Financial and corporate social performance in the UK listed firms: The relevance of non-linearity and lag effects

Abstract Using environmental, social and governance (ESG) scores compiled by Reuters Datastream for each company's corporate social performance (*CSP),* we examine the relationship between *CSP* and corporate financial performance (*CFP*) of 314 UK listed companies over the period 2002 to 2015. We further evaluate the relationship between prior and subsequent *CFP* and prior and subsequent *CSP*. Based on the system-GMM estimation method, we provide direct evidence that suggests that while *CFP* and *CSP* can be linked linearly; however, when we examine the impact of *CSP* on *CFP*, the association is more non-linear (cubic) than linear. Our results suggest that firms periodically adjust their level of commitment to society, in order to meet their target *CSP*. The primary contributions of this paper are testing i) the non-monotonous relationship between *CSP* and *CFP*, ii) the lagged relationship between the two and the optimality of *CSP* levels, and iii) the presence of a virtuous circle. Our results further suggest that *CSP* contributes to *CFP* better during post-crisis years. Our findings are robust to year-on-year changes in *CFP* and *CSP*, financial versus non-financial firms, and the intensity of corporate social responsibility (CSR) engagement across industries.

Keywords Corporate social responsibility · Corporate financial performance · Corporate social performance · Slack resources theory · UK firms

JEL classification G34 · M14

1 Introduction

The extant literature on corporate social responsibility (CSR, hereafter) presents a broader view of the firm as an entity that should consider its relationships with stakeholders and not just with shareholders. Freeman (1984) notes that if stakeholders are able to voice their concern, the socially responsible behaviour of a firm may minimise externalities and maximize synergies in their relationships with stakeholders. As a result of this pressure from stakeholders, including government and the public, several firms now report on their ethical, social and environmental conduct. Firms are beginning to take 'green' issues very seriously and are minimizing their negative impact on the environment (see Martín-de Castro et al. 2015).[1] This, coupled with pressure on firms from various stakeholders (see Fieseler 2011) to invest more in socially responsible projects, highlights the need to investigate whether a relationship exists between corporate social performance (*CSP*, hereafter) and corporate financial performance (*CFP*, hereafter), given that the latter remains an important goal for the firm. If a positive association is found to exist between *CSP* and *CFP*, it will increase the need for corporations to commit more resources to improve CSR. However, if a negative relationship exists between *CSP* and *CFP*, corporations will be less receptive to calls from stakeholders to invest in socially responsible activities. Therefore, this paper examines whether *CSP* has any varying impact on *CFP* by also considering the direction of causation, and the non-linear and dynamic associations.

Does it really pay for a company to be green? This is a very important question, yet unresolved issue, despite previous scholarly attention (see Wang et al. 2015). For over three decades, academics have empirically investigated the potential link between *CSP* and *CFP* (see Cochran and Wood 1984; Aupperle et al. 1985; Stanwick and Stanwick 1998; Barnett and Salomon 2006, 2012; Galbreath 2016; Wu et al. 2017). For instance, Tosun (2017) finds that at fund-level, socially responsible firms underperform the market when there is more investment in high CSR firms. However, Filbeck et al. (2013) show that CSR constructed portfolios experience better performance. The arguments for and

[1] A study by Deloitte showed that in 2007, 80 of the FTSE 100 firms now report on their CSR, up from 56 in 2002. This highlights that firms are increasingly recognizing the need to include CSR practices in core business strategies.

against corporate social initiatives have motivated researchers to examine the *CSP-CFP* in different countries, beyond the USA, where studies on the subject have been traditionally contextualized (Ullmann, 1985). Also, a vast body of literature has examined the *CSP-CFP* relationship in different business sectors and in different countries. For instance, Simpson and Kohers (2002) investigated the *CSP-CFP* relationship in the banking industry; Gregory and Whittaker (2007) also analyzed the *CSP* of ‘ethical’ unit trusts in the UK, while in more recent times Li et al. (2013) examined whether firms’ performance affects CSR disclosure in China.

Despite the very useful contributions of these papers, a general consensus has not yet been reached. Friedman (1970) argues that CSR actions incur costs with no returns. Preston and O'Bannon (1997) suggest that a negative or neutral relationship exists between *CSP* and *CFP*, and that a link exists between past *CFP* and resulting *CSP*. There seems to be a general disagreement in the literature on the question of whether *CSP* adds value to firm performance. Academics in recent times have taken a contrasting view to suggest that firms do have other responsibilities than maximising shareholders profits (see Flammer 2015 and Wang et al. 2015). Thus, they point out that firms can benefit financially from investing in CSR projects which can be demonstrated to their stakeholders through effective communication, for example, CSR reporting. Indeed, proponents of a positive *CSP-CFP* link suggest that the term ‘socially responsible’ does not necessarily mean that firms have to reduce profits when adopting CSR policies. They argue that firms with better *CFP* can meet their social responsibilities, and the greater their profits, the greater their ability to be socially responsible (Donaldson and Preston 1995; Freeman 1984). This argument is generally anchored on the slack resources theory, which predicts that information intensity regarding ethical and moral issues influence consumers’ brand attitude and buying intentions (Schuler and Cording 2006). This may imply that companies improve their *CSP* to sustain future sales. Brammer and Millington (2008), Nelling and Webb (2009) and Scholtens (2008b) have also examined the causality of any link between CSR and *CFP*. Simpson and Kohers (2002) and Cochran and Wood (1984) argue that whilst the *CSP-CFP* link is ambiguous and difficult to measure, both companies and stakeholders would benefit from a better understanding of this relationship. In fact, if a relationship between *CSP* and *CFP* could be found, clarification surrounding the exact purpose, nature, role and responsibilities of a firm may be reached. Given that this is an unresolved issue in the literature, this study seeks to empirically address this important issue.

In doing this, we specifically differentiate our study from the existing studies with regard to data and methods: first, the study utilizes a robust and well-established index, ESG (environmental, social and governance) scores, provided by Thomson Reuters, which takes account of the multidimensional aspects of *CSP*. We are not aware of any other published work that has used this data in the *CSP/CFP* context. Furthermore, we use the system-GMM estimation technique, which accounts for the endogeneity problem as a result of the random shocks influencing both *CSP* and *CFP* and their determinants simultaneously, using recent panel data of 314 UK firms for the period 2002-2015.[2] GMM also controls for unobserved firm heterogeneity, and provides the short-term and long-term relationship between the two factors. This technique also enables us to address the presence of a possible 'virtuous circle', which suggests that a higher *CSP* leads to higher *CFP* via the strategic use of CSR, and vice versa (Waddock and Graves 1997). Moreover, Short et al. (2015) argue that *CSP* – being a major aspect of *CFP* – has been under studied empirically. We thus aim to fill the gap in the literature as we study the determinants of *CSP*.

The uniqueness and contributions of this paper therefore come from two main aspects. First, relying on perspectives from the slack resources theory and the optimality of the *CSP* literature, we empirically examine the presence of non-linear (parabolic and cubic) relationships between *CSP* and *CFP*. This is an important, yet unresolved issue in the literature (Lankoski 2008; Elsayed and Paton 2009; Barnea and Rubin 2010; Barnett and Salomon 2006, 2012). Second, we introduce a partial

[2] Nelling and Webb (2009) obtain a significant relationship between *CSP* and *CFP* when the traditional statistical methods are used but the link weakens significantly when they employ the fixed effects method. Similarly, coupled with emphasizing the importance of endogeneity concerns, Surroca et al.'s (2010) fixed effects estimates show that *CSP* and *CFP* are not directly related. This highlights the sensitivity of results to the methods and importance of choosing the precise method. Baron et al. (2011) use the difference-GMM method for the same context. As raised by Nelling and Webb (2009), therefore, additional analyses using more advanced estimation techniques are necessary, despite the extensive empirical research in this area.

adjustment process to investigate the possibility of companies adjusting the intensity of CSR activities for internal and external developments. This is important, given the large and growing *CSP-CFP* literature that refers to such a possibility as 'social responsiveness' (McWilliams and Siegel 2001; Brammer and Millington 2008). Through our methodology, we consider this possibility in an estimation model by adopting the partial adjustment process. To the best of our knowledge, no empirical study has examined this aspect of the *CSP-CFP* nexus.

Our study also contributes to the *CSP* and *CFP* literature in five unique ways. First, we hypothesize, and find direct evidence consistent with the linear relation between *CFP* and *CSP*. Second, by incorporating two strands of literature on finance and CSR, we find a non-linear (cubic) association between *CSP* and *CFP*, suggesting that firms regularly adjust their levels of commitment to society to meet their CSR targets. Third, we find that the speed of a firm's adjustment to the targeted *CSP* level is higher in the non-financial UK firms. Fourth, we split our sample into two sub-periods, pre-crisis (2002-2008) and post-crisis (2009-2015) to analyse whether any potential CSR practice change stemming from the global financial crisis influences the *CSP* and *CFP* link: our additional analyses reveal that the positive impact of *CSP* on *CFP* is more salient during the post-crisis years and for both periods we report the existence of optimal CSP levels and non-linear association between *CSP* and *CFP*.[3] Finally, we clarify the implications of wide variations in the degree of *CSP* intensity across industries. We find evidence supporting the notion that firms in industries with low CSR engagement find it beneficial to increase their current *CSP* so as to enhance current *CFP*.

The remainder of the paper is structured as follows. Section 2 reviews relevant literature and hypothesis development. Section 3 describes the data. Section 4 presents the empirical analysis and results. Section 5 concludes the paper and offer suggestions for future studies.

2 Literature Review and Hypothesis Development

[3] We thank the referee for suggesting this dimension to us.

CSR has become a global phenomenon, which continues to shape and influence discourse, policies and practices (Scherer and Palazzo 2011; Amaeshi et al. 2016). Existing studies offer several definitions of CSR, which leaves the construct ambiguous (Henderson 2001; Windsor 2001; van Marrewijk 2003). Summarising prior studies, we argue that CSR-responsive firms will advance social good (McWilliams and Siegel 2001), use legal and ethical means to earn profit (Carroll, 1991), minimise adverse environmental and social impact (European Commission 2011; Amaeshi et al. 2016). This broad understanding of CSR enables firms to balance the needs of stakeholders. Thus the issue of commitment to financially rewarding shareholders and notions of equity and fairness to other stakeholders (Adegbite and Nakajima 2011; Deakin and Whittaker 2007) may offer financial benefits to firms. It is from this CSR understanding that we explore the relation between *CSP* and *CFP*.

2.1 The non-linearity between CSP and CFP

Do firms that are socially responsible experience better financial performance (a positive association) relative to their competitors who are non-responsive (a negative association)? Robinson et al. (2011) find a significant increase in the market share of firms that are added to the Dow Jones Sustainability Index. A large body of literature on *CSP* and *CFP* mainly assumes a causal relationship between *CFP* and *CSP* (see McWilliams and Siegel 2000 and Waddock and Graves 1997). However, the association may be non-linear. For instance, *CFP* can improve with higher *CSP* up to a certain point, and then deteriorates as a result of the diminishing benefits of excessive commitment to CSR resulting in a reverse U-shaped relationship (Barnea and Rubin 2010). Another viewpoint is that it may be irrational for companies to engage in CSR as they may have to sacrifice financial resources earmarked for projects with positive net present values to pursue CSR, whilst their competitors, who argue that it does not pay to engage in CSR, will have sufficient funds to undertake projects with positive net present values. Existing studies show a U-shaped relation (see Barnett and Salomon 2006; Brammer and Millington 2008). Furthermore, Lankoski's (2008) model demonstrates an inverted-U relationship between CSR outcomes and economic performance, such that as the marginal costs of

CSR activities increase, the marginal revenues decline.[4] Porter's (1980) and Porter and Kramer's (2002) competitive advantage arguments suggest that corporations following differentiation or low-cost policies are more likely to perform better than their counterparts. This implies a cubic link for firms with moderate (low or high) *CSP* would have lower (higher) *CFP*. A recent study by Barnett and Salomon (2012) highlights the importance of considering a U-shaped link between *CSP* and *CFP* since some firms may not adequately generate positive returns, despite having significant investment in CSR.

We anchor our paper on the slack resources theory, which implies that prior high levels of *CFP* may allow managers a greater amount of slack resources to invest in CSR activities (Ullmann, 1985; Waddock and Graves, 1997). As *CSP* depends to some extent on a manager's individual discretion, the initiation or cancellation of environmental policies may depend greatly on the amount of resources available to managers (McGuire et al. 1988). Waddock and Graves (1997) argue that firms with better *CFP* history tend to have higher current levels of CSR, and that raising CSR levels in turn results in stronger *CFP*. This is termed a 'virtuous circle'. Orlitzky (1998) concluded that better *CSP* is both a predictor and the consequence of a stronger *CFP*, which is consistent with Waddock and Graves' (1997) findings of a virtuous circle.

A firm with a strong *CSP* may implement implicit contracts which may improve *CFP* and reduce variability in performance measures. However, if CSR is viewed as a considerable cost, firms with strong past *CFP* may be more willing to incur these costs in the future. Conversely, firms with poor past *CFP* may be less willing to incur these costs in the future. This time lagged analysis is consistent with Waddock and Graves (1997) who used time lags to test between prior and subsequent *CSP* and prior and subsequent *CFP*. Jo et al. (2015) report that the reducing environmental costs take about two years before they improve profitability. Furthermore, adopting both *CSP* and *CFP*

[4] Jiraporn and Chintrakarn (2013) provide tests to find out if the effect of the CEO power on their CSR activities is non-linear. Their regression analysis clearly detects a parabolic (reverse-U) association and they explain the connection of this nature within the 'agency theory' perspective.

interchangeably as dependent and explanatory variables is consistent with Scholtens (2008b) who examined the causality between the *CSP*-*CFP* nexus and showed that the direction of causation runs from *CFP* to *CSP*.

The combination of the two hypotheses implies that CFP_{t-2} improves CSP_{t-1}, and subsequently enhances CFP_t. Examining these interrelationships help to test for the presence of a virtuous circle. This extends the work of Shahzad and Sharfman (2015), who considered a lagged analysis by showing that the direction of causality runs from *CSP* to *CFP*.

2.2 The Optimality of CSP

Firms aim to maximise *CFP* but not necessarily *CSP*. Guo et al. (2016) find that corporate culture disclosure improves financial performance. On the other hand, a firm's innovation strategy could influence its *CSP* performance by reducing environmental impacts and improving health and safety (Pavelin and Porter 2008). As the literature on the optimality of *CSP* implies (see e.g., Barnea and Rubin 2010; Elsayed and Paton 2009; Fernandez-Kranz and Santalo 2010; Salzmann 2008), there are costs and benefits of being socially responsible in a competitive business environment. Brammer et al. (2006) argue that investment in social activities destroy shareholders' wealth. Nevertheless, Scholtens (2008a) – using an alternative framework for assessing CSR – shows that *CSP* within the banking sector improved significantly between 2000 and 2005. A recent study by Nollet et al. (2016) finds a positive association between *CSP* and *CFP* after investment up to a certain threshold has been met. McWilliams and Siegel (2001) propose that managers trade-off the demand for CSR against the cost of CSR activities. They suggest that an optimal CSR level can be identified. Lankoski (2000) argues that firms that deviate from optimal *CSP* level may experience a lower *CFP*. Salzmann (2008) finds this relationship intuitively appealing given that excessively improving the *CSP* (for example, aiming for carbon neutrality) is extremely costly and would certainly reduce a firm's *CFP*. This may explain why various empirical studies have failed to find either a positive or negative association between *CSP* and *CFP*. Lankoski (2008) argues that some exogenous factors (e.g., technology, definition of stakeholderism) may evolve over time and thereby change the CSR-related costs. Wang and Choi (2013) emphasize the relevance of consistency in social performance over time when examining the *CSP-CFP* link. Therefore, as discussed in Aupperle et al. (1985) and Ullmann (1985), it may be feasible for firms to optimize the intensity of their CSR by trading-off the benefits against the costs. Gregory and Whittaker (2007) examine the performance of ethical unit trusts in the UK and report that the findings are sensitive to whether static or time-varying models are adopted. Therefore, to empirically test for the presence of a possible optimal CSR level, we adopt the following partial adjustment process: we assume that a company i has a desired level of CSR for time t (CSP^*_{it}), which is determined by x explanatory variables.

$$CSP^*_{it} = \sum_{k=1} \delta_k \, x_{kit} + \pi_{it} \tag{1}$$

where x is a vector of k explanatory variables; π_{it} is a serially correlated disturbance term with a mean of zero and possibly heteroscedastic; and δ_k's are unknown estimable parameters. The model assumes that companies adjust their current CSR structure (CSP_{it}) according to the degree of adjustment coefficient 'α', to obtain the target CSR structure:

$$CSP_{it} - CSP_{it-1} = \alpha(CSP^*_{it} - CSP_{it-1}) \tag{2}$$

The actual change will be equal to the desired change when $\alpha = 1$. No adjustments are made in the case of $\alpha = 0$, suggesting that either the lagged level is the target level, or the adjustment cost is higher than the cost of remaining off target. By combining (1) and (2) we obtain:

$$CSP_{it} = (1 - \alpha)CSP_{it-1} + \sum_{k=1} \alpha\delta_k \, x_{kit} + \alpha\pi_{it} \tag{3}$$

Equation (3) assumes that α lies between 0 and 1. If the cost of being in disequilibrium is higher (lower) than the cost of adjustment, then α converges to one (zero).[5] We examine the presence

[5] This section is based on the partial adjustment mechanism (Blinder, 1986), and error correction mechanism that discusses long-term relationship between two factors and short-term deviation from equilibrium (Engle and Granger, 1987; Johansen, 1988). As discussed in Blundell and Bond (1998), the long-term link between the dependent variable and its determinants may differ from the short-term effects. Brammer and Millington (2008) raise the issue of deviation from 'normal' CSP and examine this by using the residual figures of the regression model.

of adjusting the level of CSR activities to achieve the target *CSP* level. Clearly, drawing on evidence of *CFP* and a time-varying degree of CSR, we test the following three hypotheses.

H1: *CSP* is positively associated with *CFP*.

H2: Prior *CFP* (*CSP*) will have a positive impact on subsequent *CSP* (*CFP*).

H3: Firms dynamically adjust the level of CSR activities to maintain their target *CSP*.

3 Data

We use an unbalanced panel data of 314 UK firms over the period 2002-2015. All company financials and share price data were collected from Thomson Reuters Datastream[6] and *CSP* data were collected from Thomson Reuters "Asset4" module. After the standard data filtering (e.g., deleting firms with missing data, as well as inconsistent and extreme values of variables), we restricted our sample size to 314 companies with 3240 firm-years between them. Given our adopted adjustment process, this large sample size helps us to provide a robust analysis.

3.1 Corporate social performance

The measures used in prior related empirical studies have frequently been one-dimensional, lacked clarity and have been applied to small samples of companies. As highlighted by Sheehy (2015) and Siegel and Vitaliano (2007), among others, there is a clear need for a multidimensional measure applied across a wide range of industries and larger samples. An overall measure of *CSP* is extremely difficult due to its complexity and because just one *CSP* measurement provides a limited perspective on how well a firm is socially performing.

We construct our *CSP* measure by utilizing detailed social performance data from Thomson Reuters Asset4 in Datastream. We measure *CSP* for each firm-year by using seven equally weighted

[6] Any missing data were obtained from the company annual reports. Also, the time period for the variables 'share price performance' and 'sales growth rate' is 2001 to 2015 due to their definitions.

dimensions which consist of employment quality, health and safety, training and development, diversity, human rights, community, and product responsibility. The variables are normalized on a scale of 100. Therefore, *CSP* is between 0% (lower commitment to CSR activities) and 100% (higher commitment to CSR activities). Moreover, the emphasis of our study is on social performance of companies and hence we did not include ESG's corporate governance components (i.e., board structure, board function, compensation policy, shareholder rights and vision &strategy) for our CSP construct, which are available from Thomson Reuters Datastream currently for over 4,300 global companies. Similarly, Liang and Renneboog (2017) used only the environmental (E) component of the ESG scores when their empirical focus is corporate environmental responsibility.[7]

3.2 Corporate financial performance

Studies using accounting-based measures for *CFP* have generally found a positive relationship between *CSP* and *CFP* (see Cochran and Wood 1984). Studies such as these are influenced by performance measurement types, as each type focuses on different aspects with their own biases. Another limitation is that they do not control for differences in risk. Ullmann (1985) argues that accounting-based measures should be adjusted for risk and industry characteristics. However, other studies have used market-based performance measures to examine the relationship between *CFP* and *CSP* which reflect investors' perceptions of firms' ability to generate future profits rather than using past *CFP* (see Ullman 1985). Market-based *CFP* measures are less likely to be affected by differences in accounting procedures and managerial manipulation. Our study, therefore, uses two accounting-based measures (return on assets – *ROA* and return on equity – *ROE*). We also use a market-based measure (share price performance – *SPP*) to ensure that *CSP* is not sensitive to a particular

[7] It should further be noted that our simple correlation analysis between *CSP* and corporate governance quality yielded a Pearson coefficient of 0.53. This suggests that higher CSR activities go hand in hand with higher corporate governance scores, and that the combination of CSP and corporate governance scores would have qualitatively similar effects on CFP when compared with our current results.

performance measure. *ROA* is operating income over total assets; *ROE* is net income over common equity; and *SPP* is the annual change in adjusted share prices.

3.3 Control variables

We use several variables mainly drawn from prior literature, which have been shown to have effects on *CFP* as well as *CSP*. First, as in Pava and Krausz (1996) and Waddock and Graves (1997), we control for both firm size and risk effects. A company size does have a significant effect on both *CSP* and *CFP*. For instance, a firm's CSR activities depend on its size, diversification level, consumer income, labour market conditions, stage in the industry life cycle, country of origin, and country of operation (see Adegbite and Nakajima 2011; McWilliams and Siegel 2001). We therefore use the natural logarithm of total assets (*SIZE*) to control for firm size.[8]

Porter and Kramer (2002) argue that firms with a well-directed CSR strategy have a better chance of surviving hard times. This is because firms require strong relationships with employees, suppliers and customers, which can be effectively managed through stakeholder relationships. Therefore, as both leverage and firm risk can induce 'hard times', they should be related to *CSP*.

We use company beta figures based on the capital asset pricing model (CAPM) theory (*BETA*) to control for time-varying firm risk relative to market risk. These figures capture market risk and depict the relationship between individual stock return volatility and market return volatility. We compute the annual beta for each firm using rolling time series regressions of excess company returns with respect to the FTSE All-Share Index returns using monthly data for the past five years. Low levels of CSR may result in greater exposure to financial risk as investors may believe that firms with

[8] According to Chen and Metcalf (1980), *CSP* and size may be positively linked as larger firms have greater visibility and can invest better in CSR. One reason for this could be that bigger firms are under more pressure from stakeholders, and they need to respond to these demands more attentively or larger firms will benefit from economies of scale, better management and access regarding external stakeholders and resources, and better promotional opportunities. Orlitzky et al. (2003) and Stanwick and Stanwick (1998) show that, when size is controlled for, there still exists a positive link between *CFP* and *CSP*. Orlitzky et al. (2003) show that Chen and Metcalf's (1980) finding that size was the real cause of both *CSP* and *CFP* was as a result of sampling error as, when analyzed over many samples, neither a significantly positive correlation between *CSP* and size nor a significantly positive correlation between *CFP* and size is found to exist.

less CSR are more risky due to the perception that the management of those firms possesses poor skills (Alexander and Bucholtz 1978). Investors will demand high returns from firms that show less commitment to CSR as they believe lack of CSR may result in increased financial risk as a result of heavy fines and lawsuits. Also, low debt implies that firms can meet their obligations relatively easily.

McWilliams and Siegel (2000) argue that a generic model in the literature is inadequate as the direction of the relationship keeps changing when new variables, such as research and development (*RD*), investment and industry advertising intensity, are included. They note that past studies had generated spurious results due to model misspecification. Therefore, following Surroca et al. (2010), we include in our model *RD*, measured as the research and development expenses divided by total sales. If a company is highly leveraged, it would be under great pressure to meet its loan repayments from creditors and ensure satisfactory economic performance, which might lower CSR. We calculate leverage (*LEVER*) as total debt divided by total assets. We use current ratio (*CUR*) to capture a firm's liquidity and short-term financial strength; we calculate *CUR* as current assets divided by current liabilities. We use *GROWTH* to control for current growth rate; we calculate *GROWTH* as the percentage change on the previous year's sales. Following existing literature, we employ market-to-book ratio (*MBR*) to capture future growth rate; we compute *MBR* as the ratio of 'total assets plus market value of equity less book value of equity' to total assets. Short et al. (2015) show that *CSP* is associated with industry characteristics. Therefore, to account for this, we employ nine industry dummies (*INDUSTRY*) based on the classification provided in Table A1.[9] Furthermore, the literature related to the managerial viewpoint contends that the financial decisions of corporations are largely influenced by their managers' preferences, desires and objectives. For instance, Barnea and Rubin (2010) argue that entrenched managerial ownership reduces incentives to allocate substantial financial resources to CSR expenditure. Following Sun et al. (2016), amongst others, we use managerial ownership (*MANOW*) to capture managerial entrenchment.

[9] For brevity, in our regression analysis, we report industry dummies with significant effects.

4 Empirical Analyses

4.1 Model specifications

We adopt the system-GMM model for our regression analysis. This is as a result of the dynamic nature of the model which accounts for other unobservable factors. Nelling and Webb (2009) found that *CSP* is determined more by firm-specific factors than by *CFP*. This necessitates the need to control for the effects of certain fixed factors, such as capital intensity and managerial reputation, among others. Furthermore, as it is difficult to maintain exogeneity in firm-level data, the direction of causation between variables could be problematic because of the endogeneity issue, i.e., the correlation between regressors and the error term. Therefore, using contemporaneous data for *CFP* or *CSP* and their determinants may generate spurious results. Thus, to account for these econometric problems, we use the system-GMM specification (see e.g., Duanmu and Guney 2013; Wintoki et al. 2012). Below, we illustrate our models without considering non-linearity and lagged analysis.

$$LNCSP_{i,t} = \alpha + \beta_1 CFP_{i,t} + \Sigma\beta_s CONTROLS_{s,i,t} + \Sigma\beta_j INDUSTRY_j + \Sigma\beta_k TIME_k + \mu_i + \mu_t + \varepsilon_{i,t} \quad (4)$$

$$CFP_{i,t} = \tau + \gamma_1 LNCSP_{i,t} + \Sigma\gamma_s CONTROLS_{s,i,t} + \Sigma\gamma_j INDUSTRY_j + \Sigma\gamma_k TIME_k + \mu_i + \mu_t + \Psi_{i,t} \quad (5)$$

where *LNCSP* is the logarithmic transformation of the social performance (*CSP*) measure; *CFP* is corporate financial performance based on *ROA*, *ROE* or *SPP* (without the log transformation as they are in decimal values); *TIME* (*INDUSTRY*) is for yearly (industry) dummy variables, respectively. The term μ_i represents unobservable time-invariant firm-specific effects, such as company reputation and μ_t represents time-variant effects common to all firms, such as an economic downturn; $\varepsilon_{i,t}$ and $\Psi_{i,t}$ are the time-varying disturbance terms that are serially uncorrelated with mean zero and standard deviation δ. The subscripts: *i* = 1 to 314 (firms); *t* = 2002 to 2015 (years) and hence *k* represents 13 yearly dummies; *j* =1 to 8 (industry dummies) and *s* = 1 to 8 as *CONTROLS*, represent these eight variables (i.e., *SIZE, RD, BETA, CUR, LEVER, GROWTH, MBR* and *MANOW*). Finally, α, τ, γ's and β's are estimable coefficients. To consider the non-linearity issue, we employ the following setting:

$$LNCSP_{i,t} = \alpha + \beta_1 CFP_{i,t} + \beta_2 CFP_{i,t}^2 + \beta_3 CFP_{i,t}^3 + \Sigma\beta_s CONTROLS_{s,i,t} + \Sigma\beta_j INDUSTRY_j + \Sigma\beta_k TIME_k + \mu_i + \mu_t + \varepsilon_{i,t} \quad (6)$$

$$CFP_{i,t} = \tau + \gamma_1 LNCSP_{i,t} + \gamma_2 LNCSP_{i,t}^2 + \gamma_3 LNCSP_{i,t}^3 + \Sigma\gamma_s CONTROLS_{s,i,t} + \Sigma\gamma_j INDUSTRY_j + \Sigma\gamma_k TIME_k + \mu_i + \mu_t + \Psi_{i,t} \quad (7)$$

where CFP^2 and CFP^3 are the squared and cubed terms of *CFP*, respectively; and $LNCSP^2$ and $LNCSP^3$ are the squared and cubed terms of *LNCSP*, respectively.

Furthermore, to consider the lag effects of *CSP (CFP)* on *CFP (CSP)*, we include the corresponding lagged variables in equations 4 and 5, respectively. In the next section, we employ a set of combinations in the models by including all the parabolic and cubic terms, and similarly some of the factors are lagged by one and two periods, which is to ensure comparative robustness as in Nelling and Webb (2009). Following the implications of Eq. (3), we further include lagged *LNCSP* in Eqs. (4) and (6).

4.2 The system-GMM estimations

Under the two-step system-GMM setting, the model is estimated at both levels and first differences; i.e., in the stacked regressions level, equations are simultaneously estimated using differenced lagged regressors as instruments. Regarding the consideration of a virtuous circle for example, it is expected that CFP_{t-2} enhances CSP_{t-1}, which in turn increases CFP_t. The system-GMM method accounts for such potential endogeneity issues by using appropriate instrument sets.[10] This estimation technique, hence, controls for this econometric issue that may arise from random shocks affecting both *CFP* and *CSP*, and their determinants simultaneously. As explained in Arellano and Bover (1995), and

[10] See also Jo et al. (2015) who consider several advanced techniques, including this specification, when they examine the link between environmental responsibility and financial performance. In addition, Shahzad and Sharfman (2015) highlight the importance of the sample selection bias, which is another type of endogeneity problem, when they investigate the effects of *CSP* on *CFP*, and they find a positive impact.

Blundell and Bond (1998), among others, pooled OLS, fixed effects, instrumental variables and even traditional difference-GMM methods would produce biased results for dynamic models.

4.3 Univariate analysis

In Table 1, we divide the sample into four quartiles by sorting firms according to their *CSP*, which is based on the minimum value of 4.49% and maximum value of 98.83%. The results (statistically different mean and median values) show that the characteristics of firms with high *CSP* (quartile 4), in general, differ significantly from low *CSP* firms (quartile 1). As *CSP* increases on average from quartile 1 to quartile 4, *SPP* reduces. However, the other financial performance figures (i.e., *ROA* and *ROE*) seem to suggest the absence of a linear relationship between *CSP* and *CFP*.

[INSERT TABLE 1 HERE]

Table 2 shows the descriptive statistics for our variables, including year-on-year change effects in *CSP* and *CFP*. The firms show an average *CSP* score of 63.071 which suggests that the average firm has less *CSP* concern. ΔCSP_{t}, ΔCSP_{t-1}, and ΔCSP_{t-2} are 1.333, 1.315, and 1.310 respectively. Similarly, the average market-based *SPP* is 0.048, whilst ΔSPP_{t}, ΔSPP_{t-1}, and ΔSPP_{t-2} are -0.013, -0.001, and 0.017 respectively. The year-on-year change effects for the accounting-based performance measures are ΔROA_{t}, (-0.001), ΔROA_{t-1}, (0.000), and $\Delta \mathrm{ROA}_{t-2}$ (0.000), ΔROE_{t}, (-0.001), ΔROE_{t-1}, (0.005), and ΔROE_{t-2} (0.003). *CSP* exhibits considerable volatility with a standard deviation of 25.836. *CFP* is fairly stable given a standard deviation of 0.129, 0.566, and 0.437 for *ROA*, *ROE*, and *SPP* respectively.

[INSERT TABLE 2 HERE]

4.4 Bivariate correlation analysis

Correlation analysis is reported in Table 3. Not surprisingly, the *CFP* measures are positively and significantly correlated with each other. The highest correlation amongst *CFP* measures is observed between *ROA* and *ROE*. *CSP* is highly and positively correlated with *SIZE* and leverage ratio. On the other hand, *CUR*, *MBR* and *GROWTH* are inversely and significantly correlated with *CSP*.

Furthermore, *BETA, ROA, ROE, SPP* and *RD* do not significantly correlate with *CSP*. All *CFP* measures are strongly and negatively correlated with *SIZE*. The (unreported) variance inflation factors (VIFs) are far below the threshold value of 10 (minimum =1.02; maximum=2.72), which implies the absence of multicollinearity problems among the explanatory variables. *MANOW* is negatively and significantly correlated with *LNCSP*, suggesting that entrenched managerial ownership reduces the incentive of firms to commit financial resources to enhance *CSP*. This is consistent with the negative correlation between *MANOW* and *SPP*.

[INSERT TABLE 3 HERE]

4.5 Main regression results and discussion

Table 4 provides the GMM results for the model analyzing *CFP* determinants.[11] When assuming a linear relationship between *CFP* and *CSP* in model 1, the current *CSP* has a very significant and positive influence on *ROA*. In model 2, we include the lagged values of *CSP* at time *t* and t_{-1}; although these lagged effects are statistically insignificant, the current *CSP* continues to have a strong and positive link with the current *CFP*. In model 3, we consider the possibility of a non-linear association between *CSP* and *CFP*; the respective coefficients transpire to be significant, although the squared and cubed terms are significant at the 10% level. When *CFP* is proxied by *ROA*, our results do not follow closely hypothesis 1. In models 4 and 5, current *CSP* significantly affects current *ROE*. In model 6, we test for the presence of a non-linear correlation between *CSP* and *ROE* but the results are insignificant. These findings rather suggest a linear link between *CSP* and *CFP*, and hence are in favour of hypothesis 1 when *CFP* is measured by *ROE*. In model 5, our results lend some support to hypothesis 1 with respect to the positive coefficient on *CSP* lagged one period and are statistically significant at the 10% level.

[11] Three diagnostics should be met for the system-GMM results to be reliable and consistent. Our regression results are robust to these three criteria: The *Hansen* test confirms the validity of the instrument sets; *AR(1)* test suggests the presence of first-order autocorrelation; and *AR(2)* test confirms the absence of second-order autocorrelation. We also tested for the potential endogeneity of the factors following the *Difference-in-Hansen* statistic, for which the null hypothesis states that the variable is exogenous. This test suggests that, except for the time and industry dummy variables, all other explanatory variables should be treated as endogenous; it also reveals that the differenced-instruments used in level equations are exogenous.

On the other hand, when a non-linear relationship between *CFP* and *CSP* is assumed in model 9, we obtain a cubic link between *CSP* and *SPP* as the coefficient estimates are all statistically significant at the 1% and 5% levels. This means that *CFP* improves with low and high levels of CSR activities but declines at the medium *CSP* levels.[12] This result may suggest an optimal CSR intensity. Also, the *CSP* coefficients in models 7 and 8 are insignificant. This means that hypothesis 1 is not supported when *CFP* is measured by *SPP*.

Regarding other factors, the significant and negative coefficients in models 1 to 3 for *SIZE* suggest that smaller firms have higher profitability ratios. Firm beta (*BETA*) negatively affects *ROE* but does not influence *ROA or SPP*. Higher firm liquidity (*CUR*) has a negative and statistically significant effect on *SPP* only in model 8. Debt ratio is positively (negatively) associated with *ROE* (*SPP*). Surprisingly, higher *RD* activities reduce *ROA* and *ROE*. Future growth options (*MBR*) positively impact on *CFP,* whereas current growth rate's effect on *CFP* depends on how we measure *CFP*. Finally, managerial ownership (*MANOW*) exerts a statistically significantly positive influence on *ROE* and *ROA* although this effect is insignificant on *SPP*.[13]

[INSERT TABLE 4 HERE]

Table 5 examines the determinants of current *CSP* levels. Following the implications of equation (3) as a dynamic model, including the lagged dependent variable [CSP_{-1}] in the model as one of the explanatory variables may capture the presence of such an optimality. The results show that the coefficient on CSP_{-1} is always between 0 and 1, and is statistically significant at the 1% level. These findings imply that companies find it rational to dynamically adjust the level of their CSR activities because of the varying costs and benefits that are associated with the process. This thereby supports hypothesis 3. Given that the speed of adjustment [α = 1 minus coefficient estimate on CSP_{-}

[12] The two inflection points for this cubic association are 2.8286 (first derivative) and 3.7228 (second derivative) in logarithmic values. These calculations suggest that when the *CSP* score is between 0.00% and 16.92%, or higher than 41.38%, the link between *CSP* and *CFP* is positive; when the *CSP* range is between 16.92% and 41.38%, *CSP* actually reduces *CFP*. We also tested for the presence of a parabolic relationship in this model but failed to detect one.

[13] Lagged *CFP* is not used as one of the explanatory variables in the models in Table 3 because firms are expected to maximise rather than optimize *CFP*. Moreover, when we investigate the dynamic aspect of the *CSP* and *CFP* link we do not include the non-linear terms, and vice versa, in order to see the clear impact of each aspect.

$_{1}$] ranges between 0.326 and 0.410, one can say that once the company hugely deviates from the optimal CSR activities, the adjustment process is not slow as α is far away from zero. Therefore, the adjustment costs that need to be allocated for the purpose of the deviation from the optimal CSR levels are not too deterring.

When we made the initial assumption that *CFP* affects *CSP* monotonously, there is strong evidence that higher *CFP* leads to higher *CSP* (models 1, 2, 4, 5 and 8). Being consistent with hypothesis 1, these results suggest that financial affordability plays a key role in a company undertaking CSR activities. As in Nelling and Webb (2009), our analysis in Table 5 can be considered to be testing the presence of Granger causality from *CFP* to *CSP*. The coefficients on lagged *CFP* in models (5) and (8) are significant at both at the 5% and 10% level, which supports the hypothesis that the presence of this is causality. Regarding the consideration of the virtuous circle between *CSP* and *CFP*, we find that *CFP* lagged two periods positively affects *CSP* lagged one period (model 5 of Table 5) and then this lagged *CSP* exerts a direct influence on current *CFP* (model 5 of Table 4).[14] In other words, when *CFP* is measured by *ROE*, our study finds the presence of a virtuous circle for the UK firms.

When we assume that *CFP* affects *CSP* non-monotonously in Table 5, the link between *CSP* and *CFP* based on *ROA* or *ROE* shows a cubic pattern in models 3 and 6. These findings suggest that *CFP* negatively affects *CSP* at low and high levels of *CFP* but for the medium *CFP* levels the effect is positive.[15] Therefore, these results do not support hypothesis 1 when we proxy *CFP* by *ROA* and *ROE*. The results in Table 5 imply both a linear and non-linear relationship between *CSP* and *CFP*. This suggests that one needs to be cautious with regard to whether a linear or non-linear association is more appropriate when investigating the effect of financial performance on social performance. To address this issue, we employed Ramsey's RESET specification test in which the null hypothesis

[14] Further note that the effect of CFP_{t-2} on CSP_{t-1} can be considered as that of CFP_{t-1} on CSP_{t}.

[15] The two inflection points for the cubic link in model 3 are -0.0709 (first derivative) and 1.3982 (second derivative). These calculations suggest that when *ROA* is lower than -7.1% or higher than 139.8%, *CSP* decreases when *CFP* increases; and when *ROA* is between -7.1% and 139.8%, an increase in *CFP* actually improves *CSP*. We also tested for the presence of a parabolic relationship in this model but failed to detect one.

suggests a linear association against the alternative hypothesis of non-linear association. The test suggests a strong rejection of the null hypothesis (*p*-value = 0.00), which means that the non-linear form is more appropriate.

It should be noted that the significant coefficient estimate on *CFP* (see models 3 and 6 of Table 5) does not necessarily mean that the relationship between financial performance and social performance is linear; this is because in models with quadratic equations, the variable with a polynomial degree of one (*CFP*) should be considered together with the parabolic (CFP^2) and cubic (CFP^3) terms. Table 5 shows that the causal link between *CSP* and *CFP* runs from one direction of *CSP*, as *LNCSP(-1)* is statistically significant at the 1% level from models 1-9. Table 5 reports the results of the control variables. *SIZE* has a positive and statistically significant effect on *CSP*. However, *CSP* reduces significantly when firm liquidity or leverage ratios increase. The remaining control variables generally do not exert any significant influence on *CSP*.

[INSERT TABLE 5 HERE]

We further examine the associations between *CSP* and *CFP* within UK firms for the period 2002-2015. Our focus is to determine whether any linear link exists, and the causality of any such relationship by considering the endogeneity problem. We also analyze if any non-monotonous relationship exists between *CSP* and *CFP*, and if companies will have optimal or target CSR activity levels. We find certain degrees of non-linear links between *CSP* and *CFP*. In addition, current and past *CFP* values seem to impact linearly on the current *CSP* but the presence of a cubic association between these two variables is more apparent. Our results suggest that *CFP* and *CSP* are neither strictly positively nor negatively correlated but the association is rather non-linear. This confirms Brammer and Millington's (2008) findings, and therefore suggests that the disagreement on the *CSP*-*CFP* link debate is due to the fact that the literature has ignored the non-linearity and target CSR issues (see also Barnett and Salomon 2006). Our study differs from that of Barnett and Salomon (2006) in several ways: We extend their parabolic setting, by considering a cubic link between *CSP* and *CFP*. They focused on socially responsible investing in the U.S., whereas our *CSP* measure for the UK firms is more comprehensive, and we also include several explanatory variables. We further conduct a dynamic analysis and use a robust system-GMM estimation method that is efficient for panel data analyses.

Our analysis reveals that concurrent *CFP* (*ROA*, *ROE* or *SPP*) linearly and significantly affects concurrent *CSP* in the sense that higher financial performance suggests higher social performance. The results suggest that financially stable companies can afford to be socially responsible. Similarly, concurrent *CSP* linearly, significantly and positively affects *CFP* proxy by *ROA* and *ROE*, and past *CSP* positively affects current *ROE*, although they are statistically significant at the 10% level. Moreover, *CFP* lagged one and two periods (*SPP* and *ROE* definitions) have a positive and statistically significant influence on current *CSP*. On the other hand, we report a cubic link between *CSP* and *CFP* (based on *SPP*) which suggests that at low and high levels of CSR activities, *CFP* improves but *CFP* reduces at the medium levels. Hence, the issue of whether firms should differentiate themselves with high commitment to CSR to impress stakeholders or save the resources seems to matter. Furthermore, when we examine the effect of *ROA* and *ROE* on *CSP*, we find another cubic association, which implies that firms with low and high financial performance negatively affect *CSP* but medium financial performance is associated with an improved *CSP*.

On the virtuous circle of the *CSP-CFP* relationship, a more integrated relationship receives support from our empirical analysis. Thus, it seems firms can be socially responsible and financially successful at the same time, and companies can have a competitive advantage if they invest in CSR activities (see also Gregory et al. 2016). Our findings further lend some support to the presence of the virtuous circle, which suggests that past *CFP* improves present *CSP* which then improves future *CFP*. Our partial adjustment process reveals that firms are prone to having target CSR structures and they periodically revise the intensity of their CSR activities in order to be at their optimal *CSP* levels. This is consistent with our hypothesis 3. Furthermore, the diagnostic tests for the system-GMM estimates highlight the relevance of the endogeneity problem when running regressions. It is also important to note that the regression results are not independent from econometric specifications and the proxies of *CFP*.

4.6 Additional tests

In this section, we perform additional analyses to provide robustness to our primary findings. First, we analyse year-on-year changes in *CFP* and *CSP* to underline our main results. Second, we perform our analysis based on financial and non-financial firms. Third, we consider our analysis based on the intensity of CSR engagement across industries. Finally, we assess the relevance of the global financial crisis by running the models across two time periods.

4.6.1 Year-on-year change effects

In our main analyses, we considered the association between *CSP* and *CFP* in levels. In this sub-section, we focus on the effects of year-on-year changes. Table 6 reports the regression results when *CSP* is first-differenced at time *t*, *t-1* and *t-2* (i.e., ΔCSP_t, ΔCSP_{t-1}, and ΔCSP_{t-2}, respectively) as a set of explanatory variables and *CFP* is first-differenced at time *t* (i.e., ΔCFP_t) as the dependent variable. When tables 4 and 6 are compared, it seems that *CSP* and *CFP* have more significant links when they are measured in levels compared to when they are in first-differences. However, our analysis obtained a few significant links regarding the year-on-year changes: in model 3, lagged *CSP* at time *t-2* impacts positively on first-differenced *ROA* at time t. On the other hand, in models 9-12 when we proxy *CFP* by market base variable *SPP*, we find that a reduction in *CSP* negatively affects *SPP*. This is consistent with Cheung (2016) who argues that *CSP* has a negative effect on idiosyncratic risk. An increase in idiosyncratic risk perceived by investors as a result of reduction in financial resources committed by firms to *CSP* will negatively affect the firm's share price.

[INSERT TABLE 6 HERE]

Table 7 reports the regression results when *CFP* is first-differenced at time t, t_{-1} and t_{-2} (i.e., ΔCFP_t, ΔCFP_{t-1}, and ΔCFP_{t-2}, respectively) as a set of explanatory variables and *CSP* is first-differenced at time t (i.e., ΔCSP_t) as the dependent variable. When we compare the findings of Table 7 with Table 5, the lagged first differenced *CSP* is significant in all models with coefficients taking values between values 0 and 1 in absolute terms; the corresponding signs are negative because the analyses are done by taking into account year-on-year changes. Overall, these findings suggest the presence of optimal CSR activities. As for the *CSP*-*CFP* nexus, the hypothesized positive link is apparent in model 4 where all dimensions of transformed *ROA* are statistically significant. Concerning *ROE*, its effect on ΔCSP is positive and statistically significant only for the first-differenced values at t_{-2}. Furthermore, with regard to *SPP*, the expected positive is reported only when *SPP* has its first-differenced transformation at t_{-1}.

[INSERT TABLE 7 HERE]

4.6.2 Financial vs. non-financial firms

The importance or implications of being a socially responsible company may change depending on the business sector or industry group the company is operating in (see e.g., Jenkins 2004; Scholtens 2008b; Waddock and Graves 1997). In Table 8, we investigate the *CSP* and *CFP* determinants by splitting our sample into financial (industry groups 8 and 9) and non-financial firms (industry groups 1-7 and 10) based on the industry classification in Table A1 in the Appendix.[16] Panel A of Table 8 reports the results when we regress *CFP* on *CSP*: the only significant result in panel A is the positive link between *CSP* and *ROA* in model 1. In Panel B, we conduct the same regressions for non-financial firms; the only significant and positive link between *CSP* and *CFP* is observed when *CFP* is measured by *ROE* in model 4. Panel B further reveals that *CSP* and *CFP* have a cubic relationship but the nature of this relationship depends on the *CFP* proxy; in model 3, higher or lower *CFP* improves *ROA* but at the medium *CSP* level, *ROA* decreases. In model 9, on the other hand, higher or lower *CFP* reduces *ROA* but at the medium level *CSP* improves *ROA*.

[16] For brevity, we only report in Table 8 the results for the variables related to *CSP* and *CFP*, although the models include the other explanatory variables mentioned in section 4.1.

In Panels C and D of Table 8, we regress *CSP* on *CFP* for financial and non-financial firms, respectively. Although both business sectors seem to adopt optimal CSR levels, the speed of adjustment to the optimal *CSP* level is higher for non-financial firms. Moreover, the positive effects of *CFP* on *CSP* are more apparent for non-financial firms. With regard to financial firms, current *CFP* does not impact on current *CSP*. This relationship is consistent and statistically significant for non-financial firms. Although it is not very persistent, there is some evidence to suggest that financial firms' past *ROA* or past *SPP* have a positive and statistically significant effect on current *CSP*. An interesting finding in Panel D shows that *CFP* and *CSP* have a cubic link: *CSP* and *ROA* are negatively (positively) linked for lower and higher (medium) values of *ROA.*

[INSERT TABLE 8 HERE]

4.6.3 Intensity of CSR engagement across industries

In this section, we divide our sample industries into three broad groupings based on the intensity with which the industry that firms belong to engages in CSR; (1) based on industries where CSR engagement is at high-levels; (2) industries where CSR participation is at medium-levels; and (3) industries where CSR is below the average level or is low. Using the mean *CSP* score for each industry in Table A1, we classify groups 7, 8 and 9 as those industries with low CSR engagement; groups 1, 5, 6 and 10 are industries with medium CSR engagement, and industries with high CSR engagement are groups 2, 3 and 4. Table 9 reports the regression results for these classifications. Panel A shows that firms in industries with low CSR engagement find it beneficial to increase their current *CSP* in order to improve their current *CFP*, whereas Panel C suggests that such an advantage is virtually non-existent. These findings imply that increasing the existing high level of CSR activities does not correspond to an increase in profitability; however, significantly low or high *CSP* can influence firms to optimize their CSR activities. Panels A, B and C show an interesting pattern to suggest a cubic relationship between *CSP* and *SPP*. For firms operating in medium-to-high CSR intensity industries (Panels B and C), the effect of *CSP* on *SPP* is negative for the low and high levels of *CSP* but this effect is positive for medium *CSP* levels. However, for firms operating in low-CSR intensity industries (Panel A), the impact of *CSP* on *SPP* is positive for the low and high levels of *CSP* but negative for medium *CSP* levels. This is consistent with Lins et al. (2017) who show that high *CSP* intensity firms experience higher profitability than low *CSP* firms as a result of high social capital and trust from investors, and Cheung (2016) who argues that high-CSR intensity firms experience lower idiosyncratic and systematic risk with stakeholders and investors respectively.

Panels D, E and F of Table 9 show the effects of *CFP* on *CSP* based on the level of CSR engagement. With respect to the coefficient estimates on lagged *CSP*, the results indicate that all sub-groups adopt optimal CSR policies and the speed of adjustment to the desired *CSP* level is highest (lowest) in Panel F (Panel D). This suggests that it is easier for firms in high-CSR intensity industries to be on their target *CSP* levels relative to their peers operating in low-CSR intensity industries. Panel D reveals that current *ROA* and *ROE* positively affect current *CSP* levels. Although we observe similar correlations in Panels E and F, the mentioned association is less convincing. Therefore, one can assert that firms operating in low-CSR intensity industries experience the positive effect of current *CFP* on current *CSP*.

In Panels D, E and F of Table 9 we observe a cubic association between *CSP* and *CFP* in three models. Model 3 of Panel D suggests that for firms in low-CSR intensity industries, *CSP* increases with low or high *ROA* figures but it decreases with medium *ROA* figures. However, model 9 of Panel D shows that firms in low-CSR intensity industries experience a decrease in *CSP* with low or high *SPP* figures but it increases with medium *SPP* figures. Finally, model 9 of Panel F shows that *CSP* decreases with low or high *SPP* figures but it increases with medium *SPP* figures in firms operating within high-CSR intensity industries.

[INSERT TABLE 9 HERE]

4.6.4 The relevance of the 2007-2008 global financial crises

Some studies attribute the occurrence of 2007-2008 global financial crisis partly to poor CSR commitment as a result of corporate greed and unethical behaviour (see Argandoña 2009). For instance, Karaibrahimoglu (2010) argues that during the global financial crisis, *CSP* was low as firms engaged in cost cutting activities. However, other recent studies show that *CSP* has improved following the global financial crisis (see Kemper and Martin 2010). Lopatta and Kaspereit (2014) note that there is a perceived increase in *CSP* around the world post the global financial crisis. Similarly, Lins et al. (2017) state (and then empirically show) that as the public trust in firms following the financial crisis went down, the value of being socially responsible is bound to be rising during post-crisis times. We therefore split our sample into two periods (i.e., pre-crisis (2002-2008), and post-crisis (2009-2015)) to provide additional robustness to main results.[17]

Table 10 reports the *CSP* and *CFP* results after splitting the sample. An interesting finding emerges in Panels A and B. We observe that when *CFP* is based on *ROE*, the impact of *CSP* on *CFP* is negative during the pre-crisis period whereas the same association is positive during the post-crisis period. This finding is in line with the main findings of Lins et al. (2017). Furthermore, the non-linear link obtained in Table 4 (model 3) for the whole sample is reported again for the post-crisis period only in Table 10 (Panel B, model 3). Splitting the sample leads to the presence of another significant non-linear association that we did not observe in the previous analyses: the effect of *CSP* on *ROE* is negative when CSR activities are low or high but at medium level the relationship is positive. Overall, we fail to report any linearly positive effect of *CSP* on *CFP* for the pre-crisis period.

Panels C and D show that in both periods, the UK firms continue to maintain optimal *CSP* and the speed of adjustment to this optimality is higher during the pre-crisis period. When both periods are compared, the linearly positive effect of *CFP* on *CSP* is clearly more apparent for the post-crisis period as this connection is virtually non-existent for the pre-crisis times. The only non-linear link is reported in Panel D (model 6) for the post-crisis years: the effect of *ROE* on *CSP* is negative (positive) if the intensity of CSR activities is low or high (medium).

[INSERT TABLE 10 HERE]

[17] In our sample, the average CSP value is 61.73% for the pre-crisis period and 64.01% for the post-crisis period, which is in line with the conjecture that CSR activities would be given more importance by both corporate managers and capital markets following crises. One can therefore assert that UK firms became more socially responsible after Lehman Brothers filed for bankruptcy in September 2008.

In Table 11 we consider again the pre-crisis and post-crisis years but only for financial firms. Regarding the effect of *CSP* on *CFP*, the results do not change across both time periods for these firms. With the exception of the positive effect of *CSP* on *ROA* in model 1, the results appear to be generally statistically insignificant. Yet, they are comparable to the related analyses reported in Table 8. Moreover, in Panels C and D, it is observed that financial firms adjust the level of their CSR activities towards target *CSP* levels faster in the post-crisis years than in pre-crisis years. Similarly, the positive effects of financial strength on *CSP* are more pronounced for the post-crisis period.

[INSERT TABLE 11 HERE]

In Table 12, we repeat our analyses attached to the ones in Table 11 but only focused on non-financial firms. For both periods, the only significant and positive effect of *CSP* on *CFP* is observed when *CFP* is proxied by *ROE*. Yet again, for both periods we report a cubic association (model 3), which confirms the corresponding findings in Table 8 (Panel B, model 3). However, when *CFP* is based on *SPP*, the same cubic association that we report in Table 8 (Panel B, model 9) is obtained only during the pre-crisis times for the non-financial firms in Table 12 (Panel A, model 9).

In Panels C and D of Table 12, the presence of the optimal *CSP* continues to hold for these non-financial firms. Further, the speed of adjustment is higher for the pre-crisis years than for the post-crisis years, which is in contrast with the case of financial firms in Table 11. Finally, reminiscent of the previous results in this sub-section, the positive effects of *CFP* on *CSP* is more salient for the post-crisis period for the non-financial firms.

[INSERT TABLE 12 HERE]

5 Conclusions

This study has examined the existence of non-linear link between *CSP* and *CFP* and, more importantly, how this shapes the optimal level of commitment to CSR activities. The presence of non-linearity between *CSP* and *CFP* is an important addition to the extant literature on CSR. Indeed, our empirical analysis indicates that i) medium levels of CSR activities reduce financial performance while low and high CSR levels increase financial performance, and ii) firms with low and high financial performance are less committed to CSR activities, while firms with medium financial performance engage more in CSR commitments. Evidence from the intensity of CSR engagement across industries shows a cubic link between *CSP* and *SPP*. We find a strong support for *CSP* not having a significant impact on *CFP* in financial firms; however, *CSP* does have a significant impact on *CFP* in non-financial firms. We also find a significant impact of *CFP* on *CSP* in both financial and non-financial firms. Our paper provides additional evidence as to how CSR activities and *CFP* interact during financial crisis and tranquil times. We report that the positive effect of *CSP* on *CFP* is more apparent during the post-financial crisis years. Furthermore, it appears that optimal CSR activities and the existence of non-monotonous relationships are relevant for both periods and the speed of adjustment to desired CSP levels depends on the time periods and industrial background of the firms.

These findings have implications for slack resources theory, which suggests that CSR activities should increase with higher firm financial resources. This may not always be so, as the findings of this study suggest. Indeed, explaining why there are such non-linear links through other theoretical perspectives, such as institutional theory and legitimacy theory considerations may highlight firms' motivations in engaging in CSR activities. Despite the theoretical relevance of our findings, it further implies that stakeholders (including government, customers and the wider public) may need to curtail their expectations of higher *CSP* from higher resourced firms. This has significant implications for CSR advocacy and policy. Methodologically, our study utilizes a robust and well-established index, ESG scores, which takes into account the multidimensional aspects of CSR. This is an important addition to the *CSP/CFP* discourse. Furthermore, the estimation model and partial adjustment process which we adopted in the study are useful empirical contributions to the *CSP-CFP* nexus. Our examination of the presence of non-linear (parabolic and cubic) relationships between *CSP* and *CFP* suggests that companies might adjust the intensity of their CSR activities because of internal and external developments. This includes practical implications with regard to the drivers of

CSR, the *level* of commitment to CSR activities, and the determinants of CSR activities, which are not always based on economic rationales.

While this study shows that *CFP* and *CSP* are linked both monotonously and non-linearly, it remains to be seen why this occurs, although the non-linearity effect is more apparent. Future research can address this limitation through more advanced methods that have more robust testing for the presence of a virtuous circle, Furthermore, it is likely that the benefits and costs associated with *CSP* activities vary over time and managers need to respond appropriately to these changes. Future research could consider including an advertising metric in the analysis, based on the amount a company spends advertising its CSR actions to its stakeholders. This study is also related to corporate reputation and branding (Neville et al. 2005). Moreover, it is important to further investigate the timing associated with the relationship between *CSP* and *CFP* (Brammer and Millington 2008) as the interactions between these would become clearer if we know how long it would take for the impact of CSR on *CFP* to be shown. Data analysis with longer panels in emerging markets would be another future research opportunity. Also, future studies could methodologically scrutinize and identify the specific situations whereby it is unbeneficial to be socially responsible. Future studies that can further provide detailed empirical and theoretical analyses of stakeholder decision making processes might improve our understanding of how *CSP* interacts with *CFP*.

References

Adegbite E, Nakajima C (2011) Corporate governance and responsibility in Nigeria. Int J Discl Gov 8:252–271

Alexander GJ, Buchholz RA (1978) Corporate social performance and stock market performance. Academy Manag J 21:479–486

Argandoña A (2009) Can corporate social responsibility help us understand the credit crisis? SSRN Working Paper. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1392762

Amaeshi K, Adegbite E, Rajwani T (2016) Corporate social responsibility in challenging and non-enabling institutional contexts do institutional voids matter? J Bus Eth 134:135–153

Arellano M, Bover O (1995) Another look at the instrumental variable estimation of error components models. J Econometrics 68:29–51

Aupperle K, Carroll AB, Hatfield JD (1985) An empirical examination of the relationship between corporate social responsibility and profitability. Academy Manag J 28:446–463

Barnea A, Rubin A (2010) Corporate social responsibility as a conflict between shareholders. J Bus Eth 97:71–86

Barnett ML, Salomon RM (2006) Beyond dichotomy: the curvilinear relationship between social responsibility and financial performance. Strategic Manag J 33:1304–1320

Barnett ML, Salomon RM (2012) Does it pay to be really good? Addressing the shape of the relationship between social and financial performance. Strategic Manag J 27:1101–1122

Baron D, Harjoto M, Jo H (2011) The economics and politics of corporate social performance. Bus Politics 13:1–46

Blinder AS (1986) More on the speed of adjustment in inventory models. J Money, Credit and Bank 18:355–365

Blundell RW, Bond SR (1998) Initial conditions and moment restrictions in dynamic panel data models. J Econometrics 87:115–143

Brammer S, Brooks C, Pavelin S (2006) Corporate social performance and stock returns: Evidence from disaggregated measures. Financ Manag 35:97–116

Brammer S, Millington A (2008) Does it pay to be different? An analysis of the relationship between corporate social and financial performance. Strategic Manag J 29:1325–1343

Carroll AB (1991) The pyramid of corporate social responsibility: Toward the moral management of organizational stakeholders. Bus Horizons 34:39–48

Chen KH, Metcalf RW (1980) The relationship between pollution control record and financial indicators revisited. Acc Rev 55:168–177

Cheung A (2016) Corporate social responsibility and corporate cash holdings. J Corp Finan 37:412–430

Cochran PL, Wood RA (1984) Corporate social responsibility and financial performance. Academy Manag J 27:24–56

Deakin S, Whittaker DH (2007) Re-embedding the corporation? Comparative perspectives on corporate governance, employment relations and corporate social responsibility. Corporate Governance: An Int Rev 15:1–4

Donaldson T, Preston L (1995) The stakeholder theory of the corporation: concepts, evidence, and implications. Academy Manag Rev 20:65–91

Duanmu JL, Guney Y (2013) Heterogeneous effect of ethnic networks on international trade of Thailand: The role of family ties and ethnic diversity. Int Bus Rev 22:126–139

Elsayed K, Paton D (2009) The impact of financial performance on environmental policy: does firm life cycle matter? Bus Strategy Environ 18:397–413

Engle RF, Granger CWJ (1987) Co-integration and error correction: representation, estimation, and testing. Econometrica 55:251–276

European Commission (2011) Communication from the Commission to the European Parliament, The European Economic and Social Committee and the Committee of the Regions: A renewed EU strategy 2011–14 for Corporate Social Responsibility. Available at (accessed 02/08/2017):

http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0681:FIN:EN:PDF

Fernandez-Kranz D, Santalo J (2010) When necessity becomes a virtue: the effect of product market competition on corporate social responsibility. J Economics Manag Strategy 19:453–487

Fieseler C (2011) On the corporate social responsibility perceptions of equity analysts. Bus Eth: A Eur Rev 20:131–147

Filbeck G, Gorman R, Zhao X (2013) Are the best of the best better than the rest? The effect of multiple rankings on company value. Rev Quant Finan Acc 41:695–722

Flammer C (2015) Does corporate social responsibility lead to superior financial performance? A regression discontinuity approach. Manag Sci 61:2549–2568

Freeman RE (1984) Strategic Management: A Stakeholder Approach: Pitman, Boston

Friedman M (1970) The social responsibility of business is to increase its profit. New York Times Magazine. September 13, 32-33,122,126

Galbreath J (2016) Is board gender diversity linked to financial performance? The mediating mechanism of CSR. Bus Soc, http://dx.doi.org/10.1177/

Gregory A, Whittaker J (2007) Performance and performance persistence of 'ethical' unit trusts in the UK. J Bus Finan Acc 34:1327–1344

Gregory A, Whittaker J, Yan X (2016) Corporate Social Performance, Competitive Advantage, Earnings Persistence and Firm Value. J Bus Finan Acc 43:3–30

Guo Z, Chan KC, Xue Y (2016) The impact of corporate culture disclosure on performance. Rev Pac Basin Financ Mark Pol 19:12, https://doi.org/10.1142/S0219091516500120

Henderson D (2001) Misguided virtue. False notions of corporate social responsibility. New Zealand Business Roundtable

Jenkins H (2004) Corporate social responsibility and the mining industry: conflicts and constructs. Corp Soc Responsibility and Environ Manag 11:23–34

Jiraporn P, Chintrakarn P (2013) How do powerful CEOs view corporate social responsibility (CSR)? An empirical note. Economics Letters 119:344–347

Jo H, Kim H, Park K (2015) Corporate environmental responsibility and firm performance in the financial services sector. J Bus Eth 131:257–284

Johansen S (1988) Statistical analysis of cointegration vectors. J Econ Dynamics Control 12:231–254

Karaibrahimoglu YZ (2010) Corporate social responsibility in times of financial crisis. Afr J Bus Manag 4:382–389

Lankoski L (2000) Determinants of environmental profit: An analysis of the firm-level relationship between environmental performance and economic performance, Unpublished doctoral dissertation, Helsinki University of Technology

Lankoski L (2008) Corporate responsibility activities and economic performance: a theory of why and how they are connected. Bus Strate Environ 17:536–547

Li Q, Luo W, Wang Y, Wu L (2013) Firm performance, corporate ownership, and corporate social responsibility disclosure in China. Bus Eth Eur Rev 22:159–173

Liang, H. & Renneboog, L. (2017). On the foundations of corporate social responsibility. The J Finan, LXXII (2).

Lins KV, Servaes H, Tamyo A (2017) Social capital, trust, and firm performance: The value of corporate social responsibility during the financial crisis. The J Finan LXXII, NO. 4

Lopatta K and Kaspereit T (2014). The world capital market's perception of sustainability and the impact of financial crisis. J Bus Eth 122:475–500

Kemper, A., & Martin, R. L. (2010). After the fall: The global financial crisis as a test of corporate social responsibility theories. Eur Manag Rev 7:229–239

Martín-de Castro G, Amores-Salvadó J, Navas-López JE (2015) Environmental management systems and firm performance: improving firm environmental policy through stakeholder engagement. Corp Soc Responsibility Environ Manag 23:243–256

McGuire JB, Sundgren A, Schneeweiss T (1988) Corporate social responsibility and firm financial performance. Academy Manag J 31:854–872

McWilliams A, Siegel D (2000) Corporate social responsibility and financial performance: correlation or misspecification? Strategic Manag J 21:603–609

McWilliams A, Siegel D (2001) Corporate social responsibility: a theory of the firm perspective. Academy Manag Rev 26:117–127

Nelling E, Webb E (2009) Corporate social responsibility and financial performance: the "virtuous circle" revisited. Rev Quant Finan Acc 32:197–209

Neville BA, Bell SJ, Mengüç B (2005) Corporate reputation, stakeholders and the social performance-financial performance relationship. Eur J of Marketing 39:1184–1198

Nollet J, Filis G, Mitrokostas E (2016) Corporate social responsibility and firm performance: A non-linear and disaggregated approach. Econ Modelling 52:400–407

Orlitzky M (1998) A meta-analysis of the relationship between corporate social performance and firm financial performance, Unpublished doctoral dissertation: University of Iowa, UMI

Orlitzky M, Schmidt FL, Rynes SL (2003) Corporate social and financial performance: A meta-analysis. Organ Stud 24:403–441

Pava ML, Krausz J (1996) The association between corporate social responsibility and financial performance: The paradox of social cost. J Bus Eth 15:321–357

Pavelin S, Porter LA (2008) The corporate social performance content of innovation in the UK. J Bus Eth 8:711–725

Porter ME (1980) Competitive strategy: techniques for analyzing industries and competitors. Free Press: New York

Porter ME, Kramer, MR (2002) The competitive advantage of corporate philanthropy. Harv Busi Rev 80:57–68

Preston LE, O'Bannon DP (1997) The corporate social-financial performance relationship: a typology and analysis. Bus Soc 36:419–429

Robinson M, Kleffner A, Bartels S (2011) Signalling sustainability leadership: Empirical evidence of the value of DJSI membership. J Bus Eth 10:493–505

Salzmann O (2008) Corporate sustainability management in the energy sector: An empirical contingency approach. Gabler Edition Wissenchaft

Scherer A G, Palazzo G (2011) The new political role of business in a globalized world. A review of a new perspective on CSR and its implications for the firm, governance, and democracy. J Manag Stud 48:899–931

Scholtens B (2008a) Corporate social responsibility and the international banking industry. J Bus Eth 86:159–175

Scholtens B (2008b) A note on the interaction between corporate social responsibility and financial performance. Ecol Econ 68:46–55

Schuler DA, Cording M (2006) A corporate social performance-corporate financial performance behavioral model for consumers. Academy Manag Rev 31:540–558

Shahzad AM, Sharfman MP (2015) Corporate social performance and financial performance sample-selection issues. Bus Soc 1-30, first published on June 12, 2015 doi:10.1177/0007650315590399

Sheehy B (2015) Defining CSR: problems and solutions. J Bus Eth 131:625-648

Short JC, McKenny AF, Ketchen DJ, Snow CC, Hult GTM (2015) An empirical examination of firm, industry, and temporal effects on corporate social performance. Bus Soc 55:1122–1156

Siegel DS, Vitaliano DF (2007) An empirical analysis of the strategic use of corporate social responsibility. J Econ Manag Strategy 16:773–792

Simpson WG, Kohers T (2002) The link between corporate social and financial performance: evidence from the banking industry. J Bus Eth 32:97–109

Stanwick PA, Stanwick SD (1998) The relationship between corporate social performance, and organizational size, financial performance, and environmental performance: An empirical examination. J Bus Eth 17:195–204

Sun J, Ding L, Guo JM (2016) Ownership, capital structure and financing decision: Evidence from the UK. The Br Acc Rev 48:448–463

Surroca J, Tribo JA, Waddock S (2010) Corporate responsibility and financial performance: the role of intangible resources. Strategic Manag J 3:463–490

Tosun OK (2017) Is corporate socially responsibility sufficient enough to explain the investment by socially responsible funds? Rev Quant Finan Acc 49:697-726

Ullmann AA (1985) Data in search of a theory: A critical examination of the relationships among social performance, social disclosure, and economic performance of U.S. firms. Academy Manag Rev 10:540–557

Van Marrewijk M (2003) Concepts and definitions of CSR and corporate sustainability: Between agency and communion. J Bus Eth 44:95–105

Waddock SA, Graves SB (1997) The corporate social performance-financial performance link. Strategic Manag J 18:303–319

Wang H, Choi J (2013) A new look at the corporate social–financial performance relationship: the moderating roles of temporal and interdomain consistency in corporate social performance. J Manag 39:416–441

Wang Q, Dou J, Jia S (2015) A meta-analytic review of corporate social responsibility and corporate financial performance: the moderating effect of contextual factors. Bus Soc, http://dx.doi.org/10.1177/0007650315584317

Windsor D (2001) The future of corporate social responsibility. Int J Org Anal 9:225–256

Wintoki MB, Linck JS, Netter JM (2012) Endogeneity and the dynamics of internal corporate governance. J Financ Econ 105: 581–606

Wu MW, Shen CH, Cheng TH (2017) Application of multi-level matching between financial performance and corporate social responsibility in the banking industry. Rev Quant Finan Acc 49:29–63

Table 1 The CSP quartiles

	CSP	BETA	SIZE	ROA	ROE	SPP	RD	CUR	LEVER	GROWTH	MBR	MANOW
Quartile 1	26.336	1.148	20.531	0.113	0.216	0.063	0.012	1.704	0.228	0.089	2.256	0.852
[4.49-42.54]	(26.725)	(1.010)	(20.520)	(0.081)	(0.168)	(0.134)	(0.000)	(1.550)	(0.180)	(0.082)	(1.410)	(0.130)
Quartile 2	55.772	1.154	20.937	0.104	0.200	0.063	0.013	1.674	0.217	0.068	1.857	0.498
[42.56-68.46]	(55.555)	(1.055)	(20.844)	(0.086)	(0.164)	(0.126)	(0.000)	(1.492)	(0.197)	(0.066)	(1.479)	(0.070)
Quartile 3	77.992	1.142	21.822	0.094	0.218	0.035	0.012	1.542	0.254	0.049	1.704	0.220
[68.47-86.39]	(78.025)	(1.070)	(21.578)	(0.086)	(0.167)	(0.076)	(0.000)	(1.391)	(0.232)	(0.053)	(1.456)	(0.040)
Quartile 4	92.184	1.052	22.988	0.094	0.279	0.031	0.014	1.300	0.272	0.043	1.702	0.300
[86.40-98.83]	(92.155)	(1.000)	(22.699)	(0.083)	(0.168)	(0.059)	(0.000)	(1.252)	(0.256)	(0.037)	(1.459)	(0.020)
T-statistic	275.26***	-2.48**	30.33***	-2.31**	2.09**	-1.42	0.65	-7.06***	4.36***	-2.33**	-3.30***	-4.29***
Z-statistic	-24.65***	2.14**	-22.06***	0.54	-1.07	3.18***	-5.07***	7.09***	-5.33***	5.53***	0.49	-16.94***

Notes: Sample size is 3240 observations for 314 firms. *CSP* is the corporate social performance measure; *BETA* is the CAPM's historical beta coefficient over the period of five years; *SIZE* is the natural logarithm of deflated total assets; *ROA* is operating income divided by total assets; *ROE* is net income divided by common equity; *SPP* is share price performance measured as the natural logarithmic difference between share prices at time t and t-1; *RD* is research and development expenses divided by total sales (missing R&D data were replaced by zeroes); *CUR* is current assets divided by current liabilities; *LEVER* is total debt divided by total assets; *GROWTH* is percentage change in annual sales. *MBR* is the ratio of 'total assets plus market value of equity less book value of equity' to total assets. *MANOW* is the percentage of the number of shares held by insiders as executives and top-line managers in total shares outstanding. See Table A2 for further details of the variables' definitions. The sample is divided into four equal quartiles; from firms with lowest *CSP* (quartile 1) to highest *CSP* (quartile 4) values; *T*-statistic (Z-statistic; Wilcoxon signed ranks test) is for the mean (median) differences of each variable between the fourth and first quartiles. Median values are in the parentheses. * (**) (***) indicate the difference is significant at the 10% (5%) (1%) level (two-tailed). The figures in the square brackets show the *CSP* range in each quartile.

Table 2 Descriptive statistics

	Minimum	Maximum	Mean	Std. Dev.
CSP	4.49	98.83	63.071	25.836
ΔCSP_t	-47.96	79.64	1.333	12.251
ΔCSP_{t-1}	-47.96	79.64	1.315	12.677
ΔCSP_{t-2}	-47.96	79.64	1.310	13.194
BETA	-5.49	18.39	1.124	0.707
SIZE	16.851	28.504	21.569	1.801
ROA	-1.122	3.158	0.101	0.129
ΔROA_t	-1.113	1.181	-0.001	0.064
ΔROA_{t-1}	-1.113	1.181	0.000	0.066
ΔROA_{t-2}	-1.113	1.181	0.000	0.067
ROE	-3.958	10	0.228	0.566
ΔROE_t	-9.73	7.832	-0.001	0.567
ΔROE_{t-1}	-9.73	7.832	0.005	0.569
ΔROE_{t-2}	-9.73	7.832	0.003	0.576
SPP	-3.246	2.631	0.048	0.437
ΔSPP_t	-2.746	5.689	-0.013	0.624
ΔSPP_{t-1}	-2.746	5.689	-0.001	0.641
ΔSPP_{t-2}	-2.746	5.689	0.017	0.663
RD	-0.006	0.7	0.013	0.047
CUR	0.000	21.612	1.555	1.175
LEVER	0.000	0.990	0.243	0.198
GROWTH	-11.019	5.484	0.062	0.339
MBR	0.282	84.497	1.880	2.502
MANOW	0.000	70.148	0.467	1.979

Notes: Sample size is 3240 observations for 314 firms. *CSP* is the corporate social performance measure; *BETA* is the CAPM's historical beta coefficient over the period of five years; *SIZE* is the natural logarithm of deflated total assets; *ROA* is operating income divided by total assets; *ROE* is net income divided by common equity; *SPP* is share price performance measured as the natural logarithmic difference between share prices at time *t and t-1; RD* is research and development expenses divided by total sales (missing R&D data were replaced by zeroes); *CUR* is current assets divided by current liabilities; *LEVER* is total debt divided by total assets; *GROWTH* is percentage change in annual sales; *MBR* is the ratio of total assets plus market value of equity less book value of equity' to total assets; *MANOW* is the percentage of the number of shares held by insiders as executives and top-line managers in total shares outstanding. See Table A2 for further details of the variables' definitions. The notations ΔX_t, ΔX_{t-1} and ΔX_{t-2} for the variable X related to *CSP* or *CFP* are the first-differenced transformations, i.e., X_t-X_{t-1}. X_{t-1}-X_{t-2} and X_{t-2}-X_{t-3}, respectively.

Table 3

Pearson's pairwise correlation coefficient between the dependent and independent variables

	LNCSP	BETA	SIZE	ROA	ROE	SPP	RD	CUR	LEVER	GROWTH	MBR
BETA	-0.009										
SIZE	0.426*	0.050*									
ROA	-0.045	-0.057*	-0.281*								
ROE	0.032	-0.094*	-0.091*	0.431*							
SPP	-0.020	-0.104*	-0.073*	0.068*	0.096*						
RD	0.009	-0.050*	-0.106*	0.039	-0.007	0.034					
CUR	-0.132*	0.057*	-0.124*	0.013	-0.065*	-0.008	0.066*				
LEVER	0.055*	0.016	0.088*	-0.079*	0.016	-0.109*	-0.139*	-0.228*			
GROWTH	-0.047*	-0.040	-0.022	0.101*	0.046*	0.058*	0.020	0.042	-0.047*		
MBR	-0.094*	-0.058*	-0.230*	0.792*	0.376*	0.098*	0.096*	0.022	-0.089*	0.055*	
MANOW	-0.115*	0.055*	-0.041	0.043	0.010	-0.001	0.024	0.063*	0.002	0.038	0.025

Notes: Sample size is 3240 observations for 314 firms. *LNCSP* is the logarithmic transformation of *CSP* where *CSP* is our corporate social performance measure; *BETA* is the CAPM's historical beta coefficient over the period of five years; *SIZE* is the natural logarithm of deflated total assets; *ROA* is operating income divided by total assets; *ROE* is net income divided by common equity; *SPP* is share price performance measured as the natural logarithmic difference between share prices at time *t and t-1;RD* is research and development expenses divided by total sales (missing R&D data were replaced by zeroes); *CUR* is current assets divided by current liabilities; *LEVER* is total debt divided by total assets; *GROWTH* is percentage change in annual sales; *MBR* is the market-to-book ratio computed as total assets plus market value of equity less book value of equity, all scaled by total assets and market value and book value dates are matched. *MANOW* is the percentage of the number of shares held by insiders as executives and top-line managers in total shares outstanding. See Table A2 for further details of the variables' definitions. The asterisk * indicates if the correlation coefficient is significant at the 1% level (two-tailed, Pearson).

Table 4
The determining factors for corporate financial performance

	(1) ROA	(2) ROA	(3) ROA	(4) ROE	(5) ROE	(6) ROE	(7) SPP	(8) SPP	(9) SPP
LNCSP	0.023***	0.022**	0.943**	0.126***	0.132**	-0.588	-0.068	-0.008	3.487***
	(0.008)	(0.010)	(0.461)	(0.046)	(0.063)	(2.077)	(0.043)	(0.080)	(1.330)
LNCSP(-1)	-	- 0.029	-	-	0.026*	-	-	0.005	
		(0.028)			(0.015)			(0.083)	
LNCSP(-2)	-	0.022	-	-	0.030	-	-	-0.045	
		(0.018)			(0.063)			(0.062)	
$LNCSP^2$	-	-	-0.284*	-	-	0.187	-	-	-0.994**
			(0.173)			(0.633)			(0.469)
$LNCSP^3$	-	-	0.028*	-	-	-0.017	-	-	0.089**
			(0.016)			(0.063)			(0.041)
SIZE	-0.015**	-0.014**	-0.016***	-0.018	-0.019	0.011	0.031*	0.034*	0.042
	(0.006)	(0.006)	(0.006)	(0.020)	(0.021)	(0.030)	(0.018)	(0.020)	(0.021)
RD	-0.181***	-0.127*	-0.188**	-0.248*	0.205	-0.442	-0.422	-0.329	-0.292
	(0.069)	(0.074)	(0.077)	(0.139)	(0.359)	(0.359)	(0.289)	(0.269)	(0.263)
BETA	-0.009	-0.007	-0.008	-0.096***	-0.086***	-0.110***	0.008	0.038	0.002
	(0.007)	(0.006)	(0.006)	(0.031)	(0.031)	(0.043)	(0.029)	(0.040)	(0.032)
CUR	-0.006	-0.002	-0.006	-0.006	-0.016	0.006	-0.014	-0.032*	-0.047
	(0.007)	(0.006)	(0.007)	(0.013)	(0.015)	(0.018)	(0.015)	(0.019)	(0.017)
LEVER	0.008	0.024	0.001	0.171*	0.136	0.119	-0.655***	-0.614***	-0.574
	(0.032)	(0.034)	(0.031)	(0.101)	(0.188)	(0.201)	(0.119)	(0.131)	(0.116)
GROWTH	0.026*	0.029	0.027	0.039	0.030	0.032	0.035	0.058*	0.042
	(0.015)	(0.019)	(0.017)	(0.033)	(0.038)	(0.027)	(0.040)	(0.031)	(0.035)
MBR	0.043***	0.044***	0.043***	0.091***	0.093***	0.089***	0.008	0.006	0.009
	(0.001)	(0.001)	(0.001)	(0.004)	(0.003)	(0.005)	(0.006)	(0.004)	(0.006)
MANOW	0.303**	0.289**	0.287**	1.354***	1.120***	1.095**	0.696	0.602	0.530
	(0.131)	(0.129)	(0.129)	(0.480)	(0.421)	(0.483)	(0.646)	(0.529)	(0.500)
Industry A	0.076**	0.069**	0.081**	-0.085*	-0.134*	0.311**	0.292***	0.270**	0.077
	(0.032)	(0.030)	(0.033)	(0.050)	(0.084)	(0.152)	(0.106)	(0.135)	(0.083)
Industry B	0.060**	0.064**	0.064**	0.346**	0.432**	0.286*	0.407***	0.438***	0.247
	(0.026)	(0.033)	(0.028)	(0.178)	(0.221)	(0.173)	(0.146)	(0.160)	(0.135)
Industry C	-	-	-	-	-	-	0.366***	0.382***	0.164
							(0.111)	(0.132)	(0.082)
Constant	0.020	0.256*	-0.936	0.026	-0.308	0.439	0.179	-0.699*	-3.664
	(0.113)	(0.153)	(0.584)	(0.490)	(0.334)	(2.312)	(0.526)	(0.381)	(2.423)
Wald	10889.8***	10836.1***	11119.9***	1477.9***	2448.6***	2589.9***	739.8***	789.3***	663.8***
AR(1) (p-value)	-2.01(0.04)	-1.92(0.06)	-2.02(0.04)	-3.21(0.00)	-3.03(0.00)	-3.18(0.00)	-3.19(0.00)	-3.57(0.00)	-3.25(0.00)
AR(2) (p-value)	0.67(0.51)	0.85(0.39)	0.66(0.51)	0.69(0.49)	0.87(0.38)	0.61(0.56)	0.60(0.50)	0.85(0.41)	0.63(0.54)
Hansen (p-value)	280(0.66)	286(0.51)	283(0.59)	284(0.98)	287(0.96)	274(0.66)	279(0.95)	286(0.39)	291(0.44)
Difference-in-Hansen (p-value)	70(0.98)	81(0.97)	85(0.94)	72(0.96)	84(0.96)	61(0.98)	78(0.93)	67(0.98)	70(0.99)

Notes. The dependent variable is *CFP*, measured by *ROA, ROE* or *SPP*. $LNCSP^2$ and $LNCSP^3$ are the squared and cubed terms of *LNCSP* as corporate social performance measures, respectively; *LNCSP(-1)* and *LNCSP(-2)* are the lagged *LNCSP* for one and two periods, respectively. *ROA* is operating income divided by total assets; *ROE* is net income divided by common equity; *SPP* is the natural logarithmic difference between share prices at time t and t-1. *BETA* is the CAPM's historical beta coefficient over the period of five years; *SIZE* is the natural logarithm of deflated total assets; *ROA* is operating income divided by total assets; *ROE* is net income divided by common equity; *SPP* is share price performance measured as the natural logarithmic difference between share prices at time *t and t-1;RD* is research and development expenses divided by total sales (missing R&D data were replaced by zeroes); *CUR* is current assets divided by current liabilities; *LEVER* is total debt divided by total assets; *GROWTH* is percentage change in annual sales; *MBR* is the market-to-book ratio computed as total assets plus market value of equity less book value of equity, all scaled by total assets and market value and book value dates are matched. *MANOW* is the percentage of the number of shares held by insiders as executives and top-line managers in total shares outstanding. See Table A2 for further details of the variables' definitions. Standard errors robust to heteroscedasticity and finite sample bias are in parentheses below the coefficients. The Wald statistics test the joint significance of estimated coefficients, asymptotically distributed as $\chi2(df)$ under the null of no relationship. AR(1) and AR(2) are the first and second order autocorrelation of residuals, respectively, which are asymptotically distributed as N(0,1) under the null of no serial correlation. Hansen is the test of overidentifying restrictions, asymptotically distributed as $\chi2(df)$ under the null hypothesis, which states that the instruments employed are valid with the absence of the overidentification problem. Difference-in-Hansen is the test of exogeneity of instrument subsets under the null hypothesis which states that the differenced-instruments used in level equations are exogenous. Time and industry dummies are used for all estimates. Only consistently significant industry dummies are reported in models 1-3 (industry groups 4 and 6), in models 4-6 (industry groups 2 and 6), and in models 7-9 (industry groups 2, 6 and 10); see Table A1. (*), (**) and (***) indicate that coefficients are significant or the relevant null hypothesis is rejected at the 10%, 5% and 1% level, respectively. Stata 14 does not report R^2 for the system-GMM analyses. Sample size is 3240 observations for 314 firms.

Table 5
The determining factors for corporate social performance

	(1) ROA	(2) ROA	(3) ROA	(4) ROE	(5) ROE	(6) ROE	(7) SPP	(8) SPP	(9) SPP
LNCSP(-1)	0.594***	0.590***	0.596***	0.615***	0.652***	0.617***	0.666***	0.668***	0.674***
	(0.033)	(0.042)	(0.033)	(0.032)	(0.039)	(0.032)	(0.027)	(0.032)	(0.026)
CFP	0.162*	0.135*	0.047**	0.043**	0.050**	0.017**	0.009	0.034**	-0.032
	(0.095)	(0.079)	(0.023)	(0.017)	(0.024)	(0.008)	(0.024)	(0.015)	(0.034)
CFP^2	-	-	0.323*	-		0.008*	-		-0.039**
			(0.172)			(0.005)			(0.017)
CFP^3	-	-	-0.077**	-		-0.002**	-		-0.005
			(0.038)			(0.001)			(0.009)
CFP(-1)	-	-0.069	-	-	0.008*	-	-	0.020*	-
		(0.210)			(0.005)			(0.011)	
CFP(-2)	-	-0.083	-	-	0.017**	-	-	0.032**	-
		(0.104)			(0.008)			(0.016)	
SIZE	0.087***	0.065***	0.086***	0.070***	0.046***	0.066***	0.041***	0.036***	0.046***
	(0.013)	(0.012)	(0.013)	(0.011)	(0.010)	(0.012)	(0.009)	(0.009)	(0.009)
RD	-0.189	-0.444*	-0.145	-0.325*	-0.296	-0.440*	0.050	-0.070	-0.219
	(0.334)	(0.250)	(0.349)	(0.192)	(0.257)	(0.260)	(0.286)	(0.216)	(0.244)
BETA	0.028	-0.010	0.025	0.012	-0.009	0.021	0.008	-0.007	0.007
	(0.023)	(0.024)	(0.023)	(0.022)	(0.021)	(0.024)	(0.016)	(0.016)	(0.014)
CUR	0.010	-0.008	0.009	-0.008	-0.018**	-0.002	-0.010*	-0.011**	-0.015**
	(0.016)	(0.016)	(0.016)	(0.016)	(0.009)	(0.017)	(0.006)	(0.005)	(0.007)
LEVER	-0.137**	0.005	-0.148	-0.027	-0.014	-0.179*	0.046	0.088	0.004
	(0.065)	(0.112)	(0.111)	(0.108)	(0.087)	(0.110)	(0.090)	(0.092)	(0.087)
GROWTH	-0.025	-0.027	-0.025	-0.021	-0.023	-0.020	0.012	-0.014	0.014
	(0.027)	(0.035)	(0.027)	(0.027)	(0.030)	(0.030)	(0.021)	(0.025)	(0.025)
MBR	-0.006	-0.001	-0.013**	0.001	-0.004	-0.001	0.001	0.000	0.002
	(0.006)	(0.006)	(0.006)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)
MANOW	-0.317	0.036	-0.244	-0.229	-0.180	-0.157	-0.149	-0.108	-0.220
	(0.356)	(0.338)	(0.332)	(0.276)	(0.308)	(0.343)	(0.270)	(0.316)	(0.346)
Industry A	0.256***	0.166**	0.268***	0.234***	0.179***	0.281***	0.226*	0.150**	0.114***
	(0.071)	(0.068)	(0.074)	(0.061)	(0.048)	(0.056)	(0.141)	(0.070)	(0.044)
Industry B	0.322***	0.255**	0.335***	0.199**	0.204**	0.275***	-0.279***	-0.267***	-0.146**
	(0.102)	(0.119)	(0.106)	(0.083)	(0.101)	(0.090)	(0.067)	(0.065)	(0.067)
Industry C	0.234***	0.173*	0.236***	0.162**	0.175**	0.235***	-	-	-
	(0.087)	(0.092)	(0.091)	(0.071)	(0.076)	(0.061)			
Industry D	0.229***	0.152**	0.228***	-	-	-	-	-	-
	(0.073)	(0.075)	(0.072)						
Constant	-0.402	0.210	-0.374	-0.009	0.382**	0.013	0.482***	0.528***	0.358**
	(0.285)	(0.235)	(0.289)	(0.223)	(0.181)	(0.254)	(0.190)	(0.161)	(0.171)
Wald	908.7***	948.3***	991.9***	1063.2***	991.8***	1004.4***	1440.9***	1374.1***	1747.8***
AR(1) (p-value)	-8.47(0.00)	-8.24(0.00)	-8.45(0.00)	-8.51(0.00)	-8.49(0.00)	-8.55(0.00)	-8.71(0.00)	-8.75(0.00)	-8.72(0.00)
AR(2) (p-value)	1.36(0.17)	1.58(0.12)	1.16(0.25)	1.42(0.16)	1.58(0.12)	1.40(0.16)	1.56(0.12)	1.65(0.10)	1.53(0.13)
Hansen (p-value)	288(0.92)	278(0.94)	286(0.92)	287(0.93)	287(0.98)	288(0.99)	295(1.00)	286(0.99)	290(1.00)
Difference-in-Hansen (p-value)	79(0.98)	57(1.00)	76(0.99)	61(1.00)	75(0.99)	30(1.00)	27(1.00)	25(1.00)	26(1.00)

Notes. The dependent variable is *LNCSP* as a corporate social performance measure. *LNCSP(-1)* is the lagged *LNCSP* for one period. *CFP* is either *ROA* (models 1-3), *ROE* (models 4-6) or *SPP* (models 7-9). *CFP(-1)* and *CFP(-2)* are the lagged *CFP* for one and two periods, respectively; CFP^2 and CFP^3 are the squared and cubed terms of *CFP*, respectively. *ROA* is operating income divided by total assets; *ROE* is net income divided by common equity; *SPP* is share price performance measured as the natural logarithmic difference between share prices at time *t and t-1; BETA* is the CAPM's historical beta coefficient over the period of five years; *SIZE* is the natural logarithm of deflated total assets; *ROA* is operating income divided by total assets; *ROE* is net income divided by common equity; *RD* is research and development expenses divided by total sales (missing R&D data were replaced by zeroes); *CUR* is current assets divided by current liabilities; *LEVER* is total debt divided by total assets; *GROWTH* is percentage change in annual sales; *MBR* is the market-to-book ratio computed as total assets plus market value of equity less book value of equity, all scaled by total assets and market value and book value dates are matched. *MANOW* is the percentage of the number of shares held by insiders as executives and top-line managers in total shares outstanding. See Table A2 for further details of the variables' definitions. Standard errors robust to heteroscedasticity and finite sample bias are in parentheses below the coefficients. The Wald statistics test the joint significance of estimated coefficients, asymptotically distributed as $\chi2$(df) under the null of no relationship. AR(1) and AR(2) are the first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Hansen is the test of overidentifying restrictions, asymptotically distributed as $\chi2$(df) under the null hypothesis which states that the instruments employed are valid with the absence of the overidentification problem. Difference-in-Hansen is the test of exogeneity of instrument subsets under the null hypothesis, which states that the differenced-instruments used in level equations are exogenous. Time and industry dummies are used for all estimates. Only consistently significant industry dummies are reported in models 1-3 (industry groups 2, 6, 7 and 10), in models 4-6 (industry groups 2, 6 and 10), and in models 7-9 (industry groups 3 and 9); see Table A1. (*), (**) and (***) indicate that coefficients are significant or the relevant null hypothesis is rejected at the 10%, 5% and 1% level, respectively. Stata 14 does not report R^2 for the system-GMM analyses. Sample size is 3240 observations for 314 firms.

Table 6

The determining factors for corporate financial performance: year-on-year change effects

	(1) ΔROA	(2) ΔROA	(3) ΔROA	(4) ΔROA	(5) ΔROE	(6) ΔROE	(7) ΔROE	(8) ΔROE	(9) ΔSPP	(10) ΔSPP	(11) ΔSPP	(12) ΔSPP
ΔLNCSP	0.009	-	-	0.009	-0.028	-	-	-0.004	-0.168*	-	-	-0.012
	(0.023)			(0.026)	(0.102)			(0.127)	(0.088)			(0.113)
ΔLNCSP(-1)	-	-0.017	-	-0.006	-	0.050	-	-0.016	-	0.084	-	-0.070
		(0.014)		(0.005)		(0.098)		(0.048)		(0.105)		(0.052)
ΔLNCSP(-2)	-	-	0.026**	-0.004	-	-	-0.326	0.004	-	-	- 0.430***	-0.071*
			(0.012)	(0.007)			(0.301)	(0.059)			(0.150)	(0.041)
SIZE	-0.002	0.001	0.001	-0.001	0.011	0.002	-0.009	-0.005	0.006	0.002	-0.005	-0.017
	(0.003)	(0.002)	(0.003)	(0.003)	(0.025)	(0.019)	(0.021)	(0.016)	(0.017)	(0.015)	(0.016)	(0.012)
RD	-0.016	-0.045	-0.032	-0.007	-0.454	-0.273	-0.345	-0.368	-0.385	-0.041	-0.164	-0.159
	(0.040)	(0.034)	(0.038)	(0.038)	(0.544)	(0.443)	(0.729)	(0.543)	(0.354)	(0.280)	(0.331)	(0.296)
BETA	0.003	0.001	-0.002	-0.002	0.001	-0.004	0.001	0.002	0.159***	0.150***	0.161***	0.146***
	(0.004)	(0.003)	(0.003)	(0.003)	(0.025)	(0.028)	(0.021)	(0.027)	(0.032)	(0.033)	(0.031)	(0.029)
CUR	-0.001	-0.001	-0.004	-0.001	0.016	0.014	0.034	-0.003	-0.056**	-0.053**	-0.045**	- 0.073***
	(0.003)	(0.002)	(0.004)	(0.004)	(0.023)	(0.018)	(0.034)	(0.019)	(0.027)	(0.027)	(0.022)	(0.028)
LEVER	0.031*	0.032*	0.031	0.036*	0.349**	0.252*	0.345*	0.222*	-0.117	-0.030	0.217	0.206*
	(0.017)	(0.019)	(0.021)	(0.020)	(0.180)	(0.144)	(0.210)	(0.135)	(0.145)	(0.158)	(0.174)	(0.124)
GROWTH	0.035*	0.036*	0.038*	0.031*	0.019	0.008	-0.032	0.017	-0.130	-0.128	-0.081	-0.086
	(0.019)	(0.020)	(0.022)	(0.019)	(0.042)	(0.044)	(0.064)	(0.051)	(0.190)	(0.184)	(0.173)	(0.173)
MBR	0.008***	0.007***	0.007***	0.007***	0.019***	0.017***	0.019***	0.017***	-0.012	-0.010	-0.008	-0.009
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.004)	(0.001)	(0.009)	(0.008)	(0.008)	(0.007)
MANOW	-0.088	-0.038	-0.080	-0.088	-0.217	-0.291	-0.101	0.169	-0.137	-0.107	-0.123	-0.093
	(0.140)	(0.060)	(0.123)	(0.124)	(0.561)	(0.609)	(0.698)	(0.363)	(0.520)	(0.561)	(0.565)	(0.535)
Industry A	0.017**	0.043***	0.033**	0.016*	0.255**	0.218**	0.063**	0.168*	0.213*	0.204*	0.054**	0.005*
	(0.008)	(0.016)	(0.014)	(0.009)	(0.118)	(0.110)	(0.030)	(0.100)	(0.125)	(0.102)	(0.026)	(0.003)
Industry B	0.062**	0.046**	0.024*	0.026**	0.264*	0.181*	0.098*	0.114*	0.278**	0.179*	0.038*	0.065**
	(0.027)	(0.019)	(0.014)	(0.013)	(0.143)	(0.101)	(0.057)	(0.067)	(0.132)	(0.103)	(0.022)	(0.032)
Constant	0.002	-0.061	-0.014	-0.020	-0.444	-0.250	0.167	-0.064	0.055	0.752**	-0.034	1.233
	(0.068)	(0.048)	(0.081)	(0.058)	(0.588)	(0.442)	(0.490)	(0.384)	(0.428)	(0.371)	(0.134)	(0.287)
Wald	1322.2***	1338.3***	1167.8***	1814.9***	355.5***	644.8***	211.4***	714.4***	799.6***	811.4***	793.6***	684.8***
AR(1)	-2.38	-2.25	-2.13	-2.14	-3.31	-3.13	-3.07	-3.08	-8.30	-7.85	-7.32	-7.38
(p-value)	(0.02)	(0.02)	(0.03)	(0.03)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
AR(2)	1.31	1.26	1.23	1.19	-1.18	-1.13	-1.08	-1.13	1.57	1.41	1.48	1.58
(p-value)	(0.19)	(0.21)	(0.22)	(0.23)	(0.24)	(0.26)	(0.28)	(0.26)	(0.12)	(0.15)	(0.13)	(0.12)
Hansen	286	287	261	283	283	285	153	283	287	263	246	275
(p-value)	(0.49)	(0.98)	(0.14)	(0.73)	(0.54)	(0.32)	(0.60)	(0.52)	(0.34)	(0.57)	(0.24)	(0.64)
Difference-in-	86	13	91	69	103	111	89	117	81	54	59	70
Hansen (p-value)	(0.94)	(1.00)	(0.59)	(0.99)	(0.60)	(0.36)	(0.62)	(0.43)	(0.97)	(1.00)	(0.99)	(1.00)

Notes. The dependent variable is the annual change in *CFP*, measured by the first-differenced (i.e., Δ) transformations of *ROA*, *ROE* or *SPP*. Δ*LNCSP*, Δ*LNCSP(-1)* and Δ*LNCSP(-2)* are the first-differenced values of *LNCSP* as corporate social performance measures at time t, t-1 and t-2, respectively. *ROA* is operating income divided by total assets; *ROE* is net income divided by common equity; *SPP* is share price performance measured as the natural logarithmic difference between share prices at time *t and t-1; BETA* is the CAPM's historical beta coefficient over the period of five years; *SIZE* is the natural logarithm of deflated total assets; *ROA* is operating income divided by total assets; *ROE* is net income divided by common equity; *RD* is research and development expenses divided by total sales (missing R&D data were replaced by zeroes); *CUR* is current assets divided by current liabilities; *LEVER* is total debt divided by total assets; *GROWTH* is percentage change in annual sales; *MBR* is the market-to-book ratio computed as total assets plus market value of equity less book value of equity, all scaled by total assets and market value and book value dates are matched. *MANOW* is the percentage of the number of shares held by insiders as executives and top-line managers in total shares outstanding. See Table A2 for further details of the variables' definitions. Standard errors robust to heteroscedasticity and finite sample bias are in parentheses below the coefficients. The Wald statistics test the joint significance of estimated coefficients, asymptotically distributed as $\chi2$(df) under the null of no relationship. AR(1) and AR(2) are the first and second order autocorrelation of residuals, respectively, which are asymptotically distributed as N(0,1) under the null of no serial correlation. Hansen is the test of overidentifying restrictions, asymptotically distributed as $\chi2$(df) under the null hypothesis, which states that the instruments employed are valid with the absence of the overidentification problem. Difference-in-Hansen is the test of exogeneity of instrument subsets under the null hypothesis which states that the differenced-instruments used in level equations are exogenous. Time and industry dummies are used for all estimates. Only consistently significant industry dummies are reported in models 1-4 (industry groups 4 and 9), in models 5-8 (industry groups 7 and 9), and in models 9-12 (industry groups 2 and 7); see Table A1. (*), (**) and (***) indicate that coefficients are significant or the relevant null hypothesis is rejected at the 10%, 5% and 1% level, respectively. Stata 14 does not report R^2 for the system-GMM analyses. Sample size is 3240 observations for 314 firms.

Table 7

The determining factors for corporate social performance: year-on-year change effects

	(1) ΔROA	(2) ΔROA	(3) ΔROA	(4) ΔROA	(5) ΔROE	(6) ΔROE	(7) ΔROE	(8) ΔROE	(9) ΔSPP	(10) ΔSPP	(11) ΔSPP	(12) ΔSPP
ΔLNCSP(-1)	-0.192***	-0.183***	-0.214***	-0.200***	-0.189***	-0.179***	-0.192***	-0.210***	-0.196***	-0.210***	-0.185***	-0.205***
	(0.041)	(0.042)	(0.044)	(0.046)	(0.051)	(0.052)	(0.049)	(0.048)	(0.051)	(0.051)	(0.051)	(0.052)
ΔLNCFP	0.021	-	-	0.299**	-0.012	-	-	0.019	-0.005	-	-	-0.013
	(0.160)			(0.147)	(0.017)			(0.016)	(0.016)			(0.023)
ΔLNCFP(-1)	-	0.102	-	0.263**	-	-0.004	-	0.017	-	0.019*	-	-0.017
		(0.107)		(0.125)		(0.021)		(0.013)		(0.011)		(0.021)
ΔLNCFP(-2)	-	-	0.064	0.166*	-	-	0.024*	0.019**	-	-	0.001	-0.002
			(0.065)	(0.087)			(0.014)	(0.008)			(0.015)	(0.017)
SIZE	-0.014*	-0.011*	-0.016**	-0.014	-0.014	-0.014*	-0.013*	-0.015*	-0.015*	-0.023**	-0.020**	-0.018**
	(0.008)	(0.006)	(0.008)	(0.010)	(0.011)	(0.008)	(0.007)	(0.008)	(0.009)	(0.010)	(0.009)	(0.009)
RD	-0.176	-0.258	-0.313**	-0.150	-0.280	-0.232	-0.308*	-0.307*	-0.227	-0.443**	-0.351**	-0.347**
	(0.171)	(0.186)	(0.145)	(0.160)	(0.192)	(0.201)	(0.184)	(0.184)	(0.208)	(0.216)	(0.152)	(0.170)
BETA	0.009	0.012	0.008	0.019	-0.002	0.007	0.022	0.022	-0.012	-0.014	0.002	0.022
	(0.018)	(0.017)	(0.014)	(0.018)	(0.024)	(0.026)	(0.019)	(0.019)	(0.016)	(0.015)	(0.016)	(0.016)
CUR	-0.002	-0.002	-0.006	-0.013	-0.001	0.000	-0.024	-0.027*	0.004	0.008	-0.016	-0.023
	(0.013)	(0.012)	(0.012)	(0.014)	(0.015)	(0.018)	(0.015)	(0.016)	(0.015)	(0.020)	(0.015)	(0.019)
LEVER	-0.078	-0.100	-0.107	-0.200*	-0.052	-0.085	-0.118	-0.131	-0.038	-0.018	-0.091	-0.077
	(0.092)	(0.093)	(0.101)	(0.106)	(0.105)	(0.101)	(0.101)	(0.083)	(0.102)	(0.109)	(0.089)	(0.106)
GROWTH	0.048	0.060	0.055	0.031	0.059	0.057	0.041	0.039	0.066	0.067	0.049	0.042
	(0.038)	(0.038)	(0.039)	(0.036)	(0.042)	(0.046)	(0.043)	(0.039)	(0.048)	(0.050)	(0.046)	(0.042)
MBR	0.002	0.001	0.001	-0.005*	0.002**	0.001	0.002	0.001	0.001	0.001	0.002	0.002
	(0.002)	(0.002)	(0.001)	(0.003)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
MANOW	0.368	0.541*	0.258	0.251	0.297	0.234	0.088	0.164	0.073	0.188	0.072	0.206
	(0.296)	(0.313)	(0.174)	(0.198)	(0.424)	(0.372)	(0.192)	(0.252)	(0.236)	(0.304)	(0.196)	(0.277)
Industry A	-0.112**	-0.078*	-0.034*	-0.002**	0.082**	0.049*	0.094*	0.096**	0.048*	0.115**	0.108**	0.108**
	(0.056)	(0.045)	(0.020)	(0.001)	(0.040)	(0.027)	(0.050)	(0.047)	(0.028)	(0.058)	(0.044)	(0.046)
Industry B	0.028*	0.071*	0.009**	0.004**	0.101**	0.058*	0.062**	0.062*	0.103**	0.044**	0.030*	0.051*
	(0.016)	(0.041)	(0.004)	(0.002)	(0.048)	(0.034)	(0.030)	(0.037)	(0.059)	(0.022)	(0.018)	(0.030)
Industry C	-	-	-	-	-	-	-	-	0.026*	0.052*	0.054**	0.069*
									(0.015)	(0.031)	(0.027)	(0.040)
Constant	0.526***	0.494***	0.393	0.397*	0.504**	0.539**	0.336*	0.313	0.332	0.678***	0.466**	0.418**
	(0.205)	(0.180)	(0.297)	(0.216)	(0.257)	(0.265)	(0.185)	(0.199)	(0.212)	(0.245)	(0.198)	(0.207)
Wald	140.8***	152.9***	167.2***	186.7***	130.6***	121.9***	135.2***	140.1***	160.7***	163.1***	147.7***	122.5***
AR(1)	-6.51	-6.55	-5.69	-5.65	-5.89	-5.84	-5.58	-5.47	-5.88	-5.86	-5.53	-5.27
(p-value)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
AR(2)	-1.25	-1.07	-0.73	-0.57	-1.05	-0.93	-0.43	-0.64	-1.17	-1.39	-0.32	-0.57
(p-value)	(0.21)	(0.29)	(0.46)	(0.57)	(0.29)	(0.35)	(0.67)	(0.52)	(0.24)	(0.17)	(0.75)	(0.57)
Hansen	286	282	281	255	255	254	219	257	231	232	207	261
(p-value)	(0.93)	(0.96)	(0.79)	(0.29)	(0.15)	(0.14)	(0.37)	(0.26)	(0.40)	(0.33)	(0.46)	(0.19)
Difference-in-	80	66	78	121	122	122	105	126	115	125	112	129
Hansen (p-value)	(1.00)	(1.00)	(0.99)	(0.78)	(0.56)	(0.56)	(0.76)	(0.69)	(0.75)	(0.50)	(0.61)	(0.66)

Notes. The dependent variable is the annual change in *CSP*, measured by the first-differenced (i.e., Δ) transformation of *LNCSP* as a corporate social performance measure. Δ*LNCSP(-1)* is the first-differenced values of Δ*LNCSP* at time t-1. Δ*LNCFP*, Δ*LNCFP(-1)* and Δ*LNCFP(-2)* are the first-differenced values of *CFP* at time t, t-1 and t-2, respectively; *ROA* is operating income divided by total assets; *ROE* is net income divided by common equity; *SPP* is share price performance measured as the natural logarithmic difference between share prices at time t and t-1; *BETA* is the CAPM's historical beta coefficient over the period of five years; *SIZE* is the natural logarithm of deflated total assets; *RD* is research and development expenses divided by total sales (missing R&D data were replaced by zeroes); *CUR* is current assets divided by current liabilities; *LEVER* is total debt divided by total assets; *GROWTH* is percentage change in annual sales; *MBR* is the market-to-book ratio computed as total assets plus market value of equity for less book value of equity, all scaled by total assets and market value and book value dates are matched. *MANOW* is the percentage of the number of shares held by insiders as executives and top-line managers in total shares outstanding. See Table A2 for further details of the variables' definitions. Standard errors robust to heteroscedasticity and finite sample bias are in parentheses below the coefficients. The Wald statistics test the joint significance of estimated coefficients, asymptotically distributed as $\chi 2(df)$ under the null of no relationship. AR(1) and AR(2) are the first and second order autocorrelation of residuals, respectively, which are asymptotically distributed as N(0,1) under the null of no serial correlation. Hansen is the test of overidentifying restrictions, asymptotically distributed as $\chi 2(df)$ under the null hypothesis which states that the instruments employed are valid with the absence of the overidentification problem. Difference-in-Hansen is the test of exogeneity of instrument subsets under the null hypothesis, which states that the differenced-instruments used in level equations are exogenous. Time and industry dummies are used for all estimates. Only consistently significant industry dummies are reported in models 1-4 (industry groups 4 and 8), in models 5-8 (industry groups 2 and 7), and in models 9-12 (industry groups 2, 7 and 8); see Table A1. (*), (**) and (***) indicate that coefficients are significant or the relevant null hypothesis is rejected at the 10%, 5% and 1% level, respectively. Stata 14 does not report R^2 for the system-GMM analyses. Sample size is 3240 observations for 314 firms.

Table 8

The determining factors for corporate financial and social performance: financial vs. non-financial firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	ROA	ROA	ROA	ROE	ROE	ROE	SPP	SPP	SPP
Panel A: The effect of CSP on CFP: financial firms									
LNCSP	0.017*	0.004	-0.101	0.017	-0.020	-0.773	-0.065	-0.084	-3.664
	(0.010)	(0.014)	(0.246)	(0.052)	(0.074)	(0.976)	(0.105)	(0.089)	(3.936)
LNCSP(-1)	-	0.001	-	-	0.019	-	-	0.031	-
		(0.012)			(0.096)			(0.115)	
LNCSP(-2)	-	0.008	-	-	-0.006	-	-	-0.034	-
		(0.011)			(0.060)			(0.108)	
$LNCSP^2$	-	-	0.031	-	-	0.378	-	-	1.322
			(0.081)			(0.340)			(1.291)
$LNCSP^3$	-	-	-0.003	-	-	-0.050	-	-	-0.148
			(0.009)			(0.039)			(0.134)
Panel B: The effect of CSP on CFP: non-financial firms									
LNCSP	0.004	-0.009	1.426**	0.083**	0.030	-3.811	-0.007	0.074	-5.481**
	(0.012)	(0.018)	(0.701)	(0.041)	(4.323)	(3.120)	(0.042)	(0.072)	(2.623)
LNCSP(-1)	-	-0.026	-	-	0.063	-	-	-0.020	-
		(0.027)			(5.933)			(0.078)	
LNCSP(-2)	-	0.026	-	-	0.022	-	-	0.007	-
		(0.021)			(2.462)			(0.060)	
$LNCSP^2$	-	-	-0.443*	-	-	1.025	-	-	1.601**
			(0.242)			(0.909)			(0.803)
$LNCSP^3$	-	-	0.045**	-	-	-0.087	-	-	-0.152*
			(0.022)			(0.087)			(0.083)
Panel C: The effect of CFP on CSP: financial firms									
LNCSP(-1)	0.799***	0.803***	0.790***	0.791***	0.781***	0.763***	0.756***	0.812***	0.767***
	(0.066)	(0.055)	(0.068)	(0.064)	(0.063)	(0.064)	(0.046)	(0.057)	(0.053)
CFP	0.076	0.246	0.862*	0.025	0.023	-0.140	-0.068	0.002	-0.073
	(0.602)	(0.388)	(0.502)	(0.151)	(0.148)	(0.170)	(0.075)	(0.068)	(0.110)
CFP^2	-	-	1.899	-	-	-0.113	-	-	-0.062
			(2.041)			(0.255)			(0.139)
CFP^3	-	-	-4.343	-	-	0.001	-	-	-0.020
			(4.292)			(0.104)			(0.094)
CFP(-1)	-	0.404**	-	-	0.124	-	-	0.051	-
		(0.162)			(0.138)			(0.069)	
CFP(-2)	-	-0.143	-	-	0.035	-	-	0.112**	-
		(0.242)			(0.074)			(0.047)	
Panel D: The effect of CFP on CSP: non-financial firms									
LNCSP(-1)	0.544***	0.505***	0.596***	0.569***	0.552***	0.555***	0.605***	0.511***	0.567***
	(0.043)	(0.055)	(0.034)	(0.036)	(0.045)	(0.042)	(0.031)	(0.054)	(0.035)
CFP	0.092*	0.229**	0.175**	0.042***	0.040**	0.074	-0.008	0.019	-0.010
	(0.052)	(0.103)	(0.087)	(0.016)	(0.019)	(0.076)	(0.026)	(0.035)	(0.041)
CFP^2	-	-	0.220*	-	-	0.009	-	-	-0.051*
			(0.126)			(0.027)			(0.027)
CFP^3	-	-	-0.038*	-	-	-0.002	-	-	-0.012
			(0.022)			(0.002)			(0.014)
CFP(-1)	-	-0.240	-	-	-0.007	-	-	0.017	-
		(0.195)			(0.018)			(0.029)	
CFP(-2)	-	-0.096	-	-	0.015*	-	-	0.020*	-
		(0.122)			(0.008)			(0.011)	

Notes. The dependent variable is *CFP* in panels A and B, measured by *ROA, ROE* or *SPP*. The dependent variable is *LNCSP* as a corporate social performance measure in panels C and D. *CFP* is either *ROA* (models 1-3), *ROE* (models 4-6) or *SPP* (models 7-9). *CFP(-1)* and *CFP(-2)* are the lagged *CFP* for one and two periods, respectively; *LNCSP(-1)* and *LNCSP(-2)* are the lagged *LNCSP* for one and two periods, respectively; $LNCSP^2$ and $LNCSP^3$ are squared and cubed terms of *LNCSP*, respectively; CFP^2 and CFP^3 are squared and cubed terms of *CFP*, respectively. *ROA* is operating income divided by total assets; *ROE* is net income divided by common equity; *SPP* is share price performance measured as the natural logarithmic difference between share prices at time t and t-1. See Table A2 for further details of the variables' definitions. Time dummies are included in all models. We include the other explanatory variables (i.e., *SIZE, RD, BETA, CUR, LEVER, GROWTH, MBR* and *MANOW*) as defined in the notes to Table 1 and a constant term in all models but they are not reported for space concerns. (*), (**) and (***) indicate that coefficients are significant or the relevant null hypothesis is rejected at the 10%, 5% and 1% level, respectively. The Wald statistics (not reported) are consistently significant at the 1% level in all models. The unreported diagnostics statistics (i.e., AR(1), AR(2), Hansen, Difference-in-Hansen) confirm the validity and consistency of the system-GMM results. All unreported figures are available on request. Standard errors robust to heteroscedasticity and finite sample bias are in parentheses below the coefficients. Financial firms are in industry groups 8 and 9; non-financial firms are in industry groups 1 to 7, and 10; see Table A1. Sample size is 703 (2537) observations for financial (non-financial) firms.

Table 9

The determining factors for corporate financial and social performance: the level of CSR engagement

	(1) ROA	**(2)** ROA	**(3)** ROA	**(4)** ROE	**(5)** ROE	**(6)** ROE	**(7)** SPP	**(8)** SPP	**(9)** SPP
Panel A: The effect of CSP on CFP: industries with low CSR engagement									
LNCSP	0.019*	0.026**	0.183	0.068**	0.105**	1.180	0.038	0.032	2.533*
	(0.011)	(0.012)	(0.284)	(0.033)	(0.050)	(1.746)	(0.071)	(0.088)	(1.472)
LNCSP(-1)	-	-0.025	-	-	-0.109	-	-	0.022	-
		(0.029)			(0.077)			(0.103)	
LNCSP(-2)	-	0.017	-	-	-0.021	-	-	-0.069	-
		(0.022)			(0.078)			(0.078)	
LNCSP^2	-	-	-0.058	-	-	-0.331	-	-	-0.869*
			(0.093)			(0.576)			(0.515)
LNCSP^3	-	-	0.006	-	-	0.031	-	-	0.093**
			(0.010)			(0.061)			(0.046)
Panel B: The effect of CSP on CFP: industries with medium CSR engagement									
LNCSP	0.003	0.020*	0.663**	0.056	0.025	-2.615	0.015	0.125***	-7.571***
	(0.011)	(0.011)	(0.303)	(0.054)	(0.060)	(3.600)	(0.041)	(0.076)	(2.860)
LNCSP(-1)	-	-0.008	-	-	0.005	-	-	-0.053	-
		(0.013)			(0.070)			(0.086)	
LNCSP(-2)	-	-0.002	-	-	0.094*	-	-	-0.001	-
		(0.014)			(0.055)			(0.089)	
LNCSP^2	-	-	-0.210*	-	-	0.615	-	-	2.302***
			(0.125)			(1.064)			(0.849)
LNCSP^3	-	-	0.021*	-	-	-0.044	-	-	-0.225***
			(0.012)			(0.102)			(0.082)
Panel C: The effect of CSP on CFP: industries with high CSR engagement									
LNCSP	0.013	0.001	-1.249	0.043	0.085	0.025	0.022	0.269*	-26.838**
	(0.018)	(0.022)	(1.931)	0.091	(0.102)	(1.984)	(0.120)	(0.132)	(12.039)
LNCSP(-1)	-	0.006	-	-	-0.039	-	-	-0.074	-
		(0.012)			(0.058)			(0.126)	
LNCSP(-2)	-	0.000	-	-	-0.004	-	-	-0.046	-
		(0.017)			(0.055)			(0.104)	
LNCSP^2	-	-	0.340	-	-	-0.030	-	-	7.379*
			(0.519)			(0.595)			(4.386)
LNCSP^3	-	-	-0.030	-	-	0.005	-	-	-0.671*
			(0.046)			(0.064)			(0.397)
Panel D: The effect of CFP on CSP: industries with low CSR engagement									
LNCSP(-1)	0.762***	0.789***	0.739***	0.747***	0.801***	0.769***	0.770***	0.791***	0.726***
	(0.042)	(0.035)	(0.048)	(0.057)	(0.042)	(0.053)	(0.053)	(0.047)	(0.060)
CFP	0.394**	0.255*	0.595**	0.044**	0.031*	0.095	0.003	0.030	0.072*
	(0.190)	(0.149)	(0.301)	(0.021)	(0.018)	(0.077)	(0.045)	(0.047)	(0.042)
CFP^2	-	-	-0.439*	-	-	-0.009	-	-	-0.080*
			(0.256)			(0.029)			(0.047)
CFP^3	-	-	0.105*	-	-	0.001	-	-	-0.070**
			(0.061)			(0.002)			(0.032)
CFP(-1)	-	0.078	-	-	0.017	-	-	0.027	-
		(0.333)			(0.022)			(0.036)	
CFP(-2)	-	0.038	-	-	0.020	-	-	0.057*	-
		(0.116)			(0.030)			(0.034)	
Panel E: The effect of CFP on CSP: industries with medium CSR engagement									
LNCSP(-1)	0.624*	0.596***	0.574***	0.598***	0.602***	0.593***	0.623***	0.520***	0.641***
	(0.358)	(0.044)	(0.051)	(0.052)	(0.044)	(0.055)	(0.101)	(0.061)	(0.038)
CFP	-0.036	0.113	0.072	0.045**	0.010	0.105*	0.017	0.017	-0.027
	(2.796)	(0.195)	(0.469)	(0.023)	(0.022)	(0.063)	(0.092)	(0.052)	(0.047)
CFP^2	-	-	0.419	-	-	-0.003	-	-	-0.026
			(0.749)			(0.032)			(0.026)
CFP^3	-	-	-0.137	-	-	-0.001	-	-	0.012
			(1.265)			(0.004)			(0.013)
CFP(-1)	-	0.035	-	-	0.008	-	-	0.009	-
		(0.221)			(0.028)			(0.029)	

Table 9 (continued)

Panel F: The effect of CFP on CSP: industries with high CSR engagement

LNCSP(-1)	0.555***	0.624***	0.501***	0.656***	0.581***	0.557***	0.585***	0.584***	0.422***
	(0.091)	(0.099)	(0.092)	(0.088)	(0.095)	(0.120)	(0.085)	(0.082)	(0.092)
CFP	0.546*	0.263	1.362	0.030**	0.040	-0.021	-0.005	0.034	0.014*
	(0.316)	(0.870)	(1.806)	(0.014)	(0.114)	(0.189)	(0.040)	(0.040)	(0.008)
CFP^2	-	-	0.414	-	-	0.016	-	-	-0.105***
			(11.676)			(0.180)			(0.040)
CFP^3	-	-	-7.422	-	-	0.001	-	-	-0.032**
			(20.945)			(0.040)			(0.014)
CFP(-1)	-	-0.514	-	-	-0.008	-	-	0.039**	-
		(0.870)			(0.034)			(0.016)	
CFP(-2)	-	0.175	-	-	0.031	-	-	-0.027	-
		(0.581)			(0.051)			(0.043)	

Notes. The dependent variable is *CFP* in panels A, B and C, measured by *ROA*, *ROE* or *SPP*. The dependent variable is *LNCSP* as a corporate social performance measure in panels D, E and F. *CFP* is either *ROA* (models 1-3), *ROE* (models 4-6) or *SPP* (models 7-9). *CFP(-1)* and *CFP(-2)* are the lagged CFP for one and two periods, respectively; *LNCSP(-1)* and *LNCSP(-2)* are the lagged *LNCSP* for one and two periods, respectively; $LNCSP^2$ and $LNCSP^3$ are squared and cubed terms of *LNCSP*, respectively; CFP^2 and CFP^3 are squared and cubed terms of *CFP*, respectively. *ROA* is operating income divided by total assets; *ROE* is net income divided by common equity; *SPP* is share price performance measured as the natural logarithmic difference between share prices at time *t and t-1;*. See Table A2 for further details of the variables' definitions. Time dummies are included in all models. We include the other explanatory variables (*SIZE, RD, BETA, CUR, LEVER, GROWTH, MBR* and *MANOW*) and a constant term in all models but they are not reported for space concerns. (*), (**) and (***) indicate that coefficients are significant or the relevant null hypothesis is rejected at the 10%, 5% and 1% level, respectively. The Wald statistics (not reported) are consistently significant at the 1% level in all models. The unreported diagnostics statistics (i.e., AR(1), AR(2), Hansen, Difference-in-Hansen) confirm the validity and consistency of the system-GMM results. All unreported figures are available on request. Standard errors robust to heteroscedasticity and finite sample bias are in parentheses below the coefficients. Industries with low CSR engagement are groups 7, 8 and 9 (1033 observations); industries with medium CSR engagement are groups 1, 5, 6 and 10 (1481 observations); industries with high CSR engagement are groups 2, 3 and 4 (726 observations). See Table A1 for the detailed industry classification.

Table 10

The determining factors for corporate financial and social performance: the relevance of the financial crisis

	(1) ROA	(2) ROA	(3) ROA	(4) ROE	(5) ROE	(6) ROE	(7) SPP	(8) SPP	(9) SPP
Panel A: The effect of CSP on CFP: pre-crisis period									
LNCSP	0.009	0.014	0.743	-0.121*	-0.116	-4.415**	-0.012	-0.044	-1.374
	(0.011)	(0.017)	(0.674)	(0.064)	(0.093)	(2.147)	(0.064)	(0.126)	(3.881)
LNCSP(-1)	-	-0.012	-	-	0.099	-	-	0.182	-
		(0.012)			(0.100)			(0.129)	
LNCSP(-2)	-	0.002	-	-	-0.070	-	-	-0.012	-
		(0.010)			(0.080)			(0.093)	
$LNCSP^2$	-	-	-0.230	-	-	1.421**	-	-	0.478
			(0.199)			(0.683)			(1.157)
$LNCSP^3$	-	-	0.023	-	-	-0.149**	-	-	-0.052
			(0.019)			(0.074)			(0.112)
Panel B: The effect of CSP on CFP: post-crisis period									
LNCSP	0.027*	0.034*	2.299**	0.178**	0.154**	2.299	-0.112	0.099	3.569
	(0.015)	(0.018)	(1.107)	(0.089)	(0.076)	(1.592)	(0.087)	(0.112)	(4.082)
LNCSP(-1)	-	-0.046	-	-	-0.081	-	-	-0.106	-
		(0.047)			(0.106)			(0.137)	
LNCSP(-2)	-	0.021	-	-	0.057	-	-	-0.035	-
		(0.032)			(0.100)			(0.093)	
$LNCSP^2$	-	-	-0.669*	-	-	-0.669	-	-	-1.115
			(0.393)			(0.466)			(1.220)
$LNCSP^3$	-	-	0.063**	-	-	0.063	-	-	0.109
			(0.031)			(0.044)			(0.119)
Panel C: The effect of CFP on CSP: pre-crisis period									
LNCSP(-1)	0.539***	0.537***	0.536***	0.524***	0.501***	0.518***	0.544***	0.527***	0.562***
	(0.048)	(0.069)	(0.048)	(0.053)	(0.076)	(0.052)	(0.059)	(0.063)	(0.056)
CFP	-0.036	-0.125	-0.347	-0.096	-0.106	-0.168*	-0.098	-0.084	-0.104
	(0.315)	(0.563)	(0.834)	(0.063)	(0.069)	(0.101)	(0.078)	(0.090)	(0.104)
CFP^2	-	-	2.055	-	-	0.031	-	-	0.008
			(3.409)			(0.059)			(0.115)
CFP^3	-	-	-2.602	-	-	-0.002	-	-	-0.006
			(3.211)			(0.008)			(0.065)
CFP(-1)	-	0.629	-	-	0.074	-	-	0.072	-
		(0.863)			(0.099)			(0.072)	
CFP(-2)	-	-0.112	-	-	0.088*	-	-	-0.016	-
		(0.539)			(0.048)			(0.074)	
Panel D: The effect of CFP on CSP: post-crisis period									
LNCSP(-1)	0.576***	0.613***	0.584***	0.580***	0.589***	0.573***	0.595***	0.598***	0.591***
	(0.043)	(0.041)	(0.045)	(0.041)	(0.046)	(0.042)	(0.044)	(0.043)	(0.044)
CFP	0.229*	0.247*	0.236	0.035**	0.054*	-0.022*	-0.002	0.027	-0.012
	(0.134)	(0.145)	(0.243)	(0.015)	(0.031)	(0.012)	(0.003)	(0.037)	(0.045)
CFP^2	-	-	0.266	-	-	0.041*	-	-	-0.031
			(0.298)			(0.024)			(0.031)
CFP^3	-	-	-0.074	-	-	-0.004**	-	-	-0.009
			(0.096)			(0.002)			(0.016)
CFP(-1)	-	-0.099	-	-	-0.017	-	-	0.020	-
		(0.207)			(0.017)			(0.023)	
CFP(-2)	-	-0.096	-	-	0.011	-	-	0.031**	-
		(0.086)			(0.014)			(0.015)	

Notes. The dependent variable is *CFP* in panels A and B, measured by *ROA, ROE* or *SPP*. The dependent variable is *LNCSP* as a corporate social performance measure in panels C and D. *CFP* is either *ROA* (models 1-3), *ROE* (models 4-6) or *SPP* (models 7-9). *CFP(-1)* and *CFP(-2)* are the lagged *CFP* for one and two periods, respectively; *LNCSP(-1)* and *LNCSP(-2)* are the lagged *LNCSP* for one and two periods, respectively; $LNCSP^2$ and $LNCSP^3$ are squared and cubed terms of *LNCSP*, respectively; CFP^2 and CFP^3 are squared and cubed terms of *CFP*, respectively. *ROA* is operating income divided by total assets; *ROE* is net income divided by common equity; *SPP* is share price performance measured as the natural logarithmic difference between share prices at time t and t-1. See Table A2 for further details of the variables' definitions. Time and industry dummies are included in all models. We include the other explanatory variables (i.e., *SIZE, RD, BETA, CUR, LEVER, GROWTH, MBR* and *MANOW*) as defined in the notes to Table 1 and a constant term in all models but they are not reported for space concerns. (*), (**) and (***) indicate that coefficients are significant or the relevant null hypothesis is rejected at the 10%, 5% and 1% level, respectively. The Wald statistics (not reported) are consistently significant at the 1% level in all models. The unreported diagnostics statistics (i.e., AR(1), AR(2), Hansen, Difference-in-Hansen) confirm the validity and consistency of the system-GMM results. All unreported figures are available on request. Standard errors robust to heteroscedasticity and finite sample bias are in parentheses below the coefficients. The pre-(post-)crisis period is between 2002-2008 (2009-2015). Sample size is 1338 (1902) observations for the pre-(post-)crisis period.

Table 11

The determining factors for corporate financial and social performance: the financial crisis and financial firms

	(1) ROA	(2) ROA	(3) ROA	(4) ROE	(5) ROE	(6) ROE	(7) SPP	(8) SPP	(9) SPP
Panel A: The effect of CSP on CFP: pre-crisis period and financial firms									
LNCSP	0.014**	0.012	-0.195	0.002	-0.009	-2.087	-0.089	-0.132	-0.195
	(0.006)	(0.011)	(0.319)	(0.027)	(0.079)	(1.943)	(0.066)	(0.129)	(0.319)
LNCSP(-1)	-	-0.008	-	-	0.025	-	-	0.185	-
		(0.015)			(0.072)			(0.207)	
LNCSP(-2)	-	0.010	-	-	-0.028	-	-	-0.105	-
		(0.011)			(0.067)			(0.116)	
LNCSP^2	-	-	0.050	-	-	0.761	-	-	0.050
			(0.094)			(0.656)			(0.094)
LNCSP^3	-	-	-0.003	-	-	-0.086	-	-	-0.003
			(0.008)			(0.070)			(0.008)
Panel B: The effect of CSP on CFP: post-crisis period and financial firms									
LNCSP	0.019*	0.010	0.194	0.004	-0.025	2.012	0.008	-0.027	-1.079
	(0.011)	(0.021)	(0.543)	(0.049)	(0.094)	(2.222)	(0.079)	(0.117)	(3.223)
LNCSP(-1)	-	0.013	-	-	0.017	-	-	-0.033	-
		(0.016)			(0.101)			(0.112)	
LNCSP(-2)	-	-0.012	-	-	-0.006	-	-	0.042	-
		(0.015)			(0.084)			(0.129)	
LNCSP^2	-	-	-0.063	-	-	-0.547	-	-	0.302
			(0.171)			(0.685)			(1.031)
LNCSP^3	-	-	0.007	-	-	0.046	-	-	-0.026
			(0.017)			(0.068)			(0.105)
Panel C: The effect of CFP on CSP: pre-crisis period and financial firms									
LNCSP(-1)	0.825***	0.844***	0.854***	0.837***	0.853***	0.856***	0.821***	0.908***	0.829***
	(0.081)	(0.071)	(0.081)	(0.076)	(0.065)	(0.087)	(0.069)	(0.067)	(0.079)
CFP	-0.136	1.399	1.541	0.072	0.119	0.071	0.009	0.017	-0.148
	(1.026)	(1.850)	(2.340)	(0.218)	(0.190)	(0.295)	(0.105)	(0.081)	(0.168)
CFP^2	-	-	-9.495	-	-	0.385	-	-	0.050
			(13.766)			(0.606)			(0.171)
CFP^3	-	-	5.423	-	-	0.098	-	-	0.124
			(15.268)			(0.239)			(0.106)
CFP(-1)	-	-0.087	-	-	0.115	-	-	0.025	-
		(0.773)			(0.095)			(0.142)	
CFP(-2)	-	1.386	-	-	0.131	-	-	0.160*	-
		(1.518)			(0.189)			(0.094)	
Panel D: The effect of CFP on CSP: post-crisis period and financial firms									
LNCSP(-1)	0.756***	0.778***	0.813***	0.788***	0.729***	0.764***	0.781***	0.817***	0.763***
	(0.048)	(0.057)	(0.047)	(0.038)	(0.044)	(0.056)	(0.057)	(0.043)	(0.087)
CFP	0.498*	0.297	0.564	0.024	0.018	0.108	0.020	0.062*	0.058
	(0.292)	(0.431)	(0.753)	(0.084)	(0.101)	(0.124)	(0.056)	(0.036)	(0.141)
CFP^2	-	-	0.069	-	-	-0.258	-	-	-0.008
			(1.560)			(0.239)			(0.136)
CFP^3	-	-	-0.486	-	-	-0.439*	-	-	-0.031
			(3.645)			(0.257)			(0.107)
CFP(-1)	-	0.683**	-	-	0.270***	-	-	0.044	-
		(0.322)			(0.085)			(0.050)	
CFP(-2)	-	0.297*	-	-	-0.035	-	-	0.118***	-
		(0.174)			(0.083)			(0.035)	

Notes. The dependent variable is *CFP* in panels A and B, measured by *ROA*, *ROE* or *SPP*. The dependent variable is *LNCSP* as a corporate social performance measure in panels C and D. *CFP* is either *ROA* (models 1-3), *ROE* (models 4-6) or *SPP* (models 7-9). *CFP(-1)* and *CFP(-2)* are the lagged *CFP* for one and two periods, respectively; *LNCSP(-1)* and *LNCSP(-2)* are the lagged *LNCSP* for one and two periods, respectively; $LNCSP^2$ and $LNCSP^3$ are squared and cubed terms of *LNCSP*, respectively; CFP^2 and CFP^3 are squared and cubed terms of *CFP*, respectively. *ROA* is operating income divided by total assets; *ROE* is net income divided by common equity; *SPP* is share price performance measured as the natural logarithmic difference between share prices at time t and t-1. See Table A2 for further details of the variables' definitions. Time and industry dummies are included in all models. We include the other explanatory variables (i.e., *SIZE, RD, BETA, CUR, LEVER, GROWTH, MBR* and *MANOW*) as defined in the notes to Table 1 and a constant term in all models but they are not reported for space concerns. (*), (**) and (***) indicate that coefficients are significant or the relevant null hypothesis is rejected at the 10%, 5% and 1% level, respectively. The Wald statistics (not reported) are consistently significant at the 1% level in all models. The unreported diagnostics statistics (i.e., AR(1), AR(2), Hansen, Difference-in-Hansen) confirm the validity and consistency of the system-GMM results. All unreported figures are available on request. Standard errors robust to heteroscedasticity and finite sample bias are in parentheses below the coefficients. The pre-(post-)crisis period is between 2002-2008 (2009-2015). Financial firms are in industry groups 8 and 9; see Table A1.

Table 12

The determining factors for corporate financial and social performance: the financial crisis and non-financial firms

	(1) ROA	(2) ROA	(3) ROA	(4) ROE	(5) ROE	(6) ROE	(7) SPP	(8) SPP	(9) SPP
Panel A: The effect of CSP on CFP: pre-crisis period and non-financial firms									
LNCSP	0.007	0.002	1.402**	-0.126	-0.033	-4.351	-0.043	-0.136	-10.393**
	(0.013)	(0.018)	(0.695)	(0.101)	(0.122)	(4.034)	(0.071)	(0.109)	(5.078)
LNCSP(-1)	-	-0.011	-	-	0.172*	-	-	0.131	-
		(0.010)			(0.101)			(0.104)	
LNCSP(-2)	-	0.007	-	-	-0.092	-	-	0.057	-
		(0.013)			(0.097)			(0.083)	
LNCSP^2	-	-	-0.412*	-	-	1.422	-	-	3.082*
			(0.239)			(1.237)			(1.681)
LNCSP^3	-	-	0.039**	-	-	-0.151	-	-	-0.297**
			(0.019)			(0.123)			(0.143)
Panel B: The effect of CSP on CFP: post-crisis period and non-financial firms									
LNCSP	0.004	-0.011	3.211**	0.020**	0.144	1.310	-0.084	-0.007	-4.124
	(0.016)	(0.025)	(1.547)	(0.008)	(0.153)	(5.600)	(0.082)	(0.135)	(6.049)
LNCSP(-1)	-	-0.045	-	-	-0.108	-	-	-0.117	-
		(0.047)			(0.128)			(0.149)	
LNCSP(-2)	-	0.031	-	-	0.075	-	-	0.084	-
		(0.029)			(0.109)			(0.096)	
LNCSP^2	-	-	-0.989*	-	-	-0.498	-	-	1.000
			(0.552)			(1.656)			(1.744)
LNCSP^3	-	-	0.098**	-	-	0.062	-	-	-0.079
			(0.043)			(0.158)			(0.165)
Panel C: The effect of CFP on CSP: pre-crisis period and non-financial firms									
LNCSP(-1)	0.503***	0.453***	0.500***	0.516***	0.463***	0.501***	0.522***	0.469***	0.523***
	(0.049)	(0.078)	(0.051)	(0.052)	(0.070)	(0.051)	(0.045)	(0.072)	(0.046)
CFP	-0.074	0.006	0.074	-0.020	0.020	0.074	-0.083	-0.059	-0.202**
	(0.376)	(0.470)	(0.577)	(0.046)	(0.048)	(0.577)	(0.061)	(0.081)	(0.097)
CFP^2	-	-	-0.118	-	-	-0.118	-	-	-0.117
			(2.720)			(2.720)			(0.137)
CFP^3	-	-	-0.480	-	-	-0.480	-	-	-0.017
			(2.834)			(2.835)			(0.053)
CFP(-1)	-	0.170	-	-	-0.012	-	-	0.115*	-
		(0.817)			(0.082)			(0.067)	
CFP(-2)	-	-0.168	-	-	0.005	-	-	-0.069	-
		(0.595)			(0.040)			(0.085)	
Panel D: The effect of CFP on CSP: post-crisis period and non-financial firms									
LNCSP(-1)	0.559***	0.604***	0.560***	0.569***	0.596***	0.564***	0.581***	0.618***	0.574***
	(0.048)	(0.044)	(0.049)	(0.050)	(0.046)	(0.050)	(0.049)	(0.043)	(0.049)
CFP	0.070*	0.072*	-0.060	0.046**	0.050*	0.017	-0.026	0.020	-0.008
	(0.041)	(0.040)	(0.204)	(0.021)	(0.029)	(0.073)	(0.032)	(0.035)	(0.043)
CFP^2	-	-	0.232	-	-	0.025	-	-	-0.030
			(0.188)			(0.026)			(0.028)
CFP^3	-	-	-0.039	-	-	-0.003	-	-	-0.010
			(0.053)			(0.002)			(0.012)
CFP(-1)	-	-0.029	-	-	-0.027	-	-	0.001	-
		(0.240)			(0.017)			(0.024)	
CFP(-2)	-	-0.076	-	-	0.016	-	-	0.020	-
		(0.110)			(0.012)			(0.016)	

Notes. The dependent variable is *CFP* in panels A and B, measured by *ROA*, *ROE* or *SPP*. The dependent variable is *LNCSP* as a corporate social performance measure in panels C and D. *CFP* is either *ROA* (models 1-3), *ROE* (models 4-6) or *SPP* (models 7-9). *CFP(-1)* and *CFP(-2)* are the lagged *CFP* for one and two periods, respectively; *LNCSP(-1)* and *LNCSP(-2)* are the lagged *LNCSP* for one and two periods, respectively; *LNCSP*^{2} and *LNCSP*^{3} are squared and cubed terms of *LNCSP*, respectively; *CFP*^{2} and *CFP*^{3} are squared and cubed terms of *CFP*, respectively. *ROA* is operating income divided by total assets; *ROE* is net income divided by common equity; *SPP* is share price performance measured as the natural logarithmic difference between share prices at time t and t-1. See Table A2 for further details of the variables' definitions. Time and industry dummies are included in all models. We include the other explanatory variables (i.e., *SIZE, RD, BETA, CUR, LEVER, GROWTH, MBR* and *MANOW*) as defined in the notes to Table 1 and a constant term in all models but they are not reported for space concerns. (*), (**) and (***) indicate that coefficients are significant or the relevant null hypothesis is rejected at the 10%, 5% and 1% level, respectively. The Wald statistics (not reported) are consistently significant at the 1% level in all models. The unreported diagnostics statistics (i.e., AR(1), AR(2), Hansen, Difference-in-Hansen) confirm the validity and consistency of the system-GMM results. All unreported figures are available on request. Standard errors robust to heteroscedasticity and finite sample bias are in parentheses below the coefficients. The pre-(post-)crisis period is between 2002-2008 (2009-2015). Non-financial firms are in industry groups 1 to 7 and 10; see Table A1.

Appendix

Table A1
Industry Classification

Group	Industry	Datastream INDG Classes
1	Mining and quarrying (Mean CSP score = 62.11)	50 (Exploration & Production) 51 (Oil Equipment & Services) 97 (Integrated Oil & Gas) 119 (Gold Mining) 122 (General Mining)
2	Manufacturing (Mean CSP score = 70.49)	33 (Specialty Chemicals) 37 (Electrical Equipment) 43 (Industrial Machinery) 56 (Iron & Steel) 57 (Electronic Equipment) 67 (Brewers) 68 (Distillers & Vintners) 70 (Containers & Package) 71 (Food Products) 78 (Metals) 79 (Tobacco) 82 (Paper) 95 (Pharmaceuticals) 114 (Soft Drinks) 130 (Semiconductors)
3	Electricity, gas, steam and air conditioning supply Water supply; sewerage, waste management (Mean CSP score = 80.08)	31 (Gas Distribution) 47 (Waste Disposal) 91 (Multi-utilities) 144 (Water) 169 (Con. Electricity)
4	Construction (Mean CSP score = 66.54)	30 (Building Materials) 36 (Home Construction) 39 (Heavy Construction)
5	Wholesale and retail trade; repair of motor vehicles and motor cycles (Mean CSP score = 63.99)	60 (Furnishings) 62 (Nondurable Household Products) 63 (Auto Parts) 66 (Apparel Retailers) 69 (Clothing & Accessory) 85 (Home Improvement) 87 (Broadline Retailers) 88 (Food; Retail, wholesale) 89 (Diamonds & Gemstones) 90 (Specialty Retailers)
6	Leisure, Accommodation and food service activities (Mean CSP score = 64.48)	55 (Recreational Services) 72 (Restaurants & Bars) 80 (Hotels) 94 (Travel & Tourism) 100 (Gambling) 115 (Broadcast & Entertainment)

Table A1. (continued)

Group	Industry	Datastream INDG Classes
7	Transport and storage; Information and communication (Mean CSP score = 58.37)	40 (Delivery Services) 41 (Media Agencies) 58 (Software) 64 (Transport Services) 84 (Publishing) 99 (Marine Transportation) 126 (Telecom Equipment) 129 (Airlines) 142 (Fixed Line Telecom) 143 (Mobile Telecom) 150 (Computer Services)
8	Financial and insurance activities (Mean CSP score = 61.44)	42 (Consumer Finance) 46 (Financial Administration) 102 (Banks) 104 (Asset Managers) 106 (Life Insurance) 107 (Property & Casualty Insurance) 108 (Insurance Brokers) 109 (Investment Trusts) 111 (Investment Services) 113 (Specialty Finance) 141 (Full Line Insurance)
9	Real estate activities; Professional, scientific and technical activities; Administrative and support service (Mean CSP score = 46.45)	112 (Real Estate Development) 160 (Ind. & Office REITs) 161 (Retail REITs) 163 (Diversified REITs) 164 (Specialty REITs) 167 (Real Estate Services)
10	Others (Mean CSP score = 63.43)	32 (Industrial Suppliers) 44 (Defence) 48 (Personal Products) 74 (Renewable Energy Equipment) 86 (Business Support) 98 (Aerospace) 101 (Diversified Industrials) 132 (Medical Equipment) 134 (Business Training & Employment) 156 (Consumer Services) 157 (Biotechnology)

Notes: This classification is adapted from UK Standard Industrial Classification of Economic Activities 2007.

Table A2
Definitions of Variables

Variable	Abbreviation	Description	Data source
Corporate social performance	*CSP*	Corporate social performance obtained from the module 'ASSET4 Environmental, Social and Corporate Governance Data'. This is described as "the social pillar measures a company's capacity to generate trust and loyalty with its workforce, customers and society, through its use of best management practices. It is a reflection of the company's reputation and the health of its license to operate, which are key factors in determining its ability to generate long term shareholder value."	Datastream-Worldscope
Return on assets	*ROA*	Operating income divided by total assets.	Datastream-Worldscope
Return on equity	*ROE*	Net income divided by common equity.	Datastream-Worldscope
Share price performance	*SPP*	Natural logarithm differences between adjusted share prices at time t and t-1.	Datastream-Worldscope
Firm beta	*BETA*	Is the CAPM's historical beta coefficient. We compute annual beta for each firm using rolling time series regressions of excess company returns with respect to the FTSE All-Share Index returns using monthly data for the past five years.	Datastream-Worldscope
Total assets (firm size)	*SIZE*	The natural logarithm of deflated total assets.	Datastream-Worldscope
Research and development	*RD*	Research and development expenses divided by total sales.	Datastream-Worldscope
Current ratio	*CUR*	Current assets divided by current liabilities.	Datastream-Worldscope
Leverage	*LEVER*	Total debt divided by total assets.	Datastream-Worldscope
Current growth	*GROWTH*	Percentage change in annual sales.	Datastream-Worldscope
Market-to-book ratio	*MBR*	The ratio of 'total assets plus market value of equity less book value of equity' to total assets. Market value and book value dates are matched.	Datastream-Worldscope
Managerial ownership	*MANOW*	Percentage of the number of shares held by insiders as executives and top-line managers in total shares outstanding.	Thomson Reuters EIKON