

## Assessing whether corporate social responsibility influence corporate value

Roger C. Y. Chen & Chen-Hsun Lee

To cite this article: Roger C. Y. Chen & Chen-Hsun Lee (2017): Assessing whether corporate social responsibility influence corporate value, Applied Economics, DOI: [10.1080/00036846.2017.1313949](https://doi.org/10.1080/00036846.2017.1313949)

To link to this article: <http://dx.doi.org/10.1080/00036846.2017.1313949>



Published online: 10 Apr 2017.



Submit your article to this journal [↗](#)



View related articles [↗](#)



View Crossmark data [↗](#)



## Assessing whether corporate social responsibility influence corporate value

Roger C. Y. Chen<sup>a</sup> and Chen-Hsun Lee<sup>b</sup>

<sup>a</sup>Department of Logistics Management, National Kaohsiung First University of Science and Technology, Kaohsiung City, Taiwan (R.O.C.);

<sup>b</sup>Department of Money and Banking, National Kaohsiung First University of Science and Technology, Kaohsiung City, Taiwan (R.O.C.)

### ABSTRACT

This study used the corporate social responsibility (CSR) index to gauge the corporate value and social responsibility performance of corporations in Taiwan. We investigated whether CSR influences corporate value and whether the extent of that influence varies with corporate value or time. The results indicate that the influence of CSR on corporate value does not change with time. CSR exerts a positive influence on company value, and this influence does not change over time. However, the extent of the influence significantly varies with corporate value. When the corporate value of a company is not high, investing in CSR would only increase costs and fail to effectively increase corporate value. In contrast, if the corporate value of the company is high, investments in CSR in this circumstance would instead promote the effective increase of corporate value.

### KEYWORDS

Corporate social responsibility; CSR; social responsibility performance; corporate social responsibility index; corporate value

### JEL CLASSIFICATION

G32; L25; M14

## 1. Introduction

Corporate sustainability has become an increasingly significant issue for investors and the ultimate goal for corporations. Since the 1960s, corporate social responsibility (CSR) has been recognized as a key issue associated with corporate sustainability. Investors are focusing more attention on how CSR influences the operational performance of corporations. The link between CSR and firm value is of great interest to both academics and practitioners. However, it is still unclear as to whether the shouldering of social responsibility exerts impact on corporate value. At present, existing literature is inconclusive on this matter. Becchetti, Di Giacomo, and Pinnacchio (2008; 2009) agreed with the views of classical economist Friedman (1962), in which bearing social responsibility is considered a shift in company focus to engage in non-profit-maximizing behaviour, and therefore, a negative correlation exists between CSR and financial performance. In contrast, Moneva and Ortas (2008) proposed that a positive relation exists between CSR and financial performance on the grounds that CSR can enhance brand image and enable corporations to gain better reputation in the eyes of consumers; for this reason, higher social performance leads to better financial

performance. McWilliams and Siegel (2000) maintained that CSR and R&D expenses can create new products and production innovation for corporations. Thus, as corporations actively fulfil CSR, they also pursue differentiation strategies, and investment in R&D presents a trade-off with advantages. For this reason, they indicated that CSR performance has a neutral impact on corporate value. To sum up, existing studies still have no consistent conclusions regarding the influence of socially responsible behaviour on corporate value. We speculate that this is because previous research investigated a linear relationship between CSR and corporate value. However, if a nonlinear relationship exists between the two, it may lead to results that differ from those presented in the literature.

An issue often encountered in research on CSR is the means of quantifying it. Researchers and international organizations have proposed a number of CSR indices. However, there is currently no single measurement standard for CSR. Kinder, Lydenberg, and Domini & Co. Inc. (KLD) were the first to establish CSR assessment criteria in 1990, which they used to screen the constituents of S&P 500 and develop the Domini 400 Index. Later in 2001, the Financial Times and London Stock Exchange (FTSE) created the FTSE 400 GOOD Index. Based

on the CSR assessment criteria established by the FTSE, Korea established the Korea Corporate Governance Index in 2003, and Japan created the FTSE 4 GOOD Japan Index in 2004.

CSR mainly involves the interactions between corporations and their stakeholders, which encompasses corporate information transparency and the amount of concern and contribution that the corporation gives to society and the environment (Carroll 1999). The influence of CSR on corporate value is thus a focus of concern for stakeholders. On the connection between CSR and corporate value, researchers have put forward the social impact hypothesis from the perspective of social economics and the shift of focus hypothesis from the perspective of efficiency. The former primarily holds that corporations enhance their performance in financial behaviour by meeting the demands of stakeholder; if they cannot meet the demands of stakeholders, it will create distrust in the market and affect their financial performance. Parket and Eibert (1975) indicated that the benefits of fulfilling CSR are greater than the costs of doing so, and for this reason, carrying out CSR can increase corporate value. Furthermore, taking care of employees in CSR helps increase productivity, establish growing reputation, gain public trust, and enhance brand image and competitiveness, which in turn reduces operational costs and achieves the goal of corporate sustainability (Jamali and Mirshak 2007; Dey and Sircar 2012). The empirical results derived by Johnson and Greening (1994), Waddock and Graves (1997), Porter and van der Linde (1995), and Ambec and Barla (2002) all support the social impact hypothesis indicating that CSR increases corporate value.

The primary argument of the shift of focus hypothesis is that social responsibilities such as environmental protection and care for employees and society are non-profit-maximizing behaviours that shift the focus of the company; fulfilling CSR means the investment of corporate resources and cost increases, which are not conducive to high financial performance (Becchetti, Di Giacomo, and Pinnacchio 2008; 2009). Bragdon and Marlin (1972) indicated that discharging CSR incurs more costs for corporations, which can place them at a disadvantage in the competitive market and affect their financial performance. Henderson (2002) further stated

that the public welfare activities held by corporations generally elicit little response from society and require considerable time to induce reputation effects and create product demand. Consequently, CSR does not benefit corporate value. The empirical results obtained by Bragdon and Marlin (1972), Mahapatra (1984), and Bromiley and Marcus (1989) also support the shift of focus hypothesis, thereby indicating that CSR activities have an adverse effect on corporate value.

The Coase theorem holds that in the event of zero transaction costs, externalities can increase efficiency and corporate value through the granting of property rights to resource users and the permitting of free trade in property rights to endogenize costs. We therefore extend on the Coase theorem and present the following hypothesis: When the corporate value of a corporation is not high, investments in CSR will also fail to gain the trust of stakeholders. This is because such a corporation will not be able to effectively reduce the costs of transactions with their stakeholders, and thus investments in CSR will not reduce operational costs to increase corporate value. However, if the corporate value of a corporation is high, then the corporation will be able to bear more CSR and efficiently reduce transaction costs. This will resolve market failure issues and enable the full use of economic resources, thereby endogenizing the costs of social externalities and reducing operational costs, which then leads to greater corporate value.

The remainder of this study is organized as follows. [Section II](#) describes the literature review, [Section III](#) describes the data and methodology, and [Section IV](#) presents the empirical results. Finally, [Section V](#) presents some concluding remarks.

## II. Literature review

There is much in the literature addressing the relationship between CSR and company value. Margolis et al. (2007) compiled studies relating to the link between CSR and financial performance. There is some debate as to the strength of the correlation between CSR and company value. Two dominant hypotheses related to this issue are social impact hypothesis and shift of focus hypothesis.

The social impact hypothesis implies that a company may increase its financial performance by satisfying the needs of stakeholders. When a firm is

willing to set the well-being of its employees as a high priority, its productivity can increase as a result, as does the company's reputation, public trust, brand image, and competitiveness. Thus, the firm's operational costs decrease and the goal of corporate sustainability can be achieved (Dey and Sircar 2012). The shift of focus hypothesis suggests that when a firm tries to take good care of its employees, and engages in social care and environmental protection, it shifts the focus of business operations, which is non-profit-maximizing behaviour. It indicates that acknowledgement of social responsibility requires a large amount of corporate resources, meaning costs will increase and financial performance will suffer (Becchetti, Di Giacomo, and Pinnacchio 2008; 2009).

Although there exists a wide variety of literature on the impact of CSR on corporate value and financial performance, little research has been dedicated to determining whether CSR exerts influence over corporate value and financial performance. Therefore, one of the article's aims is to discuss whether there exists a moderating effect between CSR, corporate value, and a firm's annual financial performance.

### III. Data and methodology

#### Data

In Greater China (Taiwan, Hong Kong, and Mainland China), the development of Taiwan has always served as an indicator for Mainland China, allowing for the prediction of economic and social development trends. In recent years, a series of food safety violations have occurred in Taiwan. In May 2011, it was discovered that plasticizers had been added to food, while May 2013 brought evidence of poisoned soy sauce and food starch, followed by the revelation in August 2013 that artificial essence was added to Top Pot Bakery bread and that Sunsuivi rice had intentionally been mislabelled as having been grown in Taiwan when it was actually grown elsewhere. At the end of the same year, it was discovered that Chang Chi Foodstuff Factory had been distributing adulterated olive oil. It was also discovered during this period that the semiconductor manufacturing company ASE had been polluting the rivers with seriously contaminated industrial wastewater. These incidents awakened Taiwanese society to the urgency and importance of CSR and motivated local scholars to begin researching the role CSR plays in Taiwanese

corporations. It is imperative that a corporate social responsibility index (CSRI) be created for Taiwanese firms, so that the commitment of Taiwanese enterprises to CSR can be properly gauged.

To construct a CSR index suitable for corporations in Taiwan, Chen and Hong (2013) referred to the method used by Gompers, Ishii, and Metrick (2003) to construct the G-index, a corporate governance index. Chen and Hong (2013) grounded their work on the 2010 and 2011 versions of the CSR guidelines for listed and over-the-counter companies released by the Taiwan Stock Exchange (TSE) and the GreTai Securities Market and compiled CSR data from annual shareholder reports, CSR reports, and information given on corporate websites. The CSR dummy variable equalled 1 for corporations conforming to the guidelines and 0 for those that did not. With item-by-item data validation, they quantified the data and calculated the sums of the manifest variables to construct the CSR index for Taiwanese corporations. They divided CSR into six major portions: the governance of CSR, the sustainable environment, social service, the information transparency of CSR, matters authenticated by impartial third parties, and other, which comprised 24 manifest variables. Therefore, the CSR index ranged between 0 and 24.

For this research, we relied on the CSR database developed by Chen and Hong (2013), which includes data from 2010 and 2011. Financial institutions differ from listed companies; we therefore deleted them from the sample. We therefore investigated the listed companies in 2010 and 2011 using year data and the CSR index developed by Chen and Hong (2013). Financial statements and stock price data originated from the Taiwan Economic Journal database, of which the former comprised year data and the latter were monthly data. After eliminating corporations that were newly listed, had depositary receipts, or were the first listings of foreign countries in Taiwan during the study period, we obtained a total of 1,487 pieces of data from 772 corporations.

Table 1 shows that all the *J-B* test variables were significant. Direct application of regression analysis often causes biased or inconsistent results. Furthermore, data on different levels presented abnormal distributions. Thus, hierarchical linear modelling (HLM) was selected as the primary research instrument of this study (Woltman et al. 2012).

**Table 1.** Summary statistics of listed companies in Taiwan, 2010–2011.  $N = 1,487$ .

	Mean	Max.	Min.	Std.	Sk.	K.	J-B
TOBIN'S Q	1.223	5.820	0.460	0.546	2.960	16.463	13,400.470***
CSRI	12.215	24.000	0.000	3.733	0.145	3.610	28.222***
YEAR	0.506	1.000	0.000	0.500	-0.026	1.001	247.833***
LN(ASSETS)	9.293	15.426	5.452	1.587	1.091	4.395	415.670***
AGE	31.266	66.712	1.082	13.802	0.270	2.410	39.660***
B/M	0.926	3.691	0.087	0.458	1.068	4.711	463.989***

Std. denotes standard deviation, SK. denotes the skewness, K. denotes the kurtosis, and J-B denotes the Jarque-Bera test for normality. \*\*\* indicates significance at the 1% level.  $H_0$ : SK. = 0, K. = 3 (normality).

### Model and methodology

To determine whether the influence of CSR on corporate value varied between corporations with different corporate values and whether said influence changes with time, we adopted HLM. This research question involves a two-tiered hierarchy. Level-1 variables are outcome (dependent) variables, such as corporate value and CSR performance. Level-2 variables are group-related and year-related variables of corporate value performance. Level-1 variables are nested within level-2 groups and are impacted by level-2 variables. Interest is considered an outcome and therefore a level-1 variable (Castro 2002). We ranked and grouped the samples by corporate value; the high corporate value group comprised those in the top 27%,<sup>1</sup> presenting a *Tobin's Q* of over 1.3090, whereas the low corporate value group contained those in the bottom 27% with a *Tobin's Q* of less than 0.9214. We first investigated the variance in slopes between groups with regard to *Tobin's Q* using the random coefficient model of HLM as described below.

#### Level-1 model:

$$\begin{aligned} \text{Tobin's } Q_{ij} = & \beta_{0j} + \beta_{1j} \cdot \text{Sector} \\ & + \gamma_{ij}, \gamma_{ij} \sim \text{iid } N(0, \sigma^2). \end{aligned} \quad (1)$$

In Equation (1), *Tobin's Q*<sub>ij</sub> denotes the corporate value of corporation type  $j$  in the two groups; random coefficient  $\beta_{0j}$  signifies the average corporate value of corporation type  $j$ , and  $\beta_{1j}$  represents the difference between the average corporate values of the two groups;  $\sigma^2$  is within-group variance.

#### Level-2 model:

$$\beta_{0j} = \gamma_{00} + u_{0j}, u_{0j} \sim \text{iid } N(0, \tau_{00}), \quad (2)$$

$$\beta_{1j} = \gamma_{10} + u_{1j}, u_{1j} \sim \text{iid } N(0, \tau_{11}), \quad (3)$$

By substituting Equations (2) and (3) into Equation (1), we can derive that

$$\text{Tobin's } Q_{ij} = \gamma_{00} + (\gamma_{10} + u_{1j}) \cdot \text{Sector} + u_{0j} + \gamma_{ij}, \quad (4)$$

where the fixed effects of the intercept term,  $\gamma_{00}$  and  $\gamma_{10}$ , respectively, denote the average corporate value of the low corporate value group and the difference between the average corporate values of the high and low corporate value groups; *Sector* = 0 marks the reference point representing the low corporate value group, and *Sector* = 1 is the comparison point representing the high corporate value group;  $u_{0j}$  and  $\gamma_{ij}$  are the residual terms;  $\tau_{00}$  and  $\tau_{11}$  denote the between-group variance of the intercept terms and the slope terms, respectively.

To examine the variance in slopes between groups with regard to CSR, we also adopted the random coefficient model of HLM.

#### Level-1 model:

$$\text{CSR}_{ij} = \beta_{0j} + \beta_{1j} \cdot \text{Sector} + \gamma_{ij}, \gamma_{ij} \sim \text{iid } N(0, \sigma^2). \quad (5)$$

In Equation (5), *CSR*<sub>ij</sub> indicates the CSR performance index of corporation type  $j$  in the two groups; random coefficient  $\beta_{0j}$  is the average CSR performance of the low corporate value group, and  $\beta_{1j}$  represents the difference between the CSR performance of the two groups;  $\sigma^2$  is within-group variance.

#### Level-2 model:

$$\beta_{0j} = \gamma_{00} + u_{0j}, u_{0j} \sim \text{iid } N(0, \tau_{00}), \quad (6)$$

$$\beta_{1j} = \gamma_{10} + u_{1j}, u_{1j} \sim \text{iid } N(0, \tau_{11}). \quad (7)$$

By substituting Equations (6) and (7) into Equation (5), we can derive that

<sup>1</sup>We adopted the top 27% and the bottom 27% as the grouping standards based on Kelley (1939) and Cureton (1957).

$$CSR_{ij} = \gamma_{00} + (\gamma_{10} + u_{1j}) \cdot Sector + u_{0j} + \gamma_{ij}, \quad (8)$$

where the fixed effects of the intercept term,  $\gamma_{00}$  and  $\gamma_{10}$ , respectively, denote the average CSR performance of the low corporate value group and the difference between the high and low corporate value groups in average CSR performance;  $Sector = 0$  marks the reference point representing the low corporate value group, and  $Sector = 1$  is the comparison point representing the high corporate value group;  $u_{0j}$  and  $\gamma_{1j}$  are the residual terms;  $\tau_{00}$  and  $\tau_{11}$  denote the between-group variance of the intercept terms and the slope terms, respectively.

We next investigated the variance in slopes between years with regard to *Tobin's Q* using the random coefficient model of HLM.

#### Level-1 model:

$$Tobin's\ Q_{ij} = \beta_{0j} + \beta_{1j} \cdot Year + \gamma_{ij}, \gamma_{ij} \sim iid\ N(0, \sigma^2). \quad (9)$$

In Equation (9), *Tobin's Q*<sub>ij</sub> represents the corporate value of corporation type *j* in the 2 years ( $i = 0$  and  $i = 1$  indicate 2010 and 2011, respectively); random coefficient  $\beta_{0j}$  denotes the average corporate value of all the corporations in 2010, and  $\beta_{1j}$  is the difference between the average corporate values of all the corporations in 2010 and 2011;  $\sigma^2$  is within-group variance.

#### Level-2 model:

$$\beta_{0j} = \gamma_{00} + u_{0j}, u_{0j} \sim iid\ N(0, \tau_{00}), \quad (10)$$

$$\beta_{1j} = \gamma_{10} + u_{1j}, u_{1j} \sim iid\ N(0, \tau_{11}). \quad (11)$$

By substituting Equations (10) and (11) into Equation (9), we can derive that

$$Tobin's\ Q_{ij} = \gamma_{00} + (\gamma_{10} + u_{1j}) \cdot Year + u_{0j} + \gamma_{ij}, \quad (12)$$

where the fixed effects of the intercept term,  $\gamma_{00}$  and  $\gamma_{10}$ , respectively, represent the average corporate value of all the corporations in 2010 and the difference between the average corporate values of all the corporations in 2010 and 2011;  $Year = 0$  marks the reference point representing 2010, and  $Year = 1$  is the comparison point representing 2011;  $u_{0j}$  and  $\gamma_{1j}$  are the residual terms;  $\tau_{00}$  and  $\tau_{11}$  denote the between-group variance of the intercept terms and the slope terms, respectively.

We then investigated the variance in slopes between years with regard to CSR using the random coefficient model of HLM.

#### Level-1 model:

$$CSR_{ij} = \beta_{0j} + \beta_{1j} \cdot Year + \gamma_{ij}, \gamma_{ij} \sim iid\ N(0, \sigma^2). \quad (13)$$

In Equation (13), *CSR*<sub>ij</sub> indicates the CSR performance index of corporation type *j* in the 2 years ( $i = 0$  and  $i = 1$  represent 2010 and 2011, respectively); random coefficient  $\beta_{0j}$  is the average CSR performance of all the corporations in 2010, and  $\beta_{1j}$  represents the difference between 2010 and 2011 with regard to the average CSR performance of all the corporations;  $\sigma^2$  is within-group variance.

#### Level-2 model:

$$\beta_{0j} = \gamma_{00} + u_{0j}, u_{0j} \sim iid\ N(0, \tau_{00}), \quad (14)$$

$$\beta_{1j} = \gamma_{10} + u_{1j}, u_{1j} \sim iid\ N(0, \tau_{11}). \quad (15)$$

By substituting Equations (14) and (15) into Equation (13), we can derive that

$$CSR_{ij} = \gamma_{00} + (\gamma_{10} + u_{1j}) \cdot Year + u_{0j} + \gamma_{ij}, \quad (16)$$

where the fixed effects of the intercept term,  $\gamma_{00}$  and  $\gamma_{10}$ , respectively, represent the average CSR performance of all the corporations in 2010 and the difference between 2010 and 2011 with regard to the average CSR performance of all the corporations;  $Year = 0$  marks the reference point representing 2010, and  $Year = 1$  is the comparison point representing 2011;  $u_{0j}$  and  $\gamma_{1j}$  are the residual terms;  $\tau_{00}$  and  $\tau_{11}$  denote the between-group variance of the intercept terms and the slope terms, respectively.

We next address the main issue of this study in whether the influence of CSR on corporate value varies with corporate value and the year. First, to understand the between-group variance in the intercepts and slopes, we used the slopes-as-outcomes model of HLM with corporate value as the dependent variable and CSR as the independent variables. Given level 1 representing corporate, with performance score as an outcome(dependent) variable, and level 2 representing CSR performance or years group, a random coefficients regression model is one with one or more level-1 predictors such as total assets, the age of the company, and the book-to-market ratio. The level-2 grouping variable (CSR performance or years group) remains a random

factor, but there are no other level-2 predictors. The ‘coefficients’ term in the label means that the group effect is used not only to model the level 1 intercept of corporate value as an outcome but also to model the regression coefficients of the level-1 predictors. We then added the natural logarithm of total assets ( $LnAssets$ ), the age of the company ( $age$ ), and the book-to-market ratio ( $B/M$ ) as the control variables. Thus, the level-1 model of between-group of sector was

**Level-1 model:**

$$\begin{aligned} \text{Tobin's } Q_{ij} = & \beta_{0j} + \beta_{1j} \cdot CSRI_{ij} + \beta_{2j} \cdot LnAssets_{ij} \\ & + \beta_{3j} \cdot Age_{ij} + \beta_{4j} \cdot BM_{ij} + \gamma_{ij}, \gamma_{ij} \sim iid N(0, \sigma^2), \end{aligned} \quad (17)$$

where  $CSRI_{ij}$  is the CSR performance of group  $i$  in corporation type  $j$  ( $i = 0$  and  $i = 1$  indicate the low and high corporate value groups, respectively); random coefficient  $\beta_{0j}$  denotes the average corporate value of corporation  $j$ , and random coefficient  $\beta_{1j}$  signifies the CSR-Tobin’s Q slope of corporation type  $j$ ;  $\beta_{1j}$  signifies the CSR-Tobin’s Q slope of corporation type  $j$ ;  $\beta_{2j}$  denotes the coefficient of  $LnAssets_{ij}$ ;  $\beta_{3j}$  denotes the coefficient of  $Age_{ij}$ ;  $Tobin's Q_{ij}$  is the corporate value of corporation type  $j$ , and  $\sigma^2$  is within-group variance.

**Level-2 model:**

$$\begin{aligned} \beta_{1j} = & \gamma_{10} + \gamma_{11} \cdot Sector \\ & + u_{1j}, u_{1j} \sim iid N(0, \tau_{11}). \end{aligned} \quad (18)$$

In the level-2 model, the fixed effects of the slope term,  $\gamma_{10}$  and  $\gamma_{11}$ , respectively, represent the average slope of the CSR-corporate value curve in the low corporate value group and the difference between the average slopes of the CSR-corporate value curves in the high and low corporate value groups;  $Sector = 0$  marks the reference point representing low corporate value group, and  $Sector = 1$  is the comparison point representing the high corporate value group.

By substituting Equation (18) into Equation (17), we can obtain the mixed model:

**Mixed Model:**

$$\begin{aligned} \text{Tobin's } Q_{ij} = & \beta_{0j} + (\gamma_{10} + u_{1j}) \cdot CSRI_{ij} \\ & + \gamma_{11} \cdot Sector \cdot CSRI_{ij} + \beta_{2j} \cdot LnAssets_{ij} \\ & + \beta_{3j} \cdot Age_{ij} + \beta_{4j} \cdot BM_{ij} \\ & + \gamma_{ij}, u_{1j} \sim iid N(0, \tau_{11}), \gamma_{ij} \sim iid N(0, \sigma^2). \end{aligned} \quad (19)$$

Equation (19) describes the influence of CSRI on Tobin’s Q on different corporate values. We next investigated whether the influence of CSR on corporate value varied by year. To examine the between-year variance in the slopes, we used the slopes-as-outcomes model of HLM. The dependent variable was corporate value with the industry-adjusted Tobin’s Q as a proxy variable, and the independent variable was the CSRI. Based on the settings used by Gompers, Ishii, and Metrick (2003) and Giroud and Mueller (2011), the control variables included the market-to-book ratio ( $B/M$ ), the age of the company ( $age$ ), and the natural logarithm of total assets ( $LnAssets$ ). Thus, the Level-1 model of between-group of year are

**Level-1 model:**

$$\begin{aligned} \text{Tobin's } Q_{ij} = & \beta_{0j} + \beta_{1j} \cdot CSRI_{ij} + \beta_{2j} \cdot LnAssets_{ij} \\ & + \beta_{3j} \cdot Age_{ij} + \beta_{4j} \cdot BM_{ij} + \gamma_{ij}, \gamma_{ij} \sim iid N(0, \sigma^2). \end{aligned} \quad (20)$$

**Level-2 model:**

$$\beta_{1j} = \gamma_{10} + \gamma_{11} \cdot Year + u_{1j}, u_{1j} \sim iid N(0, \tau_{11}). \quad (21)$$

In Equation (21), the fixed effects of the slope term,  $\gamma_{10}$  and  $\gamma_{11}$ , respectively, indicate the average slope of the CSR-corporate value curve in 2010 and the difference between the average slopes of the CSR-corporate value curves of all the corporations in 2010 and 2011;  $Year = 0$  marks the reference point representing 2010, and  $Year = 1$  is the comparison point representing 2011;  $u_{1j}$  is the residual term, and  $\tau_{11}$  denotes the between-group variance of the slope terms.

By substituting Equation (21) into Equation (20), we can obtain the mixed model:

**Mixed model:**

$$\begin{aligned} \text{Tobin's } Q_{ij} = & \beta_{0j} + (\gamma_{10} + u_{1j}) \cdot CSRI_{ij} \\ & + \gamma_{11} \cdot Year \cdot CSRI_{ij} + \beta_{2j} \cdot LnAssets_{ij} \\ & + \beta_{3j} \cdot Age_{ij} + \beta_{4j} \cdot BM_{ij} \\ & + \gamma_{ij}, u_{1j} \sim iid N(0, \tau_{11}), \gamma_{ij} \sim iid N(0, \sigma^2). \end{aligned} \quad (22)$$

**The reasons that CSR investments are increasing annually**

We use the CSR possibility curve to explain why investments in CSR increase with time. The CSR

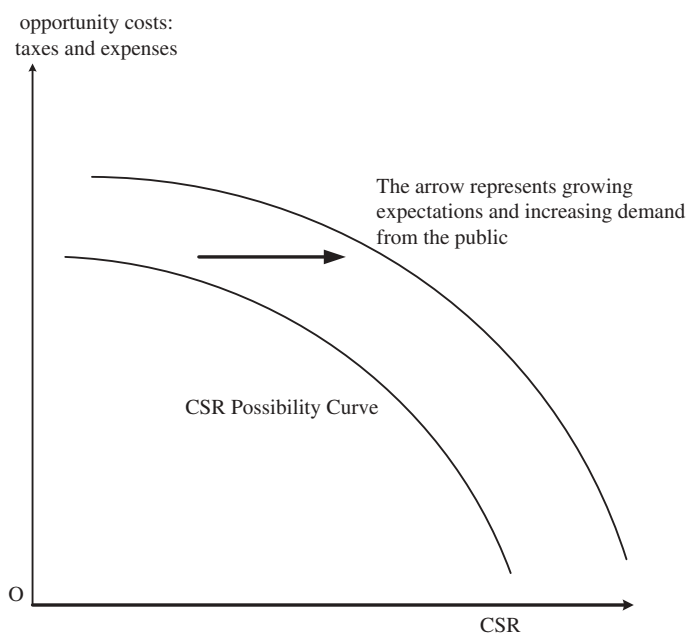
possibility curve is defined as the opportunity costs that face a corporation (y-axis) when it invests in CSR to different certain extents (x-axis). The opportunity costs include taxes as well as the fixed and variable costs needed to solve externalities.

In the CSR possibility curve (Figure 1), investment in CSR decreases as the opportunity costs increase. By contrast, investment in CSR increases as the opportunity costs decline. This involves the same CSR possibility curve which also represents changes in endogenous demand. If exogenous factors cause an increase in public expectations, these will increase with time, and exogenous changes in the CSR possibility curve will result in a horizontal shift to the right. Consequently, investment in CSR should increase with time. Figure 1 indicates that the government should introduce measures to encourage corporations to invest in CSR. However, it is also evident from Figure 1 that while CSR investment remains fixed, the loss of opportunity costs increases with time. In other words, corporations must invest more as time passes to meet the growing expectations of the public with regard to CSR.

### **Why companies with low corporate value cannot increase their corporate value by investing in corporate social responsibility (CSR)**

Tobin's Q, the ratio between a corporation's market value and the replacement cost of its assets, compares the two different value estimates of a company. Market value, the numerator, reflects how much a corporation is worth to the financial market, whereas the denominator indicates the corporation's fundamental value (in other words, the replacement cost). A corporation's value in the financial market includes the market values of the corporation's stock and debt capital. The replacement cost means the total cost of all the assets of the corporation; in other words, it is the cost of establishing this corporation from scratch.

The formula for Tobin's Q is:  $Tobin's\ Q = \frac{\text{market value of the corporation}}{\text{the replacement cost of the assets}}$ . Therefore, a high Tobin's Q indicates a high corporate value, which in turn means high operational efficiency and the presence of brand value. The investment of more funds to enhance the social welfare of stakeholders<sup>2</sup> can thus increase the welfare of all society, which also reduces



**Figure 1.** CSR possibility curve.

<sup>2</sup>Stakeholders are referred to the organization or individual within a structure that will affect the structure's goals or be affected by the structure. Firm administrators must formulate various sustainability strategies that can be employed separately to meet the differing needs of individual stakeholders. Generally speaking, stakeholders include owners of the company, governmental bodies, political groups, trade associations, trade unions, communities, financiers, suppliers, employees, and customers, and all individuals and organizations that are connected to the firm (Donaldson and Preston 1995). The firm has a binding fiduciary duty to put the needs of the stakeholders first. It might be best to think of firm stakeholders as a series of concentric circles, the core of which being the owner of the firm, with proliferating multifold layers containing other stakeholders.



the costs of transactions with stakeholders as well as externalities. This further increases the efficiency of investments in CSR, the more of which can increase corporate value even further.

#### IV. Empirical results

Table 2 presents the empirical results found using Equations (4) and (8). Table 2 shows that with regard to the between-group effects of the dependent variable *Tobin's Q*, the fixed effects of the intercept term are  $\gamma_{00} = 0.8049$  and  $\gamma_{01} = 1.0518$ . The former reaches the 1% level of significance, which demonstrates that the average corporate value of the low corporate value is significantly not 0. The latter shows that the average corporate value of the high corporate value group ( $1.8567 = 0.8049 + 1.0518$ ) is 1.0518 greater than that of the low corporate value group, thereby proving that the corporate values of the two groups differ and that the demarcations (top 27% and bottom 27%) used to group the corporations presented significantly different group effects.

In the dependent variable of CSR performance, the fixed effects of the intercept term are  $\gamma_{00} = 11.8409$  and  $\gamma_{01} = 0.4830$ . The former reaches the 1% level of significance, indicating that the average CSR performance of the low corporate value group is significantly not 0, and the latter shows that the average CSR performance of the high corporate value group ( $12.3239 = 11.8409 + 0.4830$ ) is 0.4830 greater than that of the low corporate value group. However, this difference was not statistically significant ( $p$ -value = 0.130), which means that while the CSR performance of the high corporate value group is higher than that of the low corporate value group, the CSR indices of the two groups are not significantly different.

Table 3 displays the empirical results found using Equation (19). Table 3 shows that the fixed effects of the slope term are  $\gamma_{10} = 0.0070$  and  $\gamma_{11} = 0.0118$ . The former did not reach the 10%

**Table 3.** Fixed effects of slopes as outcomes model between groups: dependent variables = *Tobin's Q*.

Fixed effects	Independent variables	Coefficient	Standard error	$p$ -value
Level 2: $\gamma_{00}$	<i>Constant</i>	2.433	0.145	0.000
Level 2: $\gamma_{10}$	<i>CSRI<sub>ij</sub></i>	0.007	0.005	0.187
Level 2: $\gamma_{11}$	<i>Sector . CSRI<sub>ij</sub></i>	0.012	0.006	0.047
Level 2: $\beta_{2j}$	<i>LnAssets<sub>ij</sub></i>	-0.018	0.014	0.198
Level 2: $\beta_{3j}$	<i>Age<sub>ij</sub></i>	-0.006	0.001	0.000
Level 2: $\beta_{4j}$	<i>BMI<sub>ij</sub></i>	-0.869	0.052	0.000

level of significance ( $p$ -value = 0.187), which means that the CSR performance of the low corporate value group did not have significantly positive influence on *Tobin's Q*. In contrast, the latter reached the 5% level of significance ( $p$ -value = 0.047), thereby indicating that the slope of the high corporate value group was 0.0118 higher than that of the low corporate value to reach 0.0188 ( $=0.0070 + 0.0118$ ). This demonstrates that the influence of CSR performance differs significantly depending on corporate value.

Therefore, when corporations with low corporate value invest in CSR, they are unable to efficiently increase corporate value. Only corporations with high corporate value can more effectively increase corporate value when investing in CSR. Although Panel B of Table 2 indicates that the CSR indices of the two groups are not significantly different, Table 3 reveals that the influence of CSR on corporate value varies significantly depending on corporate value.

Table 4 shows the empirical results found using Equations (12) and (16). Table 4 shows that in the dependent variable of *Tobin's Q*, the fixed effects of the intercept term are  $\gamma_{00} = 1.3539$  and  $\gamma_{01} = -0.2409$ . The former reaches the 1% level of significance, indicating that the average corporate value of the corporations in 2010 is significantly not 0, and the latter shows that the average corporate value of the corporations in 2011 ( $1.1130 = 1.3539 - 0.2409$ ) is 0.2409 lower than that in 2010. This indicates that corporate

**Table 2.** Fixed effects of between-group random coefficients.

Fixed effects	Independent variables	Coefficient	Standard error	$p$ -value
Panel A: Dependent variable: <i>Tobin's Q</i> Independent variable: Sector				
Level 2: $\gamma_{00}$	<i>Constant</i>	0.805	0.005	0.000
Level 2: $\gamma_{01}$	<i>Sector</i>	1.052	0.038	0.000
Panel B: Dependent variable: CSR Independent variable: Sector				
Level 2: $\gamma_{00}$	<i>Constant</i>	11.841	0.223	0.000
Level 2: $\gamma_{01}$	<i>Sector</i>	0.483	0.317	0.130

**Table 4.** Fixed effects of between-year random coefficients.

Fixed effects	Independent variables	Coefficient	Standard error	$p$ -value
Dependent variable: <i>Tobin's Q</i> , independent variable: Year				
Level 2: $\gamma_{00}$	<i>Constant</i>	1.354	0.031	0.000
Level 2: $\gamma_{01}$	<i>Year</i>	-0.241	0.039	0.000
Dependent variable: CSR, independent variable: Year				
Level 2: $\gamma_{00}$	<i>Constant</i>	12.198	0.195	0.000
Level 2: $\gamma_{01}$	<i>Year</i>	0.350	0.268	0.193

value has decreased, and the difference is significant. In the dependent variable of CSR performance, the average CSR performance of the corporations in 2010 is significantly not 0. Furthermore,  $\gamma_{01} = 0.3500$ , which indicates that the average CSR performance of the corporations in 2011 is 0.3500 greater than that in 2010, reaching 12.5481. This shows that CSR performance has improved by year and that corporations are attaching more importance to CSR. However, the difference is not significant ( $p$ -value = 0.193).

Table 5 contains the empirical results found using Equation (22). Table 5 shows that the fixed effects of the slope term are  $\gamma_{10} = 0.0066$  and  $\gamma_{11} = 0.0070$ . The former reaches the 5% level of significance ( $p$ -value = 0.039), which means that CSR performance has significantly positive influence on *Tobin's Q*. For each unit that CSR performance increases by, *Tobin's Q* rises by 0.66%. In contrast, the latter was not significant ( $p$ -value = 0.351), thereby indicating that the slope of corporations in 2011 was 0.0070 higher than that in 2010 to reach 0.0136 (=0.0066 + 0.0070). However, the difference is not significant.

## V. Conclusions

The natural logarithm of total assets (*LnAssets*), the age of the company (*Age*), and the book-to-market ratio (*B/M*) all gave significantly negative influence on corporate value. This shows that the corporate values of older companies with higher market value have reached stable development; as a company attains higher market value or as time goes on, corporate value begins the decline. Although the influence of CSR performance on corporate value was significantly positive in different years, the extent of said influence was not significantly different. When different corporate values are considered, the influence of CSR on corporate value is significantly different, which means that corporations with high

corporate value can indeed substantially increase their corporate value when they fulfil CSR. When grouped by year, the empirical results support the social impact hypothesis; however, the positive effects are fixed and do not vary with time. The views of classical economics may have been true before due to the exogenization of endogenous costs in corporations; external costs were born by the general public, which reduced internal operational costs for corporations and increased corporate value. Thus, in the past, enhancing CSR performance would only decrease corporate value when operational costs were increased. However, the external diseconomies of corporations have now become internal costs, and only when CSR activities reduce the costs of transactions with stakeholders can the issue of external diseconomies bringing increased internal operational costs be resolved and operational obstacles be reduced. Corporations can then improve their operation efficiency and reputation, which facilitates the enhancement of corporate performance and the increasing of corporate value.

The empirical results of this study therefore demonstrate that the influence of CSR on corporate value does not change with time; however, in corporations with different corporate values, the influence of CSR on corporate value is significantly different. Furthermore, our study period only covered 2 years. Future studies could consider increasing the study period to determine whether CSR can increase corporate value with time.

When the corporate value of the company is not high, then they should focus more on their business. Investments in CSR would only increase their costs but not effectively increase corporate value. In contrast, if the corporate value of the company high, then the public will expect more than only profit. Investments in CSR in this circumstance would instead promote the effective increase of corporate value.

**Table 5.** Fixed effects of slopes as outcomes model between years: dependent variable: *Tobin's Q*.

Fixed effects	Independent variables	Coefficient	Standard error	$p$ -value
Level 2: $\gamma_{00}$	<i>Constant</i>	2.3782	0.0713	0.000
Level 2: $\gamma_{10}$	<i>CSRI<sub>ij</sub></i>	0.0066	0.0032	0.039
Level 2: $\gamma_{11}$	<i>Year . CSRI<sub>ij</sub></i>	0.0070	0.0075	0.351
Level 2: $\beta_{2j}$	<i>LnAssets<sub>ij</sub></i>	-0.0388	0.0080	0.000
Level 2: $\beta_{3j}$	<i>Age<sub>ij</sub></i>	-0.0041	0.0008	0.000
Level 2: $\beta_{4j}$	<i>BM<sub>ij</sub></i>	-0.8077	0.0221	0.000

## Limitations and directions for future research

The major limitation of this article is the size of the CSR database developed by Chen and Hung (2013) who chose data ranging from 2010 to 2011. Future research could involve analysis of the larger database gathered by Chen and Hong (2013).

## Disclosure statement

No potential conflict of interest was reported by the authors.

## Funding

The authors gratefully acknowledge the financial support of the Ministry of Science and Technology (MOST 104-2410-H-327-008). Roger C. Y. Chen is Professor of Department of Logistics Management, National Kaohsiung First University of Science and Technology. He holds a Ph.D. and MS in Finance from University of Texas at Dallas. His research interests include IPO, M&A, insider trading, corporate governance and corporate social responsibility. His research papers have been published at Applied Economics, Journal of Management, Management Review, Journal of Financial Studies, Review of Securities and Futures Markets, Sun Yat-Sen Management Review, NTU Management Review, Asia-Pacific Economic and Management Review, Asia Pacific Management Review, Taiwan Banking & Finance Quarterly, Fu Jen Management Review, Securities Services Review, Contemporary Management Research, International Journal of Innovation and Learning, International Journal of Operations & Production Management, and Journal of Sustainable Finance & Investment. Chen-Hsun Lee is Assistant Professor of Department of Money and Banking, National Kaohsiung First University of Science and Technology. He completed his Ph. D. degree at Ph. D. Programs in Management, National Kaohsiung First University of Science and Technology, Taiwan. His research areas include management science, internet finance, and corporate social responsibility. His research papers have been published at Applied Economics, Sun Yat-sen Management Review, Romanian journal of economic forecasting, Review of Pacific Basin Financial Markets and Policies, Advances in Financial Planning and Forecasting, Journal of China Tourism Research, Tourism Analysis, Journal of Asia-Pacific Business, Applied Science and Management Research, Economics Bulletin, Cogent Economics and Finance, and Journal of Sustainable Finance & Investment.

## References

- Ambec, S., and P. Barla. 2002. "A Theoretical Foundation of the Porter Hypothesis." *Economics Letters* 75: 355–360. doi:10.1016/S0165-1765(02)00005-8.
- Becchetti, L., R. Ciciretti, and I. Hasan. 2009. "Corporate Social Responsibility and Shareholder's Value: An Event Study Analysis." Bank of Finland Research Discussion Paper No. 1/2009.
- Becchetti, L., S. Di Giacomo, and D. Pinnacchio. 2008. "Corporate Social Responsibility and Corporate Performance: Evidence from a Panel of US Listed Companies." *Applied Economics* 40 (5): 541–567. doi:10.1080/00036840500428112.
- Bragdon, J. H., and J. A. T. Marlin. 1972. "Is Pollution Profitable?" *Risk Management* 19: 9–18.
- Bromiley, P., and A. Marcus. 1989. "The Deterrent to Dubious Corporate Behavior: Profitability, Probability and Safety Recalls." *Strategic Management Journal* 10: 233–250. doi:10.1002/smj.4250100304.
- Carroll, A. B. 1999. "A Corporate Social Responsibility: Evolution of A Definitional Construct." *Business and Society* 38: 68–295. doi:10.1177/000765039903800303.
- Castro, S. L. 2002. "Data Analytic Methods for the Analysis of Multilevel Questions: A Comparison of Intraclass Correlation Coefficients, Rwg(I), Hierarchical Linear Modeling, Within-And-Between Analysis, and Random Group Resampling." *The Leadership Quarterly* 13: 69–93. doi:10.1016/S1048-9843(01)00105-9.
- Chen, R. C., and S.-W. Hong. 2013. "A Study on Corporate Social Responsibility Index and Investment Performance." *Gretai Securities Market* 165: 88–97.
- Cureton, E. E. 1957. "The Upper and Lower Twenty-Seven Percent Rule." *Psychometrika* 22: 293–296. doi:10.1007/BF02289130.
- Dey, M., and S. Sircar. 2012. "Integrating Corporate Social Responsibility Initiatives with Business Strategies: A Study of Some Indian Companies." *The IUP Journal of Corporate Governance* XI: 36–51.
- Donaldson, T., and L. E. Preston. 1995. "The Stakeholder Theory of the Corporation: Concept, Evidence, and Implications." *Academy of Management Review* 20 (1): 65–91.
- Friedman, M. 1962. *Capitalism and Freedom*. Chicago: Chicago University Press.
- Giroud, X., and H. Mueller. 2011. "Corporate Governance, Product Market Competition, and Equity Prices." *Journal of Finance* 66: 563–600. doi:10.1111/j.1540-6261.2010.01642.x.
- Gompers, P., J. Ishii, and A. Metrick. 2003. "Corporate Governance and Equity Prices." *The Quarterly Journal of Economics* 118: 107–155. doi:10.1162/00335530360535162.
- Henderson, D. 2002. *Misguided Virtue: False Notions of Corporate Social Responsibility*. London: Institute of Economic Affairs.
- Jamali, D., and R. Mirshak. 2007. "Corporate Social Responsibility (CSR): Theory and Practice in a Developing Country Context." *Journal of Business Ethics* 72: 243–262. doi:10.1007/s10551-006-9168-4.
- Johnson, R. A., and D. W. Greening. 1994. "Relationships between Corporate Social Performance, Financial Performance, and Firm Governance." *Best Paper Proceedings of the Academy of Management* 53: 314–318. doi:10.5465/AMBPP.1994.10345720.
- Kelley, T. L. 1939. "The Selection of Upper and Lower Groups for the Validation of Test Items." *Journal of Educational Psychology* 30: 17–24. doi:10.1037/h0057123.
- Mahapatra, S. 1984. "Investor Reaction to a Corporate Social Accounting." *Journal of Business Finance and Accounting* 11: 29–40. doi:10.1111/j.1468-5957.1984.tb00054.x.
- Margolis, J. D., H. A. Elfenbein, and J. P. Walsh. 2007. "Does It Pay to Be Good? A Meta-Analysis and Redirection of Research on the Relationship between Corporate Social

- and Financial Performance.” Working paper, Harvard Business School.
- McWilliams, A., and D. Siegel. 2000. “Corporate Social Responsibility and Financial Performance: Correlation or Misspecification?” *Strategic Management Journal* 21: 603–609. doi:10.1002/(ISSN)1097-0266.
- Moneva, J. M., and E. Ortas. 2008. “Are Stock Markets Influenced by Sustainability Matter? Evidence from European Companies.” *Journal of Sustainable Economy* 1: 1–16. doi:10.1504/IJSE.2008.020013.
- Parquet, I. R., and H. Eibert. 1975. “Social Responsibility: The Underlying Factors.” *Business Horizons* 18: 5–10. doi:10.1016/0007-6813(75)90019-1.
- Porter, M. E., and C. van der Linde. 1995. “Toward a New Conception of the Environment Competitiveness Relationship.” *Journal of Economic Perspectives* 9 (4): 97–118. doi:10.1257/jep.9.4.97.
- Waddock, S. A., and A. B. Graves. 1997. “The Corporate Social Performance-Financial Performance Link.” *Strategic Management Journal* 18 (4): 303–319. doi:10.1002/(SICI)1097-0266(199704)18:4<303::AID-SMJ869>3.0.CO;2-G.
- Woltman, H., A. Feldstain, J. C. MacKay, and M. Rocchi. 2012. “An Introduction to Hierarchical Linear Modeling.” *Tutorials in Quantitative Methods for Psychology* 8 (1): 52–69. doi:10.20982/tqmp.08.1.p052.