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Does the Market Value Corporate Environmental Responsibility? An Empirical Examination

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ABSTRACT
Although researchers have applied different theoretical perspectives to illustrate the relationship between corporate environmental responsibility and profitability, to date theories are contested and empirical findings are inconclusive. Therefore, the aim of this research was to present empirical evidence regarding the influence of engaging in environmental responsibility on corporate market value, as the first study to be applied in the Egyptian context. The findings demonstrate that the market compensates those firms that care for their environment, as environmental responsibility exerted a positive and significant coefficient on the firm market value measured by Tobin's *q* ratio. This aligns stakeholder theory as well as resource-based theory arguments, and provides supporting evidence for those studies that have concluded that it pays to be environmentally responsive. Copyright © 2007 John Wiley & Sons, Ltd and ERP Environment.

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Introduction

AFTER THE PUBLICATION OF *SILENT SPRING* BY CARSON (1962), WHICH SHOWED WHAT HUMANS were doing and how they damaged the earth, environmental legislation changed considerably to reflect the growth of environmental awareness in society. As a result, business organizations started to reconsider their natural environment as a key stakeholder that not only can affect the outcomes of their decisions but also can be affected by their actions.

From an economic point of view, Porter and Van der Linde (1995) asserted that strict legislation can lead to improvement in corporate environmental attitude and practice by inducing a firm's innovation ability to comply with regulations or even go beyond mandatory requirements. Thus, according to this

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view, the existing trade-off between business organizations and the natural environment can be solved, and this means that firm environmental responsibility and economic performance can be correlated positively. However, Palmer *et al.* (1995) argued against this paradigm, by clarifying that business organizations do not usually sacrifice their profits for the sake of environmental protection.

In this context, the relationship between environmental responsibility and profitability represents a perplexing issue in the literature. This is because, while some studies documented a positive relationship (e.g. Spicer, 1978; Waddock and Graves, 1997; Schnietz and Epstien, 2005), other studies revealed a negative relationship (e.g. Chen and Metcalf, 1980; Jaggi and Freedman, 1992; Wagner *et al.*, 2002). Furthermore, some other authors argued for the existence of either no significant relationship (e.g. Mahapatra, 1984; McWilliams and Siegel, 2000; Mill, 2006; Murray *et al.*, 2006) or a curvilinear relationship (Barnett and Solomon, 2006).

Furthermore, environmental awareness is a new prototype among Egyptian corporations, and many firms are still not convinced enough to take care of their environment. In 1997, for the first time Egypt had a full time Minister of State for Environmental Affairs to be responsible for activating environmental national and international standards, polices and initiatives to achieve sustainable development as well as rehabilitating the effectiveness of the Egyptian Environmental Affairs Agency (EEAA) to monitor the performance of business organizations in environmental issues (EEEA) (2006). One surprising matter that made the mission of the author in this study difficult is the lack of theoretical and empirical studies that tackle corporate environmental responsibility from a managerial viewpoint in the Egyptian context, as almost all the existing studies cover ecological or macro-economical topics. Thus, the author depended much on the current international literature to build the framework of this study.

Accordingly, this research aimed to explore the influence of engaging in environmental responsibility on corporate market value. In other words, the main question that this study sought to answer can be articulated as follows: does the market value corporate environmental responsibility? The other leading contribution of this study derives from the fact that this is the first study, to the best of my knowledge, that examines this issue in the Egyptian context; the literature is dominated by the Anglo-American inventory.

What Do the Theory and Empiricism Tell Us?

Although researchers have applied different theoretical perspectives to illustrate the relationship between corporate environmental responsibility and firm market value, to date theories are inconclusive and empirical evidence is mixed.

According to stakeholder theory, every corporation has its unique stakeholders that influence, and simultaneously are affected by, its actions (Freeman, 1984), and has predetermined contracts and commitments, internally and externally, with different parties, which need to be fulfilled (Wood, 1991). The assumption of the stakeholder theory is that any development in corporate environmental practices will be reflected positively in its profitability. This supposition is derived from the inverse relationship that exists between the explicit and implicit costs of the firm. For instance, if the organization decides to bring down its implicit cost by acting in an environmentally irresponsible manner by reducing cost of pollution prevention and protection, it will experience higher explicit costs, as its competitive edge will be exhausted (Waddock and Graves, 1997).

Empirically, numerous studies have supported this positive correlation in various ways. Examples of these include a positive correlation between pollution control records and profitability (Spicer, 1978), less negative reaction from the stock market after environmental crises (Blacconiere and Patten, 1994; Schnietz and Epstien, 2005) and improving financial performance as a result of environmental

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performance development (Klassen and McLaughlin, 1996). Other authors documented similar findings; for example, Dowell *et al*. (2000) concluded that firms that adopt a strict international environmental standard have a higher market value than those firms that apply less strict or weakly enforced host country standards. This positive correlation also was supported by the findings of some recent studies (e.g. Konar and Cohen, 2001; King and Lennox, 2002; Schnietz and Epstien, 2005).

On the other hand, in the context of agency theory, Friedman (1970) pointed out that the expected cost of firm social–environmental responsibility is likely to outweigh the resulting benefits and, hence, firm social performance is expected to affect firm profitability negatively. For instance, those firms that spend money on some pollution control instruments will incur costs that may affect their price and thus profitability, whilst other competitors do not do this on the basis that it is the government's responsibility (Aupperle *et al*., 1985). The underling premise of Friedman's argument is that the social responsibility of the firm is to enhance its profitability, and corporate social–environmental responsibility can be best explained as an agency problem between managers and shareholders.

Generally, this argument has found some support from various empirical studies. For instance, Chen and Metcalf (1980) found a negative correlation between firm environmental performance and financial performance. In a similar vein, Jaggi and Freedman (1992) revealed a negative relationship between pollution performance index and financial performance and concluded that the market does not reward corporate environmental commitment; a comparable finding is also reported by Wagner *et al*. (2002).

In another theoretical contribution, McWilliams and Siegel (2001) utilized the theory of the firm perspective and argued that the optimal level of investment in social–environmental responsibility for a firm can be evaluated in the same way as any other investment by considering the supply and demand sides. As a result, the relationship between corporate environmental responsibility and profitability is expected, according to this view, to be neutral. This is because firms that do not devote resources to improving their products' environmental attributes will offer their products at lower prices, while those firms that invest in developing products with environmentally responsible characteristics will be able to tender their product at higher prices.

This argument has found some empirical supporting evidence. For instance, empirical findings have signified that pollution control expenditures and firm profitability are not correlated (Mahapatra, 1984), share returns and environmental disclosure have no direct relationship (Murray *et al*., 2006) and mean risk-adjusted performance is unchanged by shifting to social responsibility investment (Mill, 2006).

Overall, previous discussion demonstrates that the literature does not yet have a definite assumption regarding the relationship between corporate environmental responsibility and firm market value. Thus, it will be not be convenient to establish this research with a predetermined hypothesis regarding the expected relationship. This becomes indispensable in the present study, where no previous work is available in the Egyptian context regarding the relationship between corporate environmental responsibility and corporate market value.

Empirical Analysis

In corporate environmental responsibility discipline 'there is not yet even an agreed definition of the object of the research' (Cramer, 1998, p. 162), and therefore researchers have used different proxies in the literature to express corporate environmental responsibility. Some of these proxies include developing corporate environmental policy (Henriques and Sadorsky, 1996), levels of pollution emissions (Wagner *et al*., 2002) and adopting national or international environmental standards (Dowell *et al*., 2000; Gimenez Leal *et al*., 2003).

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One of these proxies that has been used widely to reflect corporate environmental commitment is whether the firm has been certified for an international environmental standard such as ISO 14000. This is because such a scheme identifies, regardless of firm size or type, the requirements for certification, registration and self-evaluation of an environmental management system (Gimenez Leal *et al.*, 2003).

The sample of this study was derived from the list of those Egyptian companies that have an ISO 14000 or ISO 14001 environmental certificate published by the Ministry of State for Environmental Affairs – Egyptian Environmental Affairs Agency (2006). This list was chosen as it is the only single source that offers published data regarding corporate environmental responsibility, as environmental awareness among Egyptian companies is still in its infancy and environmental reporting or disclosure is still occasional and voluntary.

This record was compared with the list of those companies that constitute the market index published by the Egyptian Capital Market Agency (ECMA). A period of three years (2003–2005) was used as the foundation for collecting data and analysis. Following previous work (see, for example, McWilliams and Siegel, 2000), variable averaging was used to overcome variations. Combination of the two published lists, as well as availability of the required data, resulted in a sample of 156 firms (84 of these have been certified), which covers 19 industrial sectors.

The dependent variable in this study is the firm market value. Firm market value in previous studies (see, for example, Dowell *et al.*, 2000; Konar and Cohen, 2001; King and Lennox, 2002) was measured by Tobin's *q* ratio. Tobin's *q* represents the ratio of the firm market value to the replacement cost of its assets (Lindenberg and Ross, 1981). Accordingly, when the ratio equals one, this refers to an equilibrium situation. However, if the value is less than one, this means less profitable investment opportunities are expected or available. On the other hand, a value of more than one indicates more anticipated investment opportunities and profitability.

Tobin's *q* ratio was measured according to Chung and Pruitt (1994) as follows: [MVE + PS + DEBT]/TA, where MVE is the product of share price and the number of common stock shares outstanding, PS is the liquidating value of the outstanding preferred stock, DEBT is the value of short-term liabilities net of short-term assets, plus the book value of the long-term debt, and TA is the book value of the total assets of the firm (King and Lennox, 2002).

Moreover, the key independent variable of interest is the corporate environmental responsibility. Because of limited available environmental data on the Egyptian companies as explained above, corporate environmental responsibility was proxied by whether the firm has been certified for the ISO 14000 or 14001 environmental standard or not. This variable is a binary variable, which takes the value of one if the firm has been certified and zero otherwise.

To overcome model misspecification, the study also controls for several variables that previous work proved might confound the relationship between corporate environmental responsibility and market value. As environmental commitment of the firm is found to be relevant to the intensity of capital investment (Rust and Rothwell, 1995; Chapple *et al.*, 2001), capital intensity was controlled for by the ratio of total fixed assets to total assets (see, for example, Russo and Fouts, 1997; Konar and Cohen, 2001). Firm risk is also a related control variable as it reflects the management's risk tolerance, which impacts on its attitude towards environmental activities. Thus, firm risk was measured by the ratio of total debt to total assets (Waddock and Graves, 1997).

Firm size was controlled for the sake of scale of economies (McWilliams and Siegel, 2001) and visibility of the firm to the public (Henriques and Sadorsky, 1996). Firm size was measured by the natural logarithm of the total number of employees as it was not normally distributed. Firm age was also included as a control variable, as it reflects firm life cycle stage, which affects profitability and managerial priorities (Hanks *et al.*, 1993).

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The relationship between environmental responsibility and market value can also be affected by the ownership structure of the firm. Previous work found that firm ownership structure has an impact on corporate governance (Zheka, 2005), corporate power (Salancik and Pfeffer, 1980) and investors' perception towards environmental responsibility (Graves and Waddock, 1994), and plays an important role in aligning diffusion in interests between shareholders interests and management objectives (Jensen and Mackling, 1976; Wahba, 2005). Thus, the ratios of shares held by management, institutions, employees, private investors, government holding and international investors were included as control variables.

Industrial variation is also found to be an important variable in determining the relationship between environmental–social activities and firm performance (Waddock and Graves, 1997; Russo and Fouts, 1997; McWilliams and Siegel, 2000), as social–environmental activities differ from one industry to another (see, for example, Cottrill, 1990; Rust and Rothwell, 1995). That is, industrial effect was controlled for by incorporating dummy variables for industrial sectors. Variables' descriptive statistics, as well as correlation coefficients, are presented in Table 1.

Estimation Results

According to a virtuous cycle between the two variables, a firm that has more profits will be able to devote more resources to support its environmental responsibility, and improvement in environmental and social performance will result in better financial performance (Preston and O'Bannon, 1997; Waddock and Graves, 1997). Thus, prior to running a regression analysis model that estimates the impact of corporate environmental responsibility on firm market value, it becomes imperative to test whether both variables are jointly determined.

Therefore, if the assumption of a virtuous cycle is true, then estimating either corporate environmental responsibility or firm profitability individually, in the presence of an endogeneity effect, leads to biased and inconsistent estimates, as a result of the expected correlation between the error term and the endogenous variable.

For this reason, the Hausman specification test (Hausman, 1978) was employed to test for the existence of an endogeneity effect (Gujarati, 2003). Accepting the null hypothesis of the Hausman test confirms that the OLS estimates are consistent and there is no endogeneity effect. To be able to conduct this, the reduced form of the corporate environmental responsibility equation with only those predetermined variables was obtained to figure out its predicted value. Original as well as predicted values of corporate environmental responsibility then were incorporated in the Tobin q model to investigate the significance of the predicted value.

De facto, empirical analysis confirmed that the null hypothesis could not be rejected, as the F-test was not significant (3.85, $p > 0.05$). Thus, it can be concluded that endogeneity does not matter in estimating the impact of corporate environmental responsibility on corporate market value, and corporate environmental responsibility can be treated as an endogenous variable.

Following this, in Table 2 under model 1, an unrestricted model that includes corporate environmental responsibility and other control variables was established to obtain the estimates of firm market value. The results of the unrestricted model demonstrated that corporate environmental responsibility exerted a positive and significant coefficient on corporate market value. As the model showed that firm age and components of ownership structure did not reveal any significant impact on corporate market value, two restricted models nested within this were considered to validate the influence of corporate environmental responsibility.

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Variables	Mean	Std dev.	1	2	3	4	5	6	7	8	9	10	11	12
1—Q	0.825	0.801	1											
2—CER			0.13*	1										
3—CAP	0.410	0.255	0.31***	−0.04	1									
4—RSK	0.619	0.391	0.44***	−0.17***	0.03	1								
5—SIZ	7.1	1.25	0.18***	0.20***	0.24***	−0.07	1							
6—AGE	35.8	22.5	0.02	0.03	−0.15***	0.12*	0.23***	1						
7—MNG	10.8	23.2	−0.03	0.01	0.02	0.02	−0.26***	−0.25***	1					
8—INS	31.3	30.2	0.07	0.10*	0.16**	−0.02	0.13**	−0.03	−0.25***	1				
9—EMP	4.71	9.37	−0.09	−0.06	−0.21***	−0.02	0.02	0.18***	−0.17**	−0.17***	1			
10—PRV	24.1	22.7	−0.05	0.13**	−0.14**	−0.02	0.19***	−0.07	−0.21***	−0.24***	0.02	1		
11—STA	22.5	29.9	0.07	0.07	−0.02	−0.03	0.56***	0.25***	−0.34***	−0.45***	0.08	−0.23***	1	
12—INT	6.3	18.2	0.2	0.11*	0.03	0.04	−0.16***	−0.02	0.05	−0.21***	−0.16**	−0.23***	−0.21***	1

Table 1. Variables' descriptive statistics and correlation coefficients
Q: Tobin's *q* ratio.
CER: corporate environmental responsibility.
CAP: capital intensity.
RSK: corporate risk.
SIZ: corporate size.
AGE: corporate age.
MNG: managerial ownership.
INS: institutional ownership.
EMP: employees ownership.
PRV: private sector ownership.
STA: government ownership.
INT: international ownership.
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Whilst the first nested model excludes those control variables that were not significant under the unrestricted model, the second nested model excludes corporate environmental responsibility as a key variable of interest in this research. Econometric estimates of these two nested models are also reported in Table 2 under model 2 and model 3, respectively. Then, a likelihood ratio (LR) test of each of the restricted models against the unrestricted model was conducted. The LR statistic for model 2 was not significant (2.63, $p > 0.10$), while it was significant under model 3 (7, $p < 0.001$). This means that corporate environmental responsibility is a significant predictor in the model and cannot be disregarded from the model.

Supplementary verification derives from performing the Akaike information criterion (AIC) and Bayesian information criterion (BIC) as two key standard information criteria for model selection (also reported in Table 2). As a lower figure for both AIC and BIC means a better specified model (Greene, 2003), both criteria confirm that model 2, which includes corporate environmental responsibility, outperforms all other models, with AIC 767.26 and BIC 857.96. Thus, the general conclusion is that corporate environmental responsibility determines market value. Furthermore, the significant effect of capital intensity, firm risk and firm size did not alter too much under any estimated model.

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Dependent variable (Tobin's *q*)	Unrestricted model (model 1)	Nested models (model 2)	(model 3)
Environmental responsibility	0.220*	0.241*	
	(0.086)	(0.084)	
Capital intensity	0.662***	0.694***	0.585***
	(0.182)	(0.171)	(0.180)
Firm risk	1.05***	1.03***	1.03***
	(0.109)	(0.105)	(0.109)
Firm size	0.104*	0.124***	0.117*
	(0.047)	(0.035)	(0.047)
Firm age	−0.002		−0.002
	(0.002)		(0.002)
Managerial ownership	−0.021		−0.026
	(0.032)		(0.032)
Institutional ownership	−0.019		−0.025
	(0.030)		(0.032)
Employee ownership	−0.020		−0.026
	(0.033)		(0.032)
Private ownership	−0.022		−0.027
	(0.031)		(0.032)
Government ownership	−0.018		−0.024
	(0.032)		(0.033)
International ownership	−0.020		−0.026
	(0.032)		(0.033)
Industry effect	3.00***	3.00***	2.84***
F	8.24***	10.88***	8.17***
R^2	0.40	0.40	0.39
Adjusted R^2	0.35	0.36	0.34
LR test-nested model (χ^2)		2.63	7.00***
Akaike information criterion (AIC)	778.66	767.26	783.65
Bayesian information criterion (BIC)	896.94	857.96	897.99
Observations		381	

Table 2. Regression analysis for the influence of environmental responsibility on firm market value measured by Tobin's *q* ratio
Figures in brackets are standard errors.
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
The LR test for nested models is the likelihood ratio test of each of the restricted models against the unrestricted model.
AIC and BIC are the standard information criteria for model selection, as a lower figure means a better specified model.

Implication of Findings and Conclusion

In spite of the fact that researchers in corporate environmental management have employed various theoretical perceptions to exemplify the association between corporate environmental responsibility and profitability, these theories as well as empirical findings present competing and contradictory conclusions. Thus, this paper sought to establish empirical evidence to explore the nature of this relationship in a developing country by using a sample of 156 firms from the Egyptian companies for three years. This study acquires its importance from being the first research that investigates this association in the Egyptian context, where environmental consciousness among Egyptian firms is still in an early stage of development and where the literature is dominated by Anglo-American evidence.

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The main conclusion that this paper revealed is that the market rewards firms for their environmental consciousness, as corporate environmental responsibility exerted a positive and significant coefficient on the firm market value measured by Tobin's *q* ratio. This finding provides support evidence for the hypothesis of stakeholder theory. Specifically, it validates the results of previous studies (e.g. Dowell *et al.*, 2000; Konar and Cohen, 2001; King and Lennox, 2002; Schnietz and Epstien, 2005) that concluded that it pays to be environmentally responsive.

Indeed, finding that the environmental commitment of the firm affects its value in the market positively can be seen as support evidence for the importance of corporate environmental responsibility as a valuable and rare resource that can be exploited to create competitive advantages for the firm over its rivals (Russo and Fouts, 1997). Consequently, the positive impact of corporate environmental responsibility on its market value does not validate the argument of Friedman (1970), who concluded that firms that invest in social and environmental activities will incur costs that can be easily avoided and hence they will incur competitive disadvantage.

This conclusion actually is also compatible with the finding of Gimenez Leal *et al.* (2003), who demonstrated that the adoption of an environmental management system such as ISO14000 can enhance firm competitive advantages through optimizing resource usage, which in turn can be reflected in a better economic performance. This finding should induce business managers to take care of their natural environment, as it is found here that corporate environmental responsibility does not hurt corporate financial performance.

That is, one key implication of the results of this study is the importance of voluntary initiatives in forcing firms to be more environmentally responsive and attaining the balance between achieving firms' financial objectives and protecting the quality of the environment (Borri and Boccaletti, 1995). In fact, increasing pressure on business organizations does not actually signify that they will respond strategically and go beyond legislation requirements if they do not realize a specific opportunity from doing this. Depending solely on command and control mechanisms that determine a limited emission level can only be useful in the short run, but the most effective tool in the long run to move business organizations beyond compliance is the free market (Kellogg, 1994). This is because relying only on governmental regulations does not lead to reaching cost-effectiveness, innovation and continuous improvement. Moreover, this approach represents a constraint, particularly on developing countries that do not have the essential capabilities to monitor compliance (Schmidheiny, 1992).

Investigating correlation coefficients (as reported in Table 1) between corporate environmental responsibility and control variables gives some initiative implications that businesses management should reconsider. In particular, to find that corporate environmental responsibility has positive correlation coefficients with institutional ownership, private sector ownership and international shareholding indicates that management has an excellent opportunity to attract more investment by raising its commitment to the natural environment. This is because such categories of investors are likely to prefer to invest in firms that have a credible environmental record as well as fewer potential liabilities. Furthermore, the positive and significant correlation between firm size and corporate environmental responsibility implies that larger firms tend to be more environmentally responsible. One justification of this result is that larger firms may have more resources that can be devoted to support social and environmental activities, as they are more visible to the public than small firms are. Another possible explanation is that mangers in large firms may have more power to take discretionary decisions to invest in social and environmental programs.

The findings of this research open directions for future research. One potential area that future research is invited to explore is the determinants of corporate environmental responsibility in developing countries and how they possibly differ from those variables that affect developed countries. Another possible area that is available for future research is the investigation of the mechanism by which

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corporate environmental responsibility develops over time, especially in developing countries. Studies in this regard have developed and adopted either stage or typology models. Stage models (see, e.g., Hunt and Auster, 1990) assume that firm environmental responsiveness develops over time. On the other hand, typology or matrix models (see, e.g., Ghobadian *et al*., 1998) do not suppose this, but that environmental responsiveness relies upon the interaction between internal and external variables. Overall, this literature has suggested different variables that affect firm environmental responsiveness and the chosen strategy in dealing with the natural environment. This becomes more important, as there is no discussion in the literature regarding the dynamic nature of environmental responsiveness. In other words, the implication of firm environmental responsiveness itself is not constant over time.

One main limitation that this study was faced with, in investigating the relationship between corporate environmental responsibility and firm profitability, is the use of ISO 14000/14001 certification as a proxy for corporate environmental commitment. This, in fact, might not be such a good proxy for environmental performance, as the firm's decision to adopt an environmental management system may be affected by different internal and external variables such as satisfying customers' requirement and export regulations. This becomes crucial especially with the findings of Pedersen (2007), who showed that implementing an environmental management system is recognized as a success even though the costs of launching such a system outweigh the perceived financial gains. As the current study has no available data on exports at firm levels, future work could examine this topic using different proxies as well as investigating motivations of Egyptian firms in adopting an environmental management system.

Although this paper, in fact, covered the relationship between environmental responsibility and firm economic performance in Egypt, there are still many promising areas that can be explored in coming research to enhance the understanding of environmental performance in the Egyptian context at the political, managerial and organizational levels. Some of these areas include the role of ownership structure in determining corporate environmental commitment, the effect of consumer behavior and attitudes in motivating the firm to show a more responsible orientation towards its natural environment and the expected interrelationship between corporate governance practices and organizational social–environmental commitment.

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