RESEARCH NOTES AND COMMUNICATIONS

CORPORATE SOCIAL RESPONSIBILITY AND FINANCIAL PERFORMANCE: CORRELATION OR MISSPECIFICATION?

ABAGAIL McWILLIAMS[1]* and DONALD SIEGEL[2]
[1]*School of Management, Arizona State University West, Phoenix, Arizona, U.S.A.*
[2]*The University of Nottingham Business School, Nottingham, U.K.*

Researchers have reported a positive, negative, and neutral impact of corporate social responsibility (CSR) on financial performance. This inconsistency may be due to flawed empirical analysis. In this paper, we demonstrate a particular flaw in existing econometric studies of the relationship between social and financial performance. These studies estimate the effect of CSR by regressing firm performance on corporate social performance, and several control variables. This model is misspecified because it does not control for investment in R&D, which has been shown to be an important determinant of firm performance. This misspecification results in upwardly biased estimates of the financial impact of CSR. When the model is properly specified, we find that CSR has a neutral impact on financial performance. Copyright © 2000 John Wiley & Sons, Ltd.

In recent years, customers, employees, suppliers, community groups, governments, and some shareholders have encouraged firms to undertake additional investments in corporate social responsibility (CSR). Some firms have responded to these concerns by devoting more resources to CSR. Other companies' managers have resisted, arguing that additional investment in CSR is inconsistent with their efforts to maximize profits. The resulting controversy has induced researchers to examine the relationship between CSR and financial performance, in an effort to assess the validity of concerns regarding a tradeoff between investment in CSR and profitability.

Existing studies of the relationship between CSR and financial performance suffer from several important theoretical and empirical limitations. One major concern is that these studies sometimes use models that are misspecified in the sense that they omit variables that have been shown to be important determinants of profitability. One such variable is the intensity of R&D investment by the firm. In this paper we discuss the correlation between CSR and R&D, and how to appropriately estimate the impact of CSR on financial performance.

EMPIRICAL STUDIES OF CSR AND FINANCIAL PERFORMANCE

There are basically two types of empirical studies of the relationship between CSR and financial performance. One set of studies uses the event study methodology to assess the *short-run* financial impact (abnormal returns) when firms engage in socially responsible or irresponsible acts (see, for example, Clinebell and Clinebell, 1994; Hannon and Milkovich, 1996; Posnikoff, 1997; Teoh, Welch and Wazzan, 1999; Worrell, Davidson, and Sharma, 1991; Wright and Ferris, 1997). The results of these studies have been mixed. For example, Wright and Ferris found a negative relationship; Posnikoff reported a positive relationship; and Teoh et al. found no relationship between CSR and financial performance, when examining divestitures from South Africa during the Apartheid controversy (see McWilliams, Siegel and Teoh, 1999, for a discussion of these studies). Other studies are similarly inconsistent on the relationship between CSR and short run financial returns (McWilliams and Siegel, 1997, provides a theoretical and empirical critique of the use of the event study methodology for examining the impact of CSR).

A second set of studies examines the nature of the relationship between some measure of corporate social performance, CSP (a measure of CSR), and measures of *long term* firm performance, using accounting or financial measures of profitability (see, for example, Aupperle, Carroll, and Hatfield, 1985; McGuire, Sundgren and Schneeweis, 1988; and Waddock and Graves, 1997). The results from these studies have also been mixed. Aupperle et al. found no relationship between CSP and profitability, McGuire et al. found that prior performance was more closely related to CSP than was subsequent performance, and Waddock and Graves found significant positive relationships between an index of CSP and performance measures such as ROA in the following year.

The inconsistency of the results from these studies of the relationship between CSR and performance is not surprising, given the nature of the models that form the basis for the empirical estimation. For example, Waddock and Graves (1997) estimate the following econometric model:[1]

$$PERF_i = f(CSP_i, SIZE_i, RISK_i, IND_i) \quad (1)$$

where

$PERF_i$ = long-run economic or financial performance of firm i (measures of accounting profits)

CSP_i = a proxy for corporate social responsibility of firm i (based on an index of social performance)

$SIZE_i$ = a proxy for the size of firm i

$RISK_i$ = a proxy for the "risk" of firm i (debt/asset ratio)

IND_i = industry of firm i (4 digit SIC code)

The inclusion of the industry dummy (IND) is to control for some industry-level factors that have been shown to explain variation in firm performance across industries, such as economies of scale and competitive intensity.[2] We hypothesize that Equation 1 is misspecified due to omitted variables, because it does not control for a firm's rate of investment in R&D and the advertising intensity of its industry. A more appropriate specification is:

$$PERF_i = f$$

$$(CSP_i, SIZE_i, RISK_i, IND_i, RDINT_i, INDADINT_i)$$

$$(2)$$

where the additional covariates are:

$RDINT_i$ = R&D intensity of firm i (R&D expenditures/sales)

$INDADINT_i$ = advertising intensity of the industry of firm i

Excluding R&D in the econometric model is especially problematic, because there is a long standing theoretical literature linking investment in R&D to improvements in long-run economic performance (Griliches, 1979). In these models, R&D is considered to be a form of investment in "technical" capital. Investment in technical capital results in knowledge enhancement, which leads to product *and* process innovation. This innovative activity enables firms to enhance their productivity.

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[1] Note that many studies simply examine correlation coefficients, but with causal implications.

[2] We will argue that a very specific type of industry effect—industry advertising intensity—must also be (separately) controlled for, because it is so closely associated with CSR.

There is strong empirical evidence to support this hypothesis, using a wide variety of measures of long-run economic performance. These results are robust to different time periods and levels of aggregation.[3] For example, using data from over 2000 firms, Lichtenberg and Siegel (1991) report a strong positive correlation between R&D investment and growth in total factor productivity. Clark and Griliches (1984) find similar results at the line-of-business level, using the PIMS database. Ben-Zion (1984), Guerard, Bean, and Andrews (1987), Guerard, Stone, and Andrews (1988), and Hall (1999) report similar positive associations between R&D, accounting profits, and long-term shareholder returns (and other proxies for long-term financial performance).[4]

If R&D has a positive impact on firm performance, then the coefficient on any variable that is strongly positively correlated with R&D will be *overestimated* when R&D is omitted from Equation 1 (Theil, 1971: 549). We hypothesize that R&D and CSP are positively correlated, since many aspects of CSR create either a product innovation, a process innovation, or both.

The link between CSR and R&D

Investment in CSR promotes product differentiation at the product and firm levels. Some firms will produce goods or services with attributes or characteristics that signal to the consumer that the company is concerned about certain social issues. Also, many companies will try to establish a socially responsible corporate image. Both of these strategies will encourage consumers to believe that, by consuming the product, they are directly or indirectly supporting a cause.

These strategies are effective with those consumers who wish to champion firms that devote resources to CSR. Consequently, many products have labels that indicate the use of certain

ingredients and production methods that promote CSR. For example, natural food companies place labels on their products signifying the use of organic, pesticide-free ingredients; cosmetic firms boast of animal-free testing; manufacturing companies display "made in the USA" stickers; and radio and television commercials tell us to "look for the union label." Labels that refer to CSR attributes also create new (socially responsible) product categories in the perception of consumers.

The examples above apply to process *and* product innovations, both of which are valued by some consumers. For instance, the "organic, pesticide-free" label simultaneously indicates the use of organic methods, which constitutes a *process innovation* by the *farmer*, and the creation of a new product category, or a *product innovation* by the *natural foods retailer*. If the natural foods company is vertically integrated, it engages in both CSR-related process and product innovation simultaneously. Each of these examples underscores the point that some consumers want the goods they purchase to have certain socially responsible attributes (product innovation), while some also value knowing that the goods they purchase are produced in a socially responsible manner (process innovation).

Consumer-oriented CSR may also involve intangible attributes such as a reputation for quality or reliability. The presumption is that firms that actively support CSR are more reliable and their products are of higher quality. This is especially important for food products. For example, some restaurants serve "free range" chicken and beef. "Free range" meat products are perceived to be of higher quality than conventional meat products. Presumably, this is because they have a more natural taste, due perhaps to their closer proximity to a natural state (in the sense that the animals roam more freely) or because they are not injected with hormones or antibiotics. By promoting their use of "free range" chicken and beef, restaurants signify to their patrons that they are concerned about product quality (use of the finest ingredients) and also about more humane treatment of animals.

There is strong evidence that many (but certainly not all) consumers value CSR attributes. Therefore, an increasing number of companies incorporate CSR into their marketing strategies, to exploit the appeal of CSR to key segments of the market, such as "baby-boomers" or "gener-

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[3]See Lichtenberg and Siegel (1991) and Griliches (1998) for comprehensive reviews of existing empirical studies of the relationship between R&D and productivity growth.
[4]Evidence on the short-run impact of R&D on stock prices (event studies) is mixed. Early event studies (Chan et al., 1990, Austin, 1993) found that announcements of increases in R&D expenditures and patent awards enhance share prices. The results of recent event studies (Sundaram et al., 1996, Chung et al., 1998, and Chung and Wright, 1998) cast doubt on such broad generalizations. These authors report that the short-run stock market response to unexpected changes in R&D will depend on firm characteristics and strategic factors.

ation X" shoppers. We need only look at the rapid growth of such socially responsible companies as Ben & Jerry's, the Body Shop, and Health Valley to confirm the importance of CSR in marketing.

Support of CSR may also be used to create a reputation that a firm is reliable and honest, and some consumers may assume that the products of a reliable and honest firm will be of high quality. Therefore, advertising that provides information about CSR attributes may be used to create a reputation for quality or reliability or honesty—all attributes that are important, but may be difficult for consumers to determine. Such advertising makes consumers aware of product differentiation (quality) based on CSR attributes.

For example, New United Motor Manufacturing, Inc., or NUMMI, the innovative joint venture between Toyota and General Motors, was established in Fremont, California in 1984 to build small cars for both companies. The NUMMI plant implemented many of the latest Japanese "lean manufacturing" methods (process innovation), and produced the Geo Prism, the prototype for GM's new generation of small cars (product innovation). Furthermore, through its unique partnership with the United Auto Workers (UAW), NUMMI also implemented a number of progressive workplace practices, such as a strong emphasis on teamwork and employee empowerment. The bottom line is that some consumers perceived that NUMMI cars, such as the Geo Prism, were superior to traditional, American-made cars, in terms of quality and reliability. More germanely, many customers also believed that by purchasing these cars, they were demonstrating their support of progressive human resource management practices and the UAW.

The link between advertising and firm performance

The remaining independent variable in our proposed model—Equation 2- ($INDADINT_i$) is designed to serve as a proxy for the extent of product differentiation at the industry level and entry barriers that might serve to enhance firm profitability. Entry barriers are a shared asset across firms in an industry, because entry barriers are an industry level construct (McWilliams and Smart, 1993). While there is considerable debate regarding the magnitudes of industry level effects

(Powell, 1996; Rumelt, 1991; Schmalansee, 1975; Waring, 1996), the consensus is that industry factors "matter," in the sense that they explain a non-negligible percentage of the variation in profitability across firms. Thus, $INDADINT_i$ should be included in the model, along with "size" and "risk," as a control variable.

If our conjectures are true (corr (RDINT, PERF) > 0, corr (RDINT, CSP) > 0), then the consequences of omitting R&D from Equation 1 are clear. As noted in Theil (1971), if an omitted regressor, in this case RDINT, is positively correlated with both the dependent variable (PERF) and the included regressor (CSP), then the coefficient on CSP, in the misspecified Equation 1, will be overestimated.

Simply put, the positive and significant coefficient on CSP, as reported by Waddock and Graves (1997), could simply reflect the impact of R&D on firm performance. It is impossible to isolate the impact of CSP on firm performance unless the model is properly specified. A similar argument could be made for other omitted regressors, such as advertising intensity, if they are also positively correlated with CSP and firm performance.

EMPIRICAL ANALYSIS

To assess the validity of the results reported in studies that employ Equation 1 (Waddock and Graves, 1997), we estimate the model outlined in Equation 2. For this estimation, we linked Compustat data to information on corporate social performance provided to us by the firm of Kinder, Lydenberg, and Domini (KLD), which began compiling this information in May 1991. KLD provides ratings of corporate social performance, or CSP (a measure of corporate social responsibility), for portfolio managers and other institutional investors who wish to incorporate social factors into their investment decisions. Many of these social investors want to "screen" their portfolios to exclude companies that violate their social principles. In this context, CSP is defined as a (0,1) variable; a firm is either socially responsible or it is not, based on the "screen" applied. For example, an investment firm that is managing a portfolio for evangelical Christians will avoid companies in the gambling and alcohol industries.

KLD uses a combination of surveys, financial statements, articles on companies in the popular press, academic journals (especially law journals), and government reports to assess CSP along eleven dimensions: military contracting, nuclear power, gambling, tobacco, alcohol, community relations, diversity, employee relations, environment, and product quality (innovation/R&D), and non-U.S. operations (usually environment and labor relations).[5] Based on this information, the firm constructed the Domini 400 Social Index (DSI 400), the functional equivalent of the Standard and Poors 500 Index for socially responsible firms.

In order to be eligible for the DSI 400, a firm must derive less than 2% of its gross revenue from the production of military weapons, have no involvement in nuclear power, gambling, tobacco, and alcohol, and have a positive record in each of the remaining six categories. For example, a firm that implements recycling and pollution-prevention programs, provides donations to conservation organizations, and demonstrates concern for the environment in its day-to-day operations, is regarded as having a positive record along the environmental dimension. A firm that actively promotes minorities and women to top managerial positions and membership on the board of directors will receive a similar positive score along the diversity dimension. Our measure of CSP is a dummy variable, with a value of 1 if a firm is included in the DSI 400 in a given year (for having passed the "social screen"); 0 otherwise.

Our data series, created from a linkage of the KLD data and Compustat, contains 524 firms. To simplify the econometric analysis and to ensure comparability with existing studies, each of the variables in Equation 2 is computed as an average annual value for the years 1991–1996, a time period that corresponds to the overlap of the Compustat and KLD files. Table 1 presents definitions, descriptive statistics, and a correlation matrix for the three key variables: PERF, CSP, and RDINT.

Several stylized facts are evident from Table 1. The most striking results are that R&D, CSP, and financial performance all appear to be strongly positively correlated. This supports our hypothesis

that estimation of Equation 1 constitutes a specification error that may result in an overestimation of the impact of CSP on financial performance. This overestimation arises because CSP is positively correlated with R&D, which has been found to be a strong determinant of improvements in economic performance.

We argue that firm-level investment in R&D, and additional industry factors (advertising intensity as a proxy for barriers to entry) should also be included in the econometric specification. To explicitly test our hypothesis that Equation 1 is misspecified, we examine variants of Equation 2, including the rate of firm level investment in R&D and industry dummy variables (4 digit SIC) in the model (with advertising intensity included as a control variable). These findings are presented in Table 2.

The results confirm our hypothesis regarding the importance of including R&D and industry factors in a model that attempts to "explain" corporate performance. As shown in column (1), when R&D and industry factors are excluded from the model, the coefficient on CSP is positive and statistically significant. However, when R&D and industry factors are added to the model, the magnitude of the coefficient diminishes dramatically and is no longer significant. Additionally, the "fit" of the model improves, as shown by the increase in the adjusted R^2. Thus, our findings underscore the importance of using the appropriate specification when estimating the "return" on CSR investment.[6]

DISCUSSION

Over the last 3 decades, the pressure on firms to engage in corporate social responsibility (CSR) has increased. Many managers have responded to these pressures, but many have resisted. Those who resist typically have invoked the trade-off between socially responsible behavior and profitability. Management researchers have responded to this by attempting to demonstrate the effect of CSR on profitability. However, the results of

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[5]Additional detail on the KLD file and the social "screens" is presented in Waddock and Graves (1997) and Kinder and Domini (1997).

[6]A caveat is in order. Our result of no financial impact from CSR may be a result of the lack of a good measure of CSR. We use the KLD rating system, which relies heavily on negative screens and includes philanthropic activities. A more business-oriented definition of CSR might yield a different result. We thank a reviewer for pointing this out.

Table 1.   Definitions of key variables, descriptive statistics, and correlations (N = 524 firms)

Variable	Definition	Mean	Std Dev	PERF	CSP	RDINT
PERF	Financial Performance	−0.011	1.043	1.000		
CSP	Corporate Social Performance	0.619	0.345	0.356**	1.000	
RDINT	R&D to Sales Ratio	0.011	0.949	0.403**	0.449***	1.00

All variables computed as annual averages over the period 1991–1996.
*p ≤ 0.10; **p ≤ 0.05; ***p ≤ 0.01

Table 2.   Regression results from estimation of variants of Equation 2 (N = 524 firms, standard errors in parentheses)

Dependent Variable: PERF	(1)	(2)	(3)
Coefficient on CSP	0.141*** (0.052)	0.104 (0.106)	−0.062 (0.059)
Coefficient on RDINT	–	0.145*** (0.036)	0.263*** (0.050)
Industry Dummies (4 digit SIC) included	No	No	Yes
Adjusted R^2	0.10	0.19	0.29

*p ≤ 0.10; **p ≤ 0.05; ***p ≤ 0.01
Note: All regressions include controls for size, risk, and advertising intensity, which are computed as annual averages over the period 1991–1996.

empirical studies of the relationship between CSR and profitability have been inconclusive, reporting positive, negative, and neutral results.

We hypothesized that this inconsistency could be due to flaws in empirical analysis. One particular flaw is econometric estimation of a misspecified model. An example of such a specification error is the equation estimated by Waddock and Graves, 1997, which is misspecified because it does not include a measure of firm-level investment in R&D. This is unfortunate, because there is a large body of empirical evidence showing that investment in R&D has a strong positive impact on profitability. We also hypothesized that R&D investment and CSR are likely to be highly correlated, because both are associated with product and process innovation. If CSR and R&D are highly correlated, an equ-

ation that includes CSP (a measure of CSR) as a determinant of firm performance, but *not* R&D will result in upwardly biased estimates of the CSP variable.

To test our hypothesis, we estimated two models. The first was the same specification as Waddock and Graves and the second was one in which we included R&D intensity. Our results confirm that CSP and R&D are highly correlated, and that, when R&D intensity is included in the equation, CSP is shown to have a neutral effect on profitability. This should not be surprising, because many firms that actively engage in CSR are also pursuing a differentiation strategy, involving complementary strategic investments in R&D. This makes it difficult to isolate the impact of CSR on performance without simultaneously controlling for R&D. Therefore, we caution readers to be wary of models that claim to "explain" firm performance, but do not include important strategic variables, such as R&D intensity.

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