Performance and Corporate Social Responsibility in the Information Technology Industry

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Abstract

There are trade-offs between short-term and long-term effects of spending decisions. This is certainly the case when considering the implementation of Corporate Social Responsibility measures. The purpose of our research is to explore the relationships among corporate social responsibility (CSR) and financial success measures in the Information Technology and Telecommunications industry. More specifically, we examine the relationships between employee relations, an aspect of social responsibility, and accounting measures of efficiency and profitability. In addition, we investigate the relationship of these CSR aspects with Tobin's Q, a measure of market success. Our findings suggest that positive relationships exist between employee relations and accounting and market measures of success. However, we find no evidence that a negative relationship exists between poor employee relations and our success measures.

Keywords: corporate social responsibility, employee relations, accounting measures, Tobin's Q

1. INTRODUCTION

Corporate Social Responsibility (CSR) in general relates to the "economic, legal, ethical, and discretionary expectations that society has of organizations at a given point in time" (Carroll, 1979, p.500). While there is not a single definition of CSR, Wan-Jan (Wan-Jan, 2006) suggests the definition provided by Hopkins (2003), "that CSR means treating the stakeholders of the firm ethically or in a responsible manner." This conforms to the

argument that CSR should be an ethical stance without any expectation of getting rewards; however, it does not reject the notion that CSR could be aimed at enhancing profitability.
Even Hopkins' definition of CSR does not necessarily provide clear direction when management is faced with a conflicting decision between the interests of stockholders and other company stakeholders. The neo-classical economists' view suggests that management decisions should be predicated on the objective of maximizing a company's long-term market value and thus the wealth of its owners. In contrast, stakeholder theory extends concerns to a wide spectrum of stakeholders including employees, customers, suppliers and the general community (Bird et al., 2007).

Besides the dilemma of stakeholder interests, CSR casts a wide net over controversial products or activities such as tobacco or gambling, the natural environment and human rights practices. A plethora of studies surrounding CSR focuses on these concerns. Our study, however, is focused on the employee as a corporate stakeholder. We look inward to the human resource practices and policies applied by an organization, and in particular, target the information technology and telecommunications (IT&T) industry.

The IT&T arena was chosen for investigation due to some of the uncommon employee practices and trends in this field. Three of the factors which lead to a varied employee setting are described. First, despite the current economic situation in the United States, there remains a need for qualified professionals in the IT&T fields. The United States Bureau of Labor Statistics March 29, 2012 Edition of the Occupational Outlook Handbook (Bureau of Labor Statistics, 2012) states,

> "Employment in professional, scientific, and technical services is projected to grow by 29%, adding about 2.1 million new jobs by 2020. Employment in computer systems design and related services is expected to increase by 47%, driven by growing demand for sophisticated computer network and mobile technologies."

A second reason for our focus on the IT&T industry is based upon the people already employed in this arena. The types of individuals that enter into this profession tend to have different expectations and work habits than the population at large. They are often focused on technology certifications and knowledge specialization. They are more likely to prefer project management oriented structures over more traditional management structures (Glen, 2003). In his book, Leading Geeks, Paul Glen makes several distinctions between the knowledge workers who specialize in the creation, maintenance, and support of high technology and others in an organization. For instance, they are loyal to their profession and not captivated by money. And, they bring nontraditional values and interests to the workplace (Glen, 2003).

A third basis for our research focus is the recognition that many of the companies relying on IT&T professionals have already identified the need for an unusual organizational culture and climate in order to attract and retain top producers. Several of these organizations make the notable CNNMoney list of the "100 Best Companies To Work For." The 2011 list (February 7, 2011 issue) includes SAS at the top, a privately held software company which has been on this list for 14 years and is notorious for its human resource management style. Other IT&T companies on the 2011 list include: Google, NetApp, Cisco, Qualcomm, Intuit, Intel, Salesforce.com, Adobe Systems, Microsoft, and Rackspace Hosting. The 2012 list (February 6, 2012 issue) drops SAS to third place and elevates Google to first. However the 2013 list ranks Google again at number 1 and SAS at number 2 (CNN Money, 2012 & 2013).

The purpose of our research is to explore the relationships among CSR and success measures in the IT&T industry. More specifically, we examine the relationships between employee relations, an aspect of social responsibility, and accounting measures of efficiency and financial success. In addition, we investigate the relationship of these CSR aspects with Tobin's Q, a measure of market success.

The remainder of this paper presents a review of the relevant literature, develops a model and states hypotheses, discusses the collection of data and methodology used in the study, presents the results along with implications of

these results, recommends future research, and finally, draws conclusions based on the research outcomes.

2. LITERATURE REVIEW

The literature review section first describes research surrounding the employee relations factor of CSR and its direct impact on measures of financial success. We also discuss the indirect relationship between an organization's culture and climate and how that influences employees' behaviors, ultimately impacting success measures. We then focus on research findings of studies investigating CSR and measures of performance that support our selection of proxies for success.

CSR and Employee Relations

CSR encompasses a multitude of activities. This is reflected in the various categories of the Kinder, Lydenberg, and Domini (KLD) database which provides data for researchers and investors. One of these categories, and our area of focus, is employee relations. The qualitative data provided by KLD for this aspect of CSR is frequently used to investigate activities from an internal stakeholder viewpoint. In relation to our research, other investigations have identified a direct link between employee relations and financial measures of performance. For example, Bird et al. (2007) included employee relations when determining what CSR activities are valued by the market. They found that being proactive in the employment area would be rewarded by the market. El Ghoul, Guedhami, Kwok, & Mishra (2011) also used the KLD database in their investigation of CSR's effect on the cost of capital in the banking industry. They found that employee relations, along with environmental performance and product characteristics, are the only CSR attributes that affect equity pricing.

CSR is reflected in an organization's culture and climate that in turn has been shown to have a significant relationship with numerous employee behaviors. These behaviors can indirectly impact an organization's measure of financial success. For example, Siu (2002) found organizational climate impacts job satisfaction and absenteeism, while Patterson, Warr, & West, (2004) found organizational climate to be related to productivity. Other studies have found relationships between climate and turnover intentions (Rentsch, 1990; Rousseau, 1990) and climate and organizational commitment (McIntyre, Battle, Landis & Dansby, 2002). Researchers have also explored specific professions and their organizational climate and culture. For example, Ross (2000) describes the relationship between organizational culture and the high rate of turnover for many people in software development and test positions. All these factors (job satisfaction, absenteeism, productivity, turnover, commitment) can ultimately impact a company's financial performance. Thus an organization's whose culture and climate supports the expectations of its employees might anticipate higher returns due to increased productivity, less absenteeism and turnover.

Measures of Financial Success and Efficiency

There are multiple means of measuring financial success of a company; however, we will focus on two: accounting measures of performance and market performance.

One very common accounting measure of financial success is a company's return on assets (ROA). ROA is calculated as net income divided by average total assets, and is an important measure of how well a company is using its assets to generate profitability (Kieso, Weygandt & Warfield, 2012). This ratio is a common measure of financial performance within the CSR literature (McGuire, Sundgren & Schneeweiss, 1988; Orlitzky, Schmidt & Rynes, 2003). It is also a common measure of firm profitability used in the information technology business value literature (Bharadwaj, 2000).

In addition to accounting measures of financial success we evaluate market performance. Tobin's Q has been found to be a superior predictor of real rates of return in the stock market (Harney & Tower, 2003; Orlitzky, Siegel & Waldman, 2011). Therefore, we use Tobins Q as our measure of market performance.

These accounting and market measures do not always coincide. As Thompson (2009) notes, there exists tension between financial performance goals, which are short-term in nature, and market performance goals, which are long-term. By investigating both, added insight is provided when attempting to determine the impact of CSR.

Another accounting metric is sales per employee (SPE). It is an efficiency metric considered to better measure performance of non-manufacturing companies (Periu, 2011; McClure

2009). SPE and particularly its trend over time provide information about how expensive a company is to run (McClure, 2009). Trend is particularly important, as new companies may reflect a low SPE, but over time the SPE should increase if the company is successful. SPE is particularly useful for measuring the efficiency compared to competitors for service-centered companies (McClure, 2009; CSIMarket, 2013). Comparison must be made within a particular industry however, as, for example, the ratio for retail companies will be very different than that for software companies (McClure 2009).

3. MODEL DEVELOPMENT

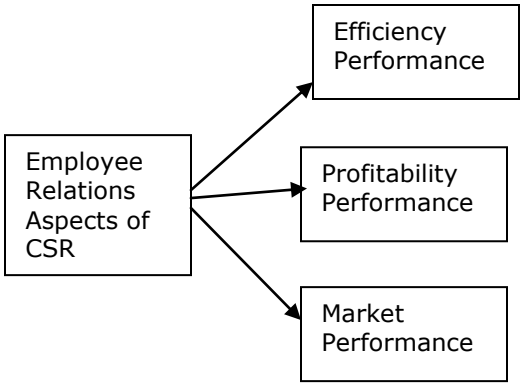

Figure 1.

Hypotheses

We propose and test three sets of hypotheses. All hypotheses are stated in the alternative. The first set of hypotheses identifies the relationship between employee relations and the productivity or efficiency of the firm. The second set addresses the relationship between accounting profitability measures and human resource practices. The final set of hypotheses addresses the relationship between market measures and human resource practices.

We posit the following hypothesis based on an efficiency measure of performance:

> $H1_1$: A significant positive relationship exists between employee relation strengths and accounting measures of efficient performance.

> $H1_2$: A significant negative relationship exists between employee relation concerns and accounting measures of efficient performance.

We posit the following hypotheses based on an accounting measure of profitability:

> $H1_3$: A significant positive relationship exists between employee relation strengths and accounting measures of profitability success.

> $H1_4$: A significant negative relationship exists between employee relation concerns and accounting measures of profitability success.

We posit the following hypothesis based on a market measure of performance:

> $H1_5$: A significant positive relationship exists between employee relation strengths and market measures of success.

> $H1_6$: A significant negative relationship exists between Employee Relation concerns and market measures of success.

4. DATA AND METHODOLOGY

In order to test the hypotheses, a study was designed which examines the relationships amongst measures of employee relations, profitability measures, efficiency measures, and market measures. The following section describes the data collection process, the variables used in the analysis, and the methodology employed.

Independent, Dependent, and Control Variables

This study uses panel data from the IT&T industry over the period 1999 through 2010. The dataset includes a total of 1217 observations with over 150 firms. We combine data from the Center for Research in Security Prices (CRSP) with the Socrates database from Kinder, Lydenberg, and Domini (KLD). The KLD Socrates database contains indicator variables for numerous categories of social performance. This database is used extensively in business ethics and socially responsible investing research; e.g., Hillman and Keim, 2001. The categories of CSR are: Community, Corporate

Governance, Diversity, Employee Relations, Environment, Human Rights, Product, and Controversial Business Issues. The last category encompasses companies with operations related to alcohol, gambling, tobacco, firearms, military, and nuclear power. Each category contains several indications of a strength or weakness (called a 'concern') relevant to the respective factors.

We develop two categorical variables by simply combining the KLD indicator ratings variables for company strengths listed under (EMPLOYEE_STRENGTHS), and the KLD indicator ratings variables that reflect concerns listed under (EMPLOYEE_CONCERNS). The indicator variables from the KLD database collapsed into employee strengths are seven employee relation variables: union relations, no-layoff policies, cash profit sharing, employee involvement, retirement benefits, health and safety, and other. The five employee relations concern variables include: union relations, health and safety, workforce reductions, retirement benefits, and other. Our samples included over 150 IT&T companies.

We are interested in investigating the relationship between both positive and negative employee relations and various measures of performance of the firm. The dependent variables used in the study represent accounting measures of efficiency, accounting measures of financial success and marketing measures of financial success. In particular, ROA and Total Sales per Employee are used to represent financial accounting profitability and efficiency, while Tobin's Q represents market performance.

In addition to the independent and dependent variables under investigation, control variables and lagged dependent variables are introduced. Serial correlation is a significant concern in this type of model. Therefore, we introduce lagged dependent variables to control for autocorrelation (i.e., SPE-1, SPE-2, ROA-1, ROA-2, Tobin's Q-2, Tobin's Q-3) in each of the equations. The number of periods is altered based on the highest lag of the dependent variable. Control variables which are found in the CSR literature are also introduced into the study. We control for cash flow using operating cash flow to assets (OPCF_TO_ASSETS). We control for research and development using research and development to sales (RD_TO_SALES). We control for leverage using the total long-term debt to equity ratio (TTL_LT_DEBT_TO_EQUITY). We control for size using the log of the number of employees (LOG_NUMB_EMP). All three models are estimated using common independent variables, but, as noted, using the required lagged dependent variables.

Table 1 provides descriptive statistics of the data acquired from the Center for Research in Security Prices (CRSP) and the Socrates database from Kinder, Lydenberg, and Domini (KLD). Of particular interest, the maximum number of employee strengths in the dataset is 4 and the mean employee strength is 0.26. No individual company had more than 2 employee concerns and the mean for this variable is 0.33.

Methodology

Since this study involves an investigation of the variables that serve as important discriminators of performance, we use a cross section, fixed effects ordinary least squares regression to model the relationships. The models for the accounting measures differ from the model for the market measure only in the timeframe of the variable measurement. We argue that accounting performance is dependent upon CSR activities that occur coincident with the accounting measure. We use standard measures of accounting performance; i.e., return on assets and total sales per employee. We use a proxy of our market performance measure. Tobin's Q is defined as the market value of the firm divided by the replacement value of the firm's assets. Given that we do not have replacement values, we proxy Tobin's Q with market value to book value. Thus, all the dependent variables and the independent CSR variables are measured at time t as depicted in Equations 1, 2 & 3.

Equation 1:

SPE = constant
+ Employee_Strengths
+ Employee_Concerns
+ SPE(-1)
+ SPE(-2)
+Operating Cash Flow to Assets
+ Research and Development to Sales
+ Total Long-Term Debt to Equity
+ Log of the Number of Employees

Equation 2:

ROA = constant
+ Employee_Strengths
+ Employee_Concerns
+ ROA(-1)

+ ROA(-2)
+ Operating Cash Flow to Assets
+ Research and Development to Sales
+ Total Long-Term Debt to Equity
+ Log of the Number of Employees

Equation 3:

Tobins Q = constant
+ Employee_Strengths
+ Employee_Concerns
+ TOBINSQ(-2)
+ TOBINSQ(-3)
+ Operating Cash Flow to Assets
+ Research and Development to Sales
+ Total Long-Term Debt to Equity
+ Log of the Number of Employees

We use a panel least squares methodology with period fixed effects to account for differences over time. We have an unbalanced panel as the available time series is not consistent across firms. The number of cross sections (firms) for each model also differs based on the elimination of observations due to lags.

All three models include period fixed effects. We test for fixed effects using both F-tests and Chi-Square tests. The tests are based on restricted specifications of the model; i.e., period fixed effects only and common intercept only. All tests strongly reject the null hypothesis that the fixed effects are redundant based on the test statistics and the corresponding p-values.

EVIEWS 7.0 software for time series analysis was used to calculate the results using panel least squares. No weighting was given to any particular variable.

5. RESULTS OF ANALYSIS

Our results for the efficiency measure of sales per employee (SPE) as the dependent variable are presented in Table 2. When SPE was used as the dependent variable the adjusted R-squared of the model was 0.83. This suggests that the independent CSR variables explain substantial changes in accounting performance. The Q-Stat calculations add credibility to the test indicating an insignificant amount of autocorrelation. The coefficient for Employee Strengths was positive and also significant at the 0.05 level. Because our independent variables (Employee Strengths and Employee Concerns) are a composite of categorical data, we are unable to interpret the resulting coefficient except for its direction. We can, however, conclude from this test that positive employee relation aspects of CSR do have a significant, positive impact on accounting measures of firm efficiency. The Employee Concerns variable, however, was not significant and the coefficient was neutral in this test.

When ROA is used as the dependent variable, the adjusted R-squared of the model is low (0.31), indicating that the explanatory power of the model is limited. However, the employee strengths coefficient was again positive and was significant at the 0.05 level. The employee concern coefficient was again not significantly different from 0. The Q-Stat calculations indicate autocorrelation is not significant in the equation.

Both of the above models support the rejection of the first and third null hypotheses indicating that a significant positive relationship exists between employee relation strengths and accounting measures of a firm's success. However, there is no evidence which would lead to the rejection of our second and fourth null hypotheses. Employee concerns do not appear to have a significant negative impact on accounting measures of success.

Table 4 contains regression results for Equation (3) that utilizes Tobin's Q as the market measure of performance. When Tobin's Q was used as the dependent variable, the adjusted R-squared of the model was 0.54. This suggests that the independent CSR variables explain more than half the changes in market performance. The Q-Stats and related p-values indicate that serial correlation is not a concern. The coefficient for the employee strengths variable was positive and also significant at the 0.05 level. The employee concerns variable coefficient was negative but was not significant. The analysis does support the rejection of our fifth null hypothesis under investigation. The results suggest that maintaining CSR through strong employee relations has a positive impact on a company's market performance. This aligns with the results presented by Harney and Tower (2003) and Orlitzky et al. (2011). However, the results of our analysis do not support the rejection of the sixth null hypothesis. There is no evidence that employee concerns within an organization have a negative impact on that firm's market performance.

6. IMPLICATION OF RESULTS

The results of this study have implications for information technology and telecommunications firms. There are, as is often the case, trade-offs between short-term and long-term effects of spending decisions. In general, decisions that save costs, thus increasing net income, all things being equal, improve financial standing as reflected in ROA. However, in regards to employee strengths and concerns, additional spending may actually improve the financial performance of companies in terms of accounting measures in the IT&T industry. Spending which is focused on establishing the desired organizational culture and climate and appropriate motivational mechanisms can impact financial performance positively. It is common knowledge that employee turnover can be costly; therefore, retaining employees with a fitting organizational atmosphere can save a company unnecessary recruiting, selection, and termination expenses. With a desirable culture and climate and fitting motivational processes, a company is also able to recruit the very best talent in the IT&T field. Spending to build strong employee relations as a component of CSR can actually decrease costs. SAS has long been a proponent of this philosophy and continues as an example of one of the most desirable places to work while continuously earning a profit. However, SAS has been a privately owned company which is not required to answer to stockholders in the short-run.

Trade-offs between short-term and long-term decisions are also incorporated into market price. Because the markets are forward-looking, we expect that CSR activities (anticipated or future behavior on the part of IT&T companies) to positively impact the prior year's Tobin's Q, our measure of market success. In other words, anticipated activity in the current period (time t) should be incorporated into market prices in the preceding period (time t-1). This rationale is consistent with previous research (Haney & tower, 2003; Orlitzky, Siegel & Waldman, 2011). Since employees are one of the most important "assets" for an IT firm, perceived abilities to attract and retain employees were expected to be viewed by investors positively. Our study did support this line of thought. Thus the positive impact on market performance which we anticipated from the employee relations portion of CSR is evident.

In summary, our study suggests a strong relationship between IT&T companies which enhance their corporate social citizenship through building strong employee relations and the accounting measures of success, SPE and ROA. This increase in accounting measures of performance was ultimately reflected in the market.

7. FUTURE RESEARCH

Our study focused on variables which captured union relations, layoff policies, cash profit sharing, employee involvement, retirement benefits, health and safety, and miscellaneous as a general measure of CSR in the employee relations arena. There are numerous measures of employee relations which can be used to expand this research. For example, investigating direct measures of organizational culture and climate with IT&T financial performance measures is encouraged. Or, various motivational techniques for personnel in the IT&T fields might be researched to determine the impact of accounting and market measures of success. Implications for the IT&T industry would also be forthcoming if research is more narrowly focused on each of the CSR variables individually to determine which, if any, has an impact on financial performance measures.

In addition to expanding and narrowing the number and type of independent variables impacting financial performance, research utilizing additional accounting and market measures is encouraged. Consistency amongst multiple measures of financial performance would provide an incentive or disincentive to companies in the IT&T industry to implement policies and procedures which directly impact employee relations.

8. CONCLUSIONS

Anecdotal evidence has long suggested that superior employee relations on the part of IT&T firms have led to superior performance. However, not all IT&T firms follow this pattern. Our objective in this study was to identify the relationship between various measures of firm performance and employee relations. We combine the data from the well-known KLD database with the CRSP data to conduct our investigation. We find very strong evidence to support that there is a positive relationship between affirmative employee relations and firm performance. Our results hold regardless of the

type of performance measure used; i.e., the results hold for profitability, efficiency and market measures. In contrast, we do not find evidence to support our hypothesis of negative outcomes associated with negative employee relations.

9. REFERENCES

Bharadwaj, A. "A resource-based perspective on information technology capability and firm performance: An empirical investigation," MIS Quarterly, 24(1), 2000, 169-196.

Bird, R., Hall, A., Momente, F., and Reggiani F. "What corporate social responsibility activities are valued by the market?" Journal of Business Ethics, 76, 2007, 189-206.

Bureau of Labor Statistics, Overview of the 2010-20 Projections. http://www.bls.gov/ooh/about/projections-overview.htm. Viewed November 12, 2012.

Carroll, A. "A three-dimensional conceptual model of corporate performance," Academy of Management Review, 4(4), 1979, 497-505.

CNNMoney, A Service of CNN, Fortune & Money. February 7, 2011 issue. http://money.cnn.com/magazines/fortune/bestcompanies/2011/full_list/ Viewed November 12, 2012.

CNNMoney, A Service of CNN, Fortune & Money. February 6, 2012 issue.
http://money.cnn.com/magazines/fortune/best-companies/2012/full_list/
Viewed November 12, 2012.

CNNMoney, A Service of CNN, Fortune & Money.
http://money.cnn.com/magazines/fortune/best-companies/2013/list/?iid=bc_sp_full
Viewed February 12, 2013

CSIMoney. "Industries" drop-down menu. CSIMarket.com/Industry_Data.php, 2013.

El Ghoul, S., Guedhami, O., Kwok, C., and Mishra D. "Does corporate social responsibility affect the cost of capital?" Journal of Banking and Finance, 35(9), 2011, 2388-2406.

Glen, P. G., Leading geeks: how to manage and lead people who deliver technology, Jossey-Bass, San Francisco, CA, 2003.

Harney, M, and Tower, E. "Predicting equity returns using Tobin's q and price-earnings ratios," Journal of Investing, 12(3), 2003, 58-69.

Hillman, A. and Keim, G. "Shareholder value, stakeholder management, and social issues: What's the bottom line?" Strategic Management Journal, 22(2), 2001, 125-139.

Hopkins, M. The Planetary Bargain, Earthscan:UK, 2003.

Kieso, D, Weygandt, J, and Warfield, T. Intermediate Accounting, 14th Edition. John Wiley & Sons. Hoboken, New Jersey, 2012.

McClure, B. "Doing more with less: The sales-per-employee ratio." http://Investopedia.com/articles/stocks/04/110304.asp. 1-2. Accessed September 8, 2013.

McGuire, J. A. Sundgren, A., and T. Schneeweiss, T. "Corporate social responsibility and firm financial performance," *Academy of Management Journal*, 31(4), 1988, 854-872.

McIntyre, R.M., Bartle, S.A., Landis, D., and Dansby, M.R. "The effects of equal opportunity fairness attitudes on job satisfaction, organizational commitment, and perceived work group efficacy," Military Psychology, 14(4), 2002, 299-319.

Orlitzky, M, Siegel, D., and Waldman, D. "Corporate social responsibility and environmental sustainability," Business and Society, 50(1), 2011, 6-27.

Orlitzky, M., Schmidt, F. & Rynes, S. "Corporate social and financial performance: A meta-analysis," Organization Studies, 24, 2003, 403-441.

Patterson, M., Warr, P., and West, M. "Organizational climate and company productivity: the role of the employee affect and employee level," Journal of Occupational and Organizational Psychology, vol.77, 2004, 193-216.

Periu, M. "The most important ratio for your business." The New Open Forum, https://www.openforum.com/articles/the-most-important-ratio-for-your-business-1, 2011, 1-7. Accessed September 8, 2013.

Rentsch, J., "Climate and Culture: Interaction and Qualitative Differences in Organizational Meanings," Journal of Applied Psychology, 75(6), 1990, 668-681.

Ross, N. "The decline and fall of high-tech corporate culture," IEEE Software, 17(6), 2000, 12-15.

Rousseau, D., "Quantitative Assessment of Organizational Culture: The Case for Multiple Measures," In B.Schneider(Ed). Frontiers in Industrial and Organizational Psychology. Vol.3, 1990, 153-192. Jossey-Bass: San Francisco.

Siu, O. "Predictors of job satisfaction and absenteeism in two samples of Hong Kong nurses," Journal of Advanced Nursing, 40(2), 2002, 218-229.

Thompson, L. "Shareholder value and your sustainability goals," Compliance Week, 6(65), 2009, 60-61.

Wan-Jan, W. S. "Defining corporate social responsibility," Journal of Public Affairs, 6(3-4), 2006, 176-184.

APPENDIX

	Observations	Mean	Median	Maximum	Minimum	Std. Dev.
NET INCOME	1208	150.607	16.413	18760.000	-16198.000	1443.913
TOTAL ASSETS	1208	2361.213	463.670	92389.000	0.979	8159.112
TOTAL SALES	1208	1368.181	294.412	62484.000	0.036	4735.641
MARKET VALUE	1202	5765.959	819.648	422640.000	3.374	29607.670
BOOK VALUE	1208	1221.200	265.014	74825.000	-4734.000	5004.871
TOTAL LONG TERM DEBT	1191	223.757	0.149	11510.000	0.000	825.904
NUMBER OF EMPLOYEES	1199	5.523	1.445	126.000	0.002	12.598
OPERATING NET CASHFLOW	1207	332.725	38.913	24073.000	-3657.000	1718.825
RESEARCH & DEVEL EXPENSE	1070	192.433	40.916	9010.000	0.000	736.767
EMPLOYEE STRENGTHS	1217	0.256	0.000	4.000	0.000	0.554
EMPLOYEE CONCERNS	1217	0.329	0.000	2.000	0.000	0.521

***The number of observations differ based on missing data.**

Table 1. Descriptive Statistics

Dependent Variable: SALES PER EMPLOYEE (SPE)						
Method: Panel Least Squares						
Sample (adjusted): 2001 2010						
Periods included: 10						
Cross-sections included: 158						
Total panel (unbalanced) observations: 626						
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**		
C	25.71095	9.155635	2.80821	0.0051		
EMP_STR	6.125793	2.501126	2.449214	0.0146		
EMP_CON	1.895629	3.484625	0.543998	0.5866		
SPE(-1)	0.80254	0.081377	9.862015	0		
SPE(-2)	0.074825	0.073333	1.020349	0.308		
OPCF_TO_ASSETS	65.40194	29.5554	2.212859	0.0273		
RD_TO_SALES	-5.948369	21.31555	-0.279062	0.7803		
TTL_LT_DEBT_TO_EQUITY	-0.217209	0.477165	-0.455207	0.6491		
LOG_NUMB_EMP	-2.015755	1.750272	-1.151681	0.2499		
	Effects Specification					
Period fixed (dummy variables)						
R-squared	0.833291	Mean dependent var		244.7695		
Adjusted R-squared	0.82863	S.D. dependent var		94.33712		
S.E. of regression	39.05263	Akaike info criterion		10.19603		
Sum squared resid	927265.5	Schwarz criterion		10.32368		
Log likelihood	-3173.357	Hannan-Quinn criter.		10.24563		
F-statistic	178.7692	Durbin-Watson stat		2.046895		
Prob(F-statistic)	0					
Autocorrelation	**Partial Corr**		**AC**	**PAC**	**Q-Stat**	**Prob**
.|. |	.|. |	1	-0.039	-0.039	0.9732	0.324
.|. |	.|. |	2	0.006	0.005	0.9986	0.607
.|. |	.|. |	3	0.012	0.012	1.0844	0.781
.|. |	.|. |	4	0.038	0.039	1.993	0.737
.|. |	.|. |	5	0.012	0.015	2.0827	0.838
.|. |	.|. |	6	0.023	0.023	2.412	0.878
.|. |	.|. |	7	0.017	0.018	2.5929	0.92
.|. |	.|. |	8	0	0	2.593	0.957

TABLE 2. Least Squares Results for SPE as Dependent Variable

Dependent Variable: RETURN ON ASSETS (ROA)						
Method: Panel Least Squares						
Sample (adjusted): 2001 2010						
Periods included: 10						
Cross-sections included: 161						
Total panel (unbalanced) observations: 636						
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**		
C	0.037738	0.02474	1.52541	0.1277		
EMP_STR	0.01895	0.008854	2.140361	0.0327		
EMP_CON	0.00603	0.01284	0.469615	0.6388		
ROA(-1)	0.080139	0.039931	2.006947	0.0452		
ROA(-2)	-0.021367	0.01486	-1.437901	0.151		
OPCF_TO_SALES	0.377065	0.081616	4.619995	0		
RD_TO_SALES	-0.555071	0.13332	-4.163453	0		
TTL_LT_DEBT_TO_EQUITY	0.006865	0.004549	1.509119	0.1318		
LOG_NUMB_EMP	-0.005812	0.005399	-1.0766	0.2821		
	Effects Specification					
Period fixed (dummy variables)						
R-squared	0.325217	Mean dependent var		0.018823		
Adjusted R-squared	0.306655	S.D. dependent var		0.17068		
S.E. of regression	0.142121	Akaike info criterion		-1.03639		
Sum squared resid	12.48252	Schwarz criterion		-0.9103		
Log likelihood	347.5715	Hannan-Quinn criter.		-0.98743		
F-statistic	17.52058	Durbin-Watson stat		2.090285		
Prob(F-statistic)	0					
Autocorrelation	**Partial Corr**		**AC**	**PAC**	**Q-Stat**	**Prob**
.|. |	.|. |	1	0.017	0.017	0.1952	0.659
.|. |	.|. |	2	0.065	0.064	2.876	0.237
.|. |	.|. |	3	0.029	0.027	3.4176	0.332
.|. |	.|. |	4	0.04	0.036	4.4705	0.346
.|. |	.|. |	5	0.005	0	4.4837	0.482
.|. |	.|. |	6	0.005	0	4.5028	0.609
.|. |	.|. |	7	0.007	0.005	4.5354	0.716
.|. |	.|. |	8	0	-0.002	4.5355	0.806

Table 3. Least Squares Results for ROA as Dependent Variable

Dependent Variable: MARKET VALUE TO BOOK VALUE (TOBINSQ)						
Method: Panel Least Squares						
Sample (adjusted): 2002 2010						
Periods included: 9						
Cross-sections included: 127						
Total panel (unbalanced) observations: 468						
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**		
C	1.41224	0.338278	4.174791	0		
EMP_STR	0.429236	0.19757	2.172583	0.0303		
EMP_CON	-0.444579	0.275552	-1.613414	0.1074		
TOBINSQ(-2)	0.491576	0.079436	6.188336	0		
TOBINSQ(-3)	0.070774	0.062722	1.128384	0.2598		
OPCF_TO_SALES	0.574522	0.745924	0.770215	0.4416		
RD_TO_SALES	-3.39393	1.546122	-2.195125	0.0287		
TTL_LT_DEBT_TO_EQUITY	2.827113	0.428859	6.592174	0		
LOG_NUMB_EMP	-0.226141	0.114783	-1.970159	0.0494		
	Effects Specification					
Period fixed (dummy variables)						
R-squared	0.553013	Mean dependent var		3.662459		
Adjusted R-squared	0.537155	S.D. dependent var		4.288597		
S.E. of regression	2.917648	Akaike info criterion		5.015081		
Sum squared resid	3839.213	Schwarz criterion		5.165773		
Log likelihood	-1156.529	Hannan-Quinn criter.		5.074378		
F-statistic	34.87363	Durbin-Watson stat		1.649905		
Prob(F-statistic)	0					
Autocorrelation	**tial Correlation**		**AC**	**PAC**	**Q-Stat**	**Prob**
.|. |	.|. |	1	0.018	0.018	0.1462	0.702
.|. |	.|. |	2	0.019	0.019	0.3142	0.855
.|. |	.|. |	3	0.01	0.009	0.3569	0.949
.|. |	.|. |	4	0.008	0.008	0.3886	0.983
.|. |	.|. |	5	0.003	0.002	0.3929	0.996
.|. |	.|. |	6	0.001	0.001	0.3939	0.999
.|. |	.|. |	7	0	0	0.3939	1

TABLE 4. Least Squares Results for TOBINSQ as the Dependent Variable