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The relations among environmental disclosure, environmental performance, and economic performance: a simultaneous equations approach

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Abstract

This study provides an integrated analysis of the interrelations among (1) environmental disclosure, (2) environmental performance, and (3) economic performance. Based on the argument that management's (unobservable) overall strategy affects each of these corporate responsibilities, we conjecture that prior literature's mixed results describing their interrelations may be attributable to the fact that researchers have not considered these functions to be jointly determined. After endogenizing these corporate functions in simultaneous equations models, we obtain results that suggest "good" environmental performance is significantly associated with "good" economic performance, and also with more extensive quantifiable environmental disclosures of specific pollution measures and occurrences.
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Introduction

As managers scramble to compete in the global economy, they must do so within societal constraints characterized by ever-increasing environmental accountability. This accountability includes heightened public scrutiny of both the firm's environmental performance and its public disclosure of that performance. These elements of corporate environmental accountability jointly impact the firm's profitability and the value of its common equity. This study provides an integrated analysis of how management's overall strategy jointly affects (1) environmental disclosure, (2) environmental performance, and (3) economic performance. Understanding these interrelations is of increasing interest to both internal and external stakeholders in an era in which corporate environmental costs have become a significant business expense.[1]

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[1] Whereas using a landfill to dump hazardous waste cost only $2.50 per ton in 1978, this charge rose to over $200 per ton by 1987 (Buchholtz, Marcus, & Post, 1992). Between 1972 and 1992, total annualized environmental protection costs for US firms tripled as a percentage of Gross Domestic Product (GDP). Senior executives anticipate this trend to continue (Walley & Whitehead, 1994).

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Prior empirical and social-responsibility research on the relations among environmental performance, environmental disclosure, and economic performance has, in general, considered the strength of pair-wise associations between two of these three factors, while not addressing the third. Academic researchers from management, finance, and economic disciplines have focused on the environmental-performance–economic-performance relation and the root question: Is going *green* good for profits? Meanwhile, accounting researchers have concentrated on the adequacy of environmental disclosure in financial reporting and its value relevance to investors: Do *green* disclosures adequately represent the firm's exposure to future *green* regulation? And because these disclosures are largely voluntary, what factors determine their shade of *green*? While this research has advanced our knowledge in specific settings,[2] no study has attempted to examine environmental performance, environmental disclosure, and economic performance within a single inclusive model.

We propose a holistic approach to examine collectively the relations among the firm's (1) environmental performance, (2) environmental disclosure, and (3) economic performance, using a conceptual framework first suggested by Ullmann (1985). Ullmann presents a descriptive analysis of prior social-responsibility studies that, in aggregate, report mixed empirical results of pair-wise associations between environmental performance and economic performance, between environmental performance and environmental disclosure, and between environmental disclosure and economic performance.[3] Ullmann posits that the inconsistent findings characteristic of these pair-wise studies reflect a common omitted variable—an inclusive management strategy. In executing the corporation's strategic business plan, management implements policies and initiates decisions that simultaneously affect the firm's environmental performance, environmental disclosure, and economic performance. If these corporate functions are endogenously determined, then piecemeal Ordinary Least Squares (OLS) estimation of pair-wise relations among these three functions will produce biased and inconsistent results.

While accepting Ullmann's premise that earlier research models used to explore these relations may have been mis-specified, we consider incorporating an unobservable managerial strategy into an empirical model to be problematic. Instead, we implement Ullmann's conceptual framework by explicitly treating environmental performance, environmental disclosure, and economic performance as endogenous variables, jointly determined by the firm's strategic management process. In doing so, we advance the following research questions: First, how are the firm's environmental performance, environmental disclosure, and economic performance interrelated after the endogeneity of these three corporate functions is explicitly considered? Second, does joint estimation of these relations significantly differ from independent OLS estimation? If so, significant methodological differences in estimating the coefficients of the endogenous variables may be due to bias in the OLS estimator. Documentation of such bias has implications for both interpreting prior research and planning future research designs.

To address these questions, we first specify environmental performance, environmental disclosure, and economic performance in three multivariate equations in which at least one of these functions is an explanatory variable of another. While our empirical proxies for economic performance are market-based and our measure for environmental performance is a nonfinancial ratio based on the relative quantity of hazardous waste recycled, we feel that it is important to qualify our measure of *environmental disclosure* and distinguish it from its more generic connotation. Within the context of this study, *environmental disclosure* is the disclosure of specific pollution measures and occurrences (toxic waste emissions, oil spills, Superfund sites, etc.) that an investor might find useful in estimating future cash flows. This definitional constraint focuses on the disclosure of cost

[2] For example, Barth, McNichols, and Wilson (1997) examine the determinants of environmental disclosure for firms with Superfund liabilities.

[3] Although Ullmann examined social-responsibility studies in general, approximately half (14 of 31) of these studies focused on environmental concerns.

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