considered. The first (firm size only model) excludes available resource. The second (available resources only model) excludes firm size.

The link test (Pregibon, 1980) as a special form of the regression specification error test (RESET) (Ramsey, 1969) does not show specification errors that result from incorrect functional form, as it was not significant under any case. Also, all models, reported in Table I, are statistically significant as the likelihood ratio (LR) χ^2 (Pregibon, 1981) is significant ($p < 0.001$) in every case. Further, the p-value for the Hosmer–Lemeshow goodness-of-fit test (Hosmer and Lemeshow, 2000) suggests that the model fits reasonably well except for the ''available resources only model'' (13.48, $p < 0.10$). Thus, the p-value for the goodness-of-fit test suggests problems concerning the fit of this model.

Then a LR test of each of the restricted models against the unrestricted model has been conducted. The LR χ^2 statistics for nested models are 1.82 ($p > 0.10$) for the ''firm size only model'' and 57.01 ($p < 0.001$) for the ''available resources only model''.

TABLE I

Logistic regression models of firm environmental responsiveness

Dependent: environmental policy	Unrestricted model	Nested models	
		Firm size only model	Available resource only model
Available resources	1.561 (1.158)		0.3096 (1.1019)
Firm size	0.7385*** (0.1061)	0.7167*** (0.1041)	
Environmental performance	0.7673*** (0.1615)	0.8201*** (0.1594)	1.019*** (0.1594)
Firm risk	−0.6399 (0.8204)	−0.9792 (0.7812)	0.0707 (0.7496)
Intangible assets intensity	−0.2426 (0.3446)	−0.2845 (0.3459)	−0.4150 (0.3160)
Capital intensity	−4.031+ (2.198)	−3.932+ (2.208)	−4.397* (2.122)
Age	−0.0102** (0.0037)	−0.0095** (0.0037)	−0.0047 (0.0033)
Industry Effects (2-digit sic)	YES***	YES***	YES***
LR(χ^2)	249.86***	248.04***	192.85***
Pseudo R^2	0.30	0.2966	0.2306
Link Test	0.018	0.019	0.034
Hosmer–Lemeshow (χ^2)Test	12.85	9.54	13.48+
LR Test – Nested model (χ^2)		1.82	57.01***
Akaike (AIC)	636.2672	636.091	691.2797
Bayesian (BIC)	748.6488	743.9774	799.6488

Note: N=173 Firms

(i) Figures in brackets are standard errors.

(ii) $^{+}p<0.10$; $^{*}p<0.05$; $^{**}p<0.01$; $^{***}p<0.001$.

(iii) Link Test of Pregibon (1980) is a special form of Ramsey (1969) regression specification error test (RESET).

(iv) Hosmer-Lemeshow χ^2-test is the Hosmer and Lemeshow (2000) goodness-of-fit test.

(v) LR test for nested model is the likelihood ratio test of each of the restricted models against the unrestricted model.

(vi) AIC and BIC are the standard information criteria for model selection, as a lower figure means a better specified model.

The implication of this is that the available resource can be safely dropped, but not firm size. That is, firm size does appear to add something unique in explaining dierences in environmental responsiveness. Further evidence comes from calculating the standard information criteria for the three models: the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) (also reported in Table I). Remembering that for both AIC and BIC, a lower figure means a better specified model (Greene, 2003), both criteria confirm that the ''firm size only model'' is superior to all other models with AIC 636.091 and BIC 734.9774. Thus, the general conclusion is that firm size, rather than firm available resources, determines its environmental responsiveness.

Econometric analysis of environmental performance, as dependent variable, is reported in Table II using the maximum-likelihood random effect model. Table II presents an unrestricted model that includes available resources and firm size as explanatory variables as well as controls for other variables. Similarly, two restricted models nested within this are considered: (firm size only model) and (available resources only model). Statistical significant of all models reported in Table II is proved, as the LR χ^2 is significant ($p < 0.001$).

The LR test of each of the restricted models against the unrestricted model was significant in all cases, which means that none of firm size and available resources can be safely dropped. This conclusion is confirmed by calculating the standard information criteria (AIC and BIC). Both criteria validating that the ''unrestricted model'' is superior to all other models with AIC 1325.156 and BIC 1448.233. Thus, results of the unrestricted model reported in Table II verify that firm size and available resources have a key role in predicting firm environmental performance.

TABLE II

Maximum-likelihood random effect models of firm environmental performance

Dependent: environmental performance	Unrestricted model	Nested models	
		Firm size only model	Available resource only model
Available resources	0.6257* (0.3251)		0.5020 (0.3253)
Firm size	0.1606*** (0.0380)	0.1554*** (0.0385)	
Environmental responsiveness	0.3113** (0.1059)	0.3210** (0.1076)	0.4556** (0.1063)
Firm risk	0.4056^{+} (0.2328)	0.3041 (0.2278)	0.5699* (0.014)
Intangible assets intensity	0.0293 (0.0923)	0.0054 (0.0916)	0.0046 (0.0931)
Capital intensity	0.8715 (0.7380)	0.9777 (0.7410)	0.9074 (0.7566)
Age	−0.0028* (0.0014)	−0.0003* (0.0015)	−0.0044* (0.0015)
Industry effects (2-digit sic)	YES***	YES***	YES***
LR (χ^2)	93.19***	89.49***	76.56***
LR test–Nested model (χ^2)		3.70*	16.63***
Akaike (AIC)	1325.156	1326.86	1339.74
Bayesian (BIC)	1448.233	1451.023	1461.156

Note: N=173 Firms

(i) Figures in brackets are standard errors.

(ii) $^{+}p < 0.10$;$^{\star}p < 0.05$; $^{\star\star}p < 0.01$;$^{\star\star\star}p < 0.001$.

(iii) LR test for nested model is the likelihood ratio test of each of the restricted models against the unrestricted model.

(iv) AIC and BIC are the standard information criteria for model selection, as a lower figure means a better specified model.

Conclusion

In spite of many studies examined why some firms are more likely to be environmentally responsive or to have a superior environmental performance, the impact of available resources and firm size on firm environmental orientation showed inconclusive evidence. Therefore, the aim of this paper was to afford empirical evidence regarding this issue using a sample of UK firms.

The results of the logistic regression model of firm environmental responsiveness, as expressed by having an environmental policy, demonstrated that firm size and rather available resources is more noteworthy in predicting firm environmental responsiveness. Additionally, the results of the maximum-likelihood random effects model of firm environmental performance revealed that both available resources and firm size are significant predictors in determining firm environmental performance. Looking at the control variables, the only significant variables were firm age and industry effects. While firm age attracts significant but negative coefficients with environmental responsiveness and environmental performance, industry effect in the entire estimated models was found to be significant.

Discussion

Managers of organizations can create competitive advantages for their firms when they accumulate and manage resources that are rare, valuable and are hard to duplicate (Barney, 1991). This study demonstrates that the amount of resources available to the firm and firm size will determine its organizational capacity in applying the appropriate environmental initiatives and then its environmental performance. However, there is no evidence that available resources will limit the firm's strategic choice and the chosen environmental responsiveness.

Comparing empirical evidence of this paper with previous work can enhance our thought in various ways. For most, the insignificant impact of available

resources on firm environmental responsiveness can be considered as supportive evidence for the work of Henriques and Sadorsky (1996). As a result, the conclusion of some previous studies (e.g., Judge and Douglas, 1998) that the level of integration of environmental issues into the strategic planning process and available resources are positively correlated is questioned here.

Furthermore, finding positive and significant effect of firm size on environmental responsiveness confirms the results of some prior research (e.g., Pava and Krausz, 1996), which argued that large firms tend to be more socially responsive. It seems that the plausible justification is that large firms have the ability to reduce their environmental impact as they tend to be more structured than small firms in their environmental response (Roy et al., 2001), as well as they are more likely to suffer if they do less in social and environmental issues (Moore, 2001). Thus, the prevailing argument that large firms are concerned more because they have available resources is also questioned here.

One more interesting result, in this paper, that deserves some discussion is that while available resources have no impact on firm environmental responsiveness, empirical findings showed positive and significant effect of available resources on firm environmental performance. Indeed, this can be explained by the fact that ''it is an easy task to claim something than actually to do it''. In other words, this is the distinction between responsiveness and performance. While environmental responsiveness refers to the strategic positioning of the firm claims towards its environment responsibility, environmental performance expresses actually what the firm does regarding its natural environment. A considerable reassurance regarding this conclusion came from performing one-way analysis of variance (ANOVA) to test how environmental performance differs according to environmental responsiveness. The resulting *F*-statistics 106.91 ($p < 0.001$) indicates that significant dierences exist in environmental performance with respect to firm environmental responsiveness. Moreover, to know the relationship between the existence of an environmental policy and the action taken with respect to environmental issues covered by such policies, I have calculated the Pearson correlation between both measures. The correlation coecient is 0.315 ($p < 0.001$), which in turn provides a substantial reassurance regarding this relationship.

The significant impact of firm age on firm environmental responsiveness and performance corroborates the consequence of controlling for firm age, something that most of preceding work made no attempt to control for. One possible explanation for the negative impact of firm age is that younger firms are less likely to be constrained by path dependency and are more able to position themselves in the market on the basis of their environmental responsiveness. A related point is that younger firms are likely to have newer assets, which do not breach environmental legislation and that use energy efficiently and less likely to face serious problems associated with developing and implementing environmental initiatives such as dealing with new technology, managerial communication and resistance of employees. Therefore, unlike what Roberts (1992) argued that the mature firms would involve more in social responsibility, econometric analysis in this study proved that younger firms tend to be more curious than older firms in protecting their natural environment.

Similar to several previous studies that raised the growing importance of industry effect in determining firm environmental orientation (e.g., Rust and Rothwell, 1995; Waddock and Graves, 1997), industry effect in the entire estimated models was found to be significant. This result, in fact, can be recognized as supporting evidence for the empirical conclusion of Cottrill (1990), which showed a significant variation between industries in respect of their corporate social responsibility. Therefore, the results of those prior studies that did not control for industry effect (e.g., Judge and Douglas, 1998; Preston and O'Bannon, 1997) might need to be reconsidered.

In addition, the insignificant impact of intangible assets intensity on environmental responsiveness and environmental performance does not support the suggested positive correlation, in Arora and Gangopadhyay (1995), between investment in intangible assets and investment in voluntary compliance with environmental regulation. One potential reason of getting this result is that firms may find that it is more easily for them to publicize their social responsibility and rather their environmental orientation using advertising (Chapple et al., 2001).

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References

Arora, S. and S. Gangopadhyay: 1995, 'Toward a Theoretical Model of Voluntary Overcompliance', *Journal of Economic Behavior and Organization* **28**, 289–309.

Barney, J.: 1991, 'Firm Resources and Sustained Competitive Advantage', *Journal of Management* **17**(1), 99–120.

Bhambri, A. and J. Sonnenfeld: 1988, 'Organizational Structure and Corporate Social Performance: A Field Study in Two Contrasting Industries', *Academy of Management Journal* **31**(3), 642–662.

Bowen, F.: 2002, 'Does Size Matter?', *Business and Society* **41**(1), 118–124.

Business in the Environment: 2000, *Fifth Index of Corporate Environmental Engagement* (Business in the Environment, London).

Buysse, K. and A. Verbeke: 2003, 'Proactive Environmental Strategies: A Stakeholder Management Perspective', *Strategic Management Journal* **24**(5), 453–470.

Chapple, W., A. Cook, V. Galt and D. Paton: 2001, 'The Determinants of Voluntary Investment Decision', *Managerial and Decision Economics* **22**, 453–463.

Chapple, W., C. Morrison and R. Harris: 2005, 'Manufacturing and Corporate Environmental Responsibility: Cost Implication of Voluntary Waste Minimisation', *Structural Change and Economic Dynamics* **16**(3), 347–373.

Christie, I., H. Rolfe and R. Legard: 1995, *Cleaner Production in Industry* (Policy Studies Institute, London).

Cohen, M., S. Fenn and S. Konar: 1995, Environmental and Financial Performance: Are They Related? (Owen Graduate School of Management Working Paper, Vanderbilt University).

Cottrill, M.: 1990, 'Corporate Social Responsibility and the Marketplace', *Journal of Business Ethics* **9**(9), 723–729.

Cramer, J.: 1998, 'Environmental Management: From "Fit" to "Stretch"', *Business Strategy and the Environment* **7**(3), 162–172.

Department for Environment, Food and Rural Affairs (DEFR): 2001, *The Digest of Environmental Statistics* (Department for Environment, Food, and Rural Affairs, London).

Eden, S.: 1996, *Environmental Issues and Business* (John Wiley & Sons, Chichester).

Edwards, D.: 1998, *The Link between Company Environmental and Financial Performance* (Earthscan Publications Ltd, London).

Fombrun, C. and M. Shanley: 1990, 'What's In a Name? Reputation Building and Corporate Strategy', *Academy of Management Journal* **33**(2), 233–258.

Fryxell, G. and J. Wang: 1994, 'The Fortune Corporation 'Reputation' Index: Reputation for What?', *Journal of Management* **20**(1), 433–438.

Greene, W.: 2003, *Econometric Analysis,* 4th edition (Prentice-Hall International, NJ).

Greiner, L.: 1972, 'Evolution and Revolution as Organizations Grow', *Harvard Business Review* **50**(4), 37–46.

Hamilton, J.: 1995, 'Pollution as News: Media and Stock Market Reactions to the Toxic Release Inventory Data', *Journal of Environmental Economics and Management* **28**(1), 98–113.

Hammond, A. and J. Slocum: 1996, 'The Impact of Prior Firm Financial Performance on Subsequent Corporate Reputation', *Journal of Business Ethics* **15**(2), 59–165.

Henderson, R. and K. Clark: 1990, 'Architectural Innovation: The Reconfiguration of Existing', *Administrative Science Quarterly* **35**(1), 9–30.

Henriques, I. and P. Sadorsky: 1996, 'The Determinants of an Environmentally Responsive Firm: An Empirical Approach', *Journal of Environmental Economics and Management* **30**, 381–395.

Hosmer, W. and S. Lemeshow: 2000, *Applied Logistic Regression,* 2nd edition (John Wiley & Sons, NY).

Judge, T. and W. Douglas: 1998, 'Performance Implications of Incorporating Natural Environmental Issues into the Strategic Planning Process: An Empirical Assessment', *Journal of Management Studies* **35**, 243–262.

Karagozoglu, N. and M. Lindell: 2000, 'Environmental Management: Testing the Win-win Model', *Journal of Environmental Planning and Management* **43**(6), 817–829.

Logsdon, J. and S. Wartick: 1995, 'Commentary: Theoretically Based Applications and Implications for Using

the Brown and Perry Database', *Business and Society* **34**(2), 222–226.
McDonagh, P. and A. Prothero: 1997, *Green Management: A Reader* (The Dryden Press, London).
McGuire, J., A. Sundgren and T. Schneeweis: 1988, 'Corporate Social Responsibility and Firm Financial Performance', *Academy of Management Journal* **31**(4), 854–872.
McWilliams, A. and D. Siegel: 2000, 'Corporate Social Responsibility and Financial Performance: Correlation or Misspecification?', *Strategic Management Journal* **21**, 603–609.
McWilliams, A. and D. Siegel: 2001, 'Corporate Social Responsibility: A Theory of the Firm Perspective', *Academy of Management Review* **26**, 117–127.
McWilliams, A., D. Van Fleet and K. Cory: 2002, 'Raising Rivals' Costs through Political Strategy: An Extension of Resource-Based Theory', *Journal of Management Studies* **39**(5), 707–723.
Mitnick, B.: 2000, 'Commitment, Revelation, and the Testaments of Belief: The Metrics of Measurement of Corporate Social Performance', *Business and Society* **39**(4), 419–465.
Moore, G.: 2001, 'Corporate Social and Financial Performance: An Investigation in the UK Supermarket Industry', *Journal of Business Ethics* **34**(4), 299–315.
Orlitzky, M.: 2001, 'Does Firm Size Confound the Relationship between Corporate Social Performance and Firm Financial Performance?', *Journal of Business Ethics* **33**(2), 167–180.
Pava, M. and J. Krausz: 1996, 'The Association between Corporate Social-responsibility and Financial Performance: The Paradox of Social Cost', *Journal of Business Ethics* **15**(3), 221–257.
Peattie, K. and M. Charter: 1997, 'Green Marketing', in P. McDonagh and A. Prothero. (eds), *Green Management: A Reader* (The Dryden Press, London), pp. 388–412.
Pensions and Investment Research Consultants (PIRC): 2000, *Environmental Reporting: Survey of the FTSE All-Share Index* (Pensions and Investment Research Consultants Ltd., London).
Pregibon, D.: 1980, 'Goodness of Link Tests for Generalized Link Models', *Applied Statistics* **29**, 15–24.
Pregibon, D.: 1981, 'Logistic Regression Diagnostics', *Annals of Statistics* **9**, 705–724.
Preston, L. and D. O'Bannon: 1997, 'The Corporate Social-Financial Performance Relationship: A Typology and Analysis', *Business and Society* **36**(4), 419–429.
Ramsey, B.: 1969, 'Tests for Specification Errors in Classical Linear Least Square Regression Analysis', *Journal of the Royal Statistical Society* **31**, 350–371.
Roarty, M.: 1997, 'Greening Business in a Market Economy', *European Business Review* **97**(5), 244–254.
Roberts, R.: 1992, 'Determinants of Corporate Social Responsibility Disclosure: An Application of Stakeholder Theory', *Accounting, Organization and Society* **17**(6), 595–612.
Rojsek, I.: 2001, 'From Red to Green: Towards the Environmental Management in the Country in Transition', *Journal of Business Ethics* **33**(1), 37–50.
Roy, M., O. Boiral and D. Lagacé: 2001, 'Environmental Commitment and Manufacturing Excellence: A Comparative Study within Canadian Industry', *Business Strategy and the Environment* **10**(5), 275–268.
Russo, M. and P. Fouts: 1997, 'A Resources-based Perspective on Corporate Environmental Performance and Profitability', *Academy of Management Journal* **40**, 534–559.
Rust, J. and G. Rothwell: 1995, 'Optimal Response to A Shift Regulatory Regime: The Case of the US Nuclear Power Industry', *Journal of Applied Econometrics* **10**(4), 75–118.
Schmalensee, R.: 1989, 'Inter-industry Studies of Structure and Performance', in R. Schmalensee and R. Willig. (eds), *Handbook of Industrial Organization* (Elsevier Science Publishers, Amsterdam), 951–1009.
Sharma, S.: 2000, 'Managerial Interpretations and Organizational Context as Predictors of Corporate Choice of Environmental Strategy', *Academy of Management Journal* **43**(4), 681–697.
Siegel, D.: 1997, 'The Impact of Investments in Computers on Manufacturing Productivity Growth: A Multiple-Indicators, Multiple-Causes Approach', *Review of Economics and Statistics* **79**(1), 68–78.
Spicer, B.: 1978, 'Investors, Corporate Social Performance and Information Disclosure: An Empirical Study', *The Accounting Review* **33**(1), 94–111.
Stanwick, P. and S. Stanwick: 1998a, 'The Relationship between Corporate Social Performance, and Organizational Size, Financial Performance, and Environmental Performance: An Empirical Examination', *Journal of Business Ethics* **17**(2), 195–204.

Stanwick, S. and P. Stanwick: 1998b, 'Corporate Social Responsiveness: An Empirical Examination Using the Environmental Disclosure Index', *International Journal of Commerce Management* **8**(3), 26–40.

Stanwick, S. and P. Stanwick: 2000, 'The Relationship between Environmental Disclosures and Financial Performance', *Eco-Management and Auditing* **7**(4), 155–164.

Tabachnick, B. and L. Fidell: 2001, *Using Multivariate Statistics,* 4th edition (Harper Collins College, New York).

Toms, S.: 2000, *Environmental Management, Environmental Accounting and Financial Performance* (The Chartered Institute of Management Accountants, London).

Toms, S.: 2002, 'Firm Resources, Quality Signals and the Determinants of Corporate Environmental Reputation: Some UK Evidence', *British Accounting Review* **34**, 257–282.

Waddock, S. and S. Graves: 1997, 'The Corporate Social Performance–Financial Performance Link', *Strategic Management Journal* **18**, 303–319.

Zhuang, L. and D. Synodinos: 1997, 'Legislation for the Environment: Does It Work?-An Empirical Study into Selected UK-Based Chemical Manufacturing Firms', *Management Decision* **35**(7), 508–518.

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