Journal of Banking and Finance 75 (2017) 280–291

Contents lists available at ScienceDirect

Journal of Banking and Finance

journal homepage: www.elsevier.com/locate/jbf

Corporate social responsibility and CEO confidence

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ARTICLE INFO

Article history:
Received 13 May 2015
Accepted 29 November 2016
Available online 29 November 2016

JEL Classification:
G02
G32
G34

Keywords:
Corporate social responsibility
Overconfidence
Behavioral finance

ABSTRACT

This study examines the relationship between firm corporate social responsibility (CSR) and CEO confidence. Research shows that CSR has a hedging feature. Research also shows that more confident CEOs underestimate firm risks, which, in turn, leads them to undertake relatively less hedging. Consistent with this, we find that CEO confidence is negatively related to the level of CSR. Closer analysis shows that this effect is stronger in the institutional aspects of CSR, such as community and workforce diversity, rather than in the technical aspects of CSR, such as corporate governance and product quality. Our results are robust to different competing explanations, including narcissism, which refers in this context to CEOs who engage in CSR to attract attention and alternative proxies for CSR and CEO confidence.

1. Introduction

Corporate social responsibility (CSR) is defined by McWilliams and Siegel (2001, p117) as involving "actions that appear to further some social good, beyond the interests of the firm and that which is required by law". The range of CSR activities is broad. For instance, firms may develop products that are made of environmentally-friendly materials, work closely with community organizations, or donate to charities. This means that CSR activity can affect the firm and the broader society. With regard to CSR and firm value, the research is mixed. Early research (Friedman, 1970) argued that CSR is negative for shareholders, while more recently, others (Jiao, 2010; Edmans, 2011; Deng et al., 2013; Cheng et al., 2014; Flammer, 2015) found that it is positive for shareholder value. One particular way CSR might be positive for shareholders is as a hedging device (Boutin-Dufresne and Savaria, 2004; Heal, 2005; Lee and Faff, 2009; Goss and Roberts, 2011; Humphrey et al., 2012).

Recent research also shows that some personal traits of managers impact corporate policies, including hedging (Ben-David et al., 2013 and Deshmukh et al., 2013). This study focusses on the personal trait of confidence. Furthermore, overconfident managers systematically overestimate the probability of good outcomes and, correspondingly, underestimate the probability of bad outcomes resulting from their actions (Heaton, 2002). In particular, for the focus of this paper, managerial overconfidence has been shown to cause managers to undertake less hedging than optimal for stockholder value maximization (Malmendier et al., 2011 and Ben-David et al., 2013).[1] Consistent with these links between CSR and hedging and CEO confidence and hedging, this paper examines the relationship between CSR and CEO confidence.

In this paper, we document a significant negative relationship between CEO confidence and CSR activity. Specifically, the more confident the CEO, the less CSR activity undertaken by the firm. This relationship holds true after controlling for CEO characteristics of gender, age, and tenure and an array of firm, industry, and time variables. We also specifically test and reject an alternative hypothesis of narcissism (that is, those CEOs who seek attention, in this context by engaging in CSR), which proposes a positive relation between CEO confidence and CSR. More detailed analysis of different dimensions of CSR shows that the negative relationship between CEO confidence and CSR is found for institutional aspects of CSR, such as community and workforce diversity, but not for technical CSR, such as corporate governance and product quality. However, this result is weakened somewhat when we drill down into the individual aspects of CSR, and find that increasing levels of confidence is generally negatively related to positive aspects of CSR, but not related to negative aspects of CSR. In other words, more confident CEOs do less "positive" CSR, but do not do more or less "negative" CSR, relative to less confident CEOs.

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[1] Depending on the analysis undertaken, research may refer to overconfidence or level of confidence. The former uses a dichotomous variable and the latter a continuous variable. The current study considers both and will use the description most appropriate throughout the paper.

http://dx.doi.org/10.1016/j.jbankfin.2016.11.024
0378-4266/

We conduct tests to rule out other factors including gender, age and tenure, which might confound the interpretation of our results. Furthermore, CEO characteristics are commonly included in studies of CSR, although the results are not always consistent. We find that female CEOs, on average, score higher on CSR than male CEOs, their average confidence score is significantly lower than that of male CEOs. However, the gender of the CEO is not significant in explaining CSR in a multivariate setting. As well, the age of the CEO is negatively related to CSR, while tenure of the CEO is positively related to CSR, albeit at only the 10% level. All results are consistent after applying a barrage of robustness checks.

The paper is organized as follows: Section 2 discusses the literature and hypothesis development; Section 3 discusses the sample, variable selection, and descriptive analysis; Section 4 documents the research, design, and results; while Section 5 concludes the paper.

2. Literature review and hypothesis development

The key relationships in this study that we develop into the testable hypotheses are those between CSR and hedging, confidence and hedging, and confidence and CSR. That is, hedging is of potential value to the firm, and CSR is a form of hedging. As overconfident CEOs hedge less, we hypothesise that firms with overconfident CEOs will engage in less CSR. The literature to develop this argument is considered below.

2.1. CSR and hedging

Over recent years, the views by academics and practitioners on CSR have changed. Before the 1980s, CSR was treated as a burden on the firm, which benefitted various stakeholders but at the expense of stockholders (Friedman, 1970). From the 1980s, CSR grew in importance in firm strategy, which coincided with development of stakeholder theory of the firm (Freeman, 1984).

According to Godfrey et al., (2009), CSR is now used to signal to various stakeholders that the company is partially altruistic (other-considering) and not completely agonistic (self-considering). Generally, the managers of firms adopting CSR appear to consider the impact of their decisions upon social good and broad stakeholder interest in the expectation that this will flow back as "positive attribution or moral capital" (Godfrey et al., 2009, p428). In this sense, CSR is part of a firm's risk management strategy; it can therefore be regarded as a hedging tool.

The broad area of firm risk management research is well developed, and a large amount of the research focusses on hedging. A number of strands exist in the literature. Firstly, there are those that look to develop a theory of hedging, such as Smith and Stulz (1985) who provide a theoretical framework for hedging as part of a firm's overall financing policy, and Stulz (1996, p23–24) who argues that "the primary goal of risk management is to eliminate the probability of costly lower-tail outcomes–those that would cause financial distress or make a company unable to carry out its investment strategy". Secondly, there is a large body of empirical work that investigates the determinants of firms that hedge, using survey data, including Nance et al. 1993 and Tufano 1996.

More recent empirical work focusses on the impact of hedging on firm value. For example, Allayannis and Weston (2001), Carter et al. (2006), Adam and Fernando (2006), Bartram et al. (2011), Campello et al. (2011) and Perez-Gonzalez and Yun (2013) all report that hedging increases firm value. In contrast, Jin and Jorion (2006) found no relation between hedging and firm value in oil and gas firms.

In terms of CSR as a hedge, CSR is clearly not as explicit as using a derivative contract. It is more subtle, and is about creating goodwill. For example, if a firm experiences an event that has a negative impact on its operations such as the impact on customers affected by changed trading hours or employees by changed work conditions, CSR mitigates the negative impact of the event. It does this by creating moral capital. Such moral capital helps stockholders attribute the negative event to what Godfrey et al. (2009, p428) call "managerial maladroitness rather than malevolence", which accordingly, reduces the punishment to firms facing these negative events. Thus, CSR is a way of hedging some of the risks facing the firm (Peloza, 2006; Godfrey et al., 2009 and Minor and Morgan, 2011). Empirical evidence confirms this hedging feature of CSR. Godfrey et al. (2009) find that when firms are facing negative law suits in the US, those with higher CSR suffer less firm value reduction than those with lower CSR. Additional evidence supporting CSR's hedging effects is provided by Minor and Morgan (2011), who find that firms with higher levels of CSR investment suffer relatively less firm value reduction in cases where a product recall is required due to a product defect. In addition, Boutin-Dufresne and Savaria (2004), Lee and Faff (2009), and Humphrey et al. (2012) find evidence that CSR is positively related to lower firm idiosyncratic risk.

2.2. Confidence and hedging

The link between CEO confidence and hedging stems from the assertion that overconfident CEOs overestimate their ability to obtain precise information about cash flows generated from prospective projects. In other words, they overestimate their own accuracy. This leads overconfident CEOs to underestimate the variation in cash flows generated from these projects. Overconfident CEOs understate the risks of projects (Ben-David et al., 2013 and Deshmukh et al., 2013), and because overconfident CEOs perceive their firms to be relatively less risky, they are less likely to hedge their firm's operations. This is borne out in the empirical literature. Marshall et al. (2012), for example, find overconfident managers in the UK are less likely to hedge foreign exchange exposure, and Adam et al. (2012), using a sample of North American gold mining firms, document that overconfident CEOs undertake less hedging (are more risky).[2]

Although a range of methods has been used to measure overconfidence (Hill et al., 2014), the most common were developed using managerial stock options (Malmendier and Tate, 2005a and 2005b). Malmendier and Tate (2005a and 2005b) proxy for a CEO's overconfidence in two ways using a dichotomous classification. The first is based on beliefs revealed from managerial stock option exercise behaviour, while the second is based on outsiders' perception, obtained from analyses of media and how the CEO is portrayed. Malmendier and Tate then use these overconfidence measurements to empirically examine how CEO overconfidence affects a firm's investment decisions. They find that the investments and cash sensitivity are stronger among firms with overconfident CEOs, especially equity-dependent firms. The results are consistent with both proxies for overconfidence.

In this paper, we follow Malmendier and Tate's (2005a and 2005b) method of using managerial stock option exercise behaviour to determine confidence levels. However, rather than having a dichotomous variable for overconfidence/not overconfidence, we initially follow Banerjee et al. (2015a and 2015b), amongst oth-

[2] The relationship between overconfidence and firm value is more complex than between overconfidence and hedging. There is evidence that overconfident CEOs tend to over-invest and waste money on negative NPV projects (Gervais et al., 2011; Campbell et al., 2011 and Kim, 2013). However, the level of overconfidence seems important. For example, Goel and Thakor (2008) show that moderate levels of CEO overconfidence benefit the firm while extreme levels are detrimental. Generally, it is not clear if overconfident CEOs have a positive or negative effect on firm value (Banerjee et al., 2015a).

ers, and use a continuous variable. This is explained in detail in Section 3.[3]

2.3. CSR and confidence

Overconfidence has been linked to a range of corporate decisions leading to investment distortions (Malmendier and Tate, 2005a). However, very little research has considered the impact that CEO confidence has on the level of CSR undertaken by the firm. This is the key contribution of the current study. Based on the literature discussed above, we are investigating the following: As hedging is useful and CSR is a hedge, and overconfident managers hedge less, then, consistent with this, overconfident CEOs will do less CSR. A possible alternative argument is based upon a personality trait that is related to overconfidence, namely narcissism. Although narcissistic personality disorder is defined by the American Psychiatric Association (2013) as a diagnosable condition, some of the features of narcissism have been linked to people who are overconfident. For example, Schaefer et al. (2004) document a relationship between overconfidence and narcissistic personality traits. Generally, people with narcissistic traits have a strong need for admiration; CSR provides opportunities for CEOs to obtain admiration. Petrenko et al. (2015) provide three reasons to link CSR with narcissistic CEOs. Firstly, CSR are value-loaded initiatives that appear to further some social good. Secondly, CSR engages sets of value sensitive audiences in adulation, media attention, and praise (Wallace and Baumeister, 2002). Finally, CSR offers a variety of avenues to change the status quo, supplying continuity and variety to the opportunities that narcissistic CEOs have to exhibit themselves to attentive and responsive audiences. In a sample of Fortune 500 firms over 10 years, Petrenko et al. (2015) find strong support for a positive relationship between CEO narcissism and CSR. Given that there is a positive relationship between both confidence and narcissism and narcissism and CSR, we expect there would be a positive association between CSR and CEO confidence, especially in those aspects of CSR that relate to providing admiration to the CEO.

2.4. Hypothesis development

Given the considerable amount of research that indicates CSR is value creating for firms, the expected relationship of CSR with CEO confidence is less clear. If the hedging effect of CSR dominates, then the more confident a CEO, the more likely that person will be to underestimate the risks to their firm, and, as a result, undertake less hedging relative to firms with less confident CEOs. Given that CSR is a form of hedging, we expect more confident CEOs to undertake less CSR. However, if narcissism dominates, we expect more confident CEOs to undertake more CSR.

Owing to the multidimensionality of CSR, the hedging effects of different dimensions of CSR may vary. Similarly, different aspects of CSR provide different impacts for narcissism. In relation to the hedging impact, there are both technical and institutional dimensions to CSR. Technical CSR consists of initiatives regarding corporate governance, employee relations, and product quality. Institutional CSR, on the other hand, is comprised of initiatives regarding community, workforce diversity, environment, and human rights. Godfrey et al. (2009) find that institutional CSR has a stronger hedging effect, while technical CSR has a weaker hedging effect.

In relation to CEO narcissism, we expect CEO confidence to have a positive impact on the institutional aspects of CSR relative to the technical aspects of CSR. The institutional aspects of CSR include charitable giving. However, as charitable giving is one of the more notable traits of narcissistic CEOs (Petrenko et al., 2015), we expect that there would be a positive relation between CEO confidence and institutional aspects of CSR. In relation to technical aspects of CSR, it is not clear what relationship we expect from increased narcissism linked to CEO confidence.

3. Sample and variable selection and descriptive statistics

The data are derived from several databases. Compustat provides the firm year-end stock prices and financial information. Following El et al. (2011), we use the comprehensive ratings provided by Kinder, Lydenberg, and Domini (KLD) Stats database on firm CSR to construct the CSR proxies. These data are available via WRDS. Owing to the data coverage of databases, our main sample period covers 1992 to 2012.[4]

KLD divides various CSR-related items into seven categories: the community, corporate governance, workforce diversity, employee relations, the environment, human rights, and product quality. For each individual category, KLD assigns a binary (0/1) ratings to a set of strengths and concerns. Each strength or concern is assigned 1 if it meets the criteria. KLD sum these for strengths and concerns in each category. We calculate a score for each category of CSR by subtracting the number of concerns from the number of strengths within that area. Then we aggregate individual scores to form an overall CSR score (CSR). This approach follows previous literature, including Jiao (2010), El et al. (2011), and Jo and Harjoto (2012).

Initially, following Malmendier and Tate (2005a, 2008), Hirshleifer et al. (2012), and Banerjee et al. (2015a and 2015b), we measure confidence based on CEO beliefs revealed by CEO option exercise behaviour. Hall and Murphy (2002) find that, given the non-tradable feature of executive options and the high level of executive under-diversification, a rational executive should exercise deep in-the-money options early. This early exercise behaviour is supported by empirical findings (Huddart and Lang, 1996 and Ofek and Yermack, 2000). Overconfident CEOs are reluctant to exercise deep in-the-money executive stock options early because they overestimate their firms' future performance and undervalue current stock prices (Malmendier and Tate, 2005a). Therefore, a proxy for CEO overconfidence is the lack of executive option exercise behaviour for deep in-the-money options. Malmendier and Tate (2005a and 2005b, amongst many others) assume that managers are overconfident when they fail to exercise options that are more than 67 percent in-the-money. Although Hirshleifer et al. (2012) follow Malmendier and Tate (2005a), they use average strike price because of data limitations. We take a slightly different approach initially and follow Banerjee et al. (2015a and 2015b), and then follow up with robustness tests using the method proposed by Hirshleifer et al. (2012). We discuss differences between Banerjee et al. (2015a and 2015b) and Hirshleifer et al. (2012) in the robustness section.

To construct our CEO confidence variable, we merged the detailed data on CEO option holdings from Execucomp with the year-end firm stock price from Compustat for each firm. Then, from Compustat, we combined the CEO confidence dataset with firm-level and industry-level control variables for each firm. From Execucomp, we obtained both the number of unexercised but vested options and the value of those options. We then constructed the value-per-option by dividing the value of a CEO's unexercised-but-vested option holdings by the number of such options. Finally, we

[3] We test for robustness of this proxy which we discuss in Section 5.1.

[4] Execucomp is used to obtain the executive option holdings and personal information; IRRC is used to obtain firm anti-takeover provisions; Thomson Reuters 13-F filings s34 Master File provides institutional investor holdings data. Reasons for this data are explained later. Execucomp has been in place since 1992, and the latest social ratings at time of writing is 2012.

Table 1
Variable definitions.

Variable	Measurement
Dependent variables	
$CSR_{i,t}$	The total number of strengths minus the total number of concerns from all the aspects of CSR in a given year *t* for firm *i*;
$COM_{i,t}$	The total number of strengths minus the total number of concerns within the community aspects of CSR in a given year *t* for firm *i*;
$CGOV_{i,t}$	The total number of strengths minus the total number of concerns within the corporate governance aspects of CSR in a given year *t* for firm *i*;
$DIV_{i,t}$	The total number of strengths minus the total number of concerns within the workforce diversity aspects of CSR in a given year *t* for firm *i*;
$EMP_{i,t}$	The total number of strengths minus the total number of concerns within the employee relation aspects of CSR in a given year *t* for firm *i*;
$ENV_{i,t}$	The total number of strengths minus the total number of concerns within the environment aspects of CSR in a given year *t* for firm *i*;
$HUM_{i,t}$	The total number of strengths minus the total number of concerns within the human rights aspects of CSR in a given year *t* for firm *i*;
$PRO_{i,t}$	The total number of strengths minus the total number of concerns within the product quality aspects of CSR in a given year *t* for firm *i*;
Independent variables	
$CONFIDENCE_{i,t}$	A continuous variable to measure CEO confidence calculated as per Banerjee et al., (2015a and 2015) for firm *i* in year *t*;
$CONFIDENCE67_{i,t}$	A dichotomous variable to measure CEO over confidence calculated as per Hirshleifer et al., (2012) for firm *i* in year *t*;
Control Variables	
$GENDER_i$	A dummy variable equal to one if the CEO of firm *i* is male and zero otherwise.
AGE_i	The age of a CEO of firm *i* in years.
$TENURE_i$	The number of years the CEO of firm *i* has been in office.
$ROA_{i,t}$	The ratio of earnings before extraordinary items to book value of total assets at the beginning of a given year *t* for firm *i*;
$LNAT_{i,t}$	Natural log of the book value of total assets at the beginning of a given year *t* for firm *i*;
$DEBT_{i,t}$	The ratio of debt to book value of total assets at the beginning of a given year *t* for firm *i*;
$ADEXP_{i,t}$	Total advertising expense divided by total book value of assets at the beginning of a given year *t* for firm *i*;
$RDEXP_{i,t}$	Total R&D expenditure divided by total book value of assets at the beginning of a given year *t* for firm *i*;
$CAPITALEXP_{i,t}$	Total capital expenditure divided by total book value of assets at the beginning of a given year *t* for firm *i*;
$EINDEX_{i,t}$	Firm *i*'s EINDEX at the beginning of a given year *t*;
$BLOCKHOLDINGS_{i,t}$	Firm *i*'s ownership position of block holders whose ownership is greater than 5 percent at the beginning of a given year *t*.

This table summarizes the primary variables used in the analysis.

constructed our CONFIDENCE variable by dividing the value-per-option by the year-end stock price obtained from Compustat.

Following prior literature, we use several proxies to control for CEO and firm characteristics that can potentially influence a firm's decision to engage in CSR. The control variables include:

- CEO characteristics: Some characteristics of the CEO are commonly included in studies of CSR, generally as controls in regression models. We control for CEO Gender: the gender of the CEO has been shown to impact the level of CSR in a firm. Manner (2010), Marquis and Lee (2013) and Zhang et al. (2013) find that having a female CEO positively relates to the level of CSR. We use a dummy variable equal to 1 if the CEO is male, and zero otherwise. We expect a negative relationship between gender and CSR. CEO Age: The age of the CEO has been shown to impact the level of CSR in a firm. Fabrizi et al. (2014) find a positive relationship between the age of the CEO and CSR, although some other studies have not found any relationship, including Godos-Diez et al. (2011). Therefore, we are not sure what relationship to expect between CEO age and CSR. CEO Tenure: defined as the number of years the CEO has been in the position. This has been included in studies on CSR, for example Chin et al. (2013). The results have been inconsistent, so we are unsure of the relationship between CEO tenure and CSR.
- Firm profitability: Proxied by the return on assets calculated as earnings before extraordinary items scaled by the book value of total assets at the beginning of the year. We expect a positive relationship between firm profitability and CSR (Waddock and Graves 1997 and Campbell, 2007).
- Firm size: Proxied by the natural log of the book value of total assets at the beginning of the year. We expect a positive relationship between firm size and CSR (McWilliams and Siegel, 2001).
- Firm leverage: Proxied by long-term debt scaled by book value of total assets at the beginning of the year. We expect a negative relationship between firm leverage and CSR (Waddock and Graves, 1997 and Jiao, 2010).
- Firm differentiation: Proxied by advertising expense scaled by book value of total assets at the beginning of the year. We expect a positive relationship between firm differentiation and CSR (McWilliams and Siegel, 2000 and Jo and Harjoto, 2012).
- Firm innovation: Proxied by R&D expenditure scaled by book value of total assets at beginning of the year. We expect a positive relationship between firm innovation and CSR (McWilliams and Siegel, 2000 and Jo and Harjoto, 2012).
- Firm capital expenditure (reliance on reputation): Proxied by total capital expenditure scaled by book value of total assets at beginning of the year. We expect a positive relationship between capital expenditure and CSR (Jo and Harjoto, 2012).
- Firm managerial entrenchment: Proxied by the E-index developed by Bebchuk et al. (2009). We expect a negative relationship between managerial entrenchment and CSR (Barnea and Rubin, 2010).
- Outside monitoring: Proxied by the sum of all ownership positions greater than five percent held by institutional investors. The relationship between outside monitoring and CSR is uncertain (Dittmar and Mahrt-Smith, 2007 and Barnea and Rubin, 2010).

Table 1 provides details of all the main variables we use. Variables that have not been mentioned previously in Table 1 are discussed later in the paper.

3.1. Descriptive statistics

The final sample includes 15,379 firm-year observations, and represents 2138 firms with 3478 different CEOs. Table 2 summarizes the descriptive statistics of the sample.[5]

Table 2, Panel A presents summary statistics for firm-level characteristics for the sample. The average total assets are approximately US$20b (which corresponds to approximately US$10b in market capitalization of equity — not reported). Statistics for control variables are similar to those reported by Jo and Harjoto

[5] All variables are winsorized at 1 and 99 percent.

Table 2
Firm characteristics and CEO characteristics summary statistics.

Panel A: CEO Characteristics						
	N	Mean	Std. Dev.	Min	Median	Max
$CONFIDENCE_i$	15,379	0.289	0.239	0.000	0.250	0.889
Male	15,047	0.290				
Female	332	0.228***				
CSR_i	15,379	−0.072	2.679	−6.000	0.000	9.000
Male	15,047	−0.106				
Female	332	1.801***				
$TENURE_i$	14,911	7.754	7.028	0.033	5.671	53.033
Male	14,581	7.812				
Female	330	5.205***				
AGE_i	14,835	55.984	6.749	33.000	56.000	90.000
Male	14,510	56.060				
Female	325	52.569***				
Panel B: Firm Characteristics (n = 15,379)						
		Mean	Std. Dev.	Min	Median	Max
Total $assets_i$ ($US)		20.400b	3.000b	1.023m	3.00b	2360.000b
ROA_i		0.134	0.084	−0.085	0.129	0.395
$LNAT_i$		8.080	1.614	4.958	7.928	12.543
$DEBT_i$		0.179	0.148	0.000	0.161	0.623
$ADEXP_i$		0.011	0.024	0.000	0.000	0.145
$RDEXP_i$		0.025	0.044	0.000	0.000	0.209
$CAPITALEXP_i$		0.048	0.046	0.000	0.035	0.242
$EINDEX_i$		2.140	1.369	0.000	2.000	6.000
$BLOCKHOLDINGS_i$		0.168	0.128	0.000	0.150	0.540

This table shows the summary statistics for sample CEOs and firms. *, **, *** indicate coefficients are significant at 10%, 5% and 1% respectively. m is million, b is billion.

(2012). Panel B summarizes CEO characteristics. The independent variable CONFIDENCE shows that, on average, a CEO's confidence level is 0.289, a figure similar to that reported by Banerjee et al., (2015a). The average level of CSR is −0.072, showing that, overall, firms are slightly negative on the KLD measure of CSR during the sample period. CEOs in the sample, on average, have tenure of 7.754 years and an age of 55.984 years.[6] There are 3 percent female CEOs, which indicates that the majority of CEOs in the sample are male. A recent report indicated that 4.6 percent of Fortune 1000 CEOs were female (see http://www.catalyst.org/knowledge/women-ceos-fortune-1000). Generally, female CEOs in the sample had significantly lower confidence scores, significantly greater CSR scores, significantly less tenure, and were significantly younger than male CEOs. These differences are explored in more detail later.

3.2. Correlation matrix

To test the presence of multicollinearity, we conduct a pairwise correlation test between all variables that we use. Table 3 summarizes these results.

Firstly, the majority of correlations are well below 0.5. Table 3 also shows the variance inflation factors (VIF) for the variables used in the main model. All values are well below 10, which indicates that multicollinearity is not a concern. It is worth noting that we find a negative correlation (significant) between CSR and CONFIDENCE, which indicates that firms with more confident CEOs tend to undertake less CSR.

4. Results

To assess the impact of our results on the existing literature, we first estimate a basic OLS regression with no fixed effects, excluding our confidence measure:

$$\begin{aligned} CSR_{i,t} = {} & \alpha_0 + \alpha_1 GENDER_{i,t-1} + \alpha_2 AGE_{i,t-1} + \alpha_3 TENURE_{i,t-1} \\ & + \alpha_4 ROA_{i,t-1} + \alpha_5 LNAT_{i,t-1} + \alpha_6 DEBT_{i,t-1} + \alpha_7 ADEXP_{i,t-1} \\ & + \alpha_8 RDEXP_{i,t-1} + \alpha_9 CAPITALEXP_{i,t-1} + \alpha_{10} EINDEX_{i,t-1} \\ & + \alpha_{11} BLOCKHOLDINGS_{i,t-1} + \varepsilon_{i,t} \end{aligned} \quad (1)$$

The results are shown in table 4, and the variables are defined in Table 1.

The predicted signs on the coefficients are shown in the second column of Table 4, and the results of estimating Model 1 using OLS regression are shown in the third column of Table 4. As shown in the third column, the results are similar to those predicted from the existing literature in both sign and significance. The exceptions include capital expenditure (CAPITALEXP), which enters Model 1 with a significantly negative coefficient and managerial entrenchment (EINDEX), which is positive and significant. CEO gender (GENDER) and age (AGE) are both negative and significant, while CEO tenure (TENURE) is insignificant. Outside monitoring (BLOCKHOLDINGS) is negative and significant. We then augment the CONFIDENCE variable into Model 1 as follows:

$$\begin{aligned} CSR_{i,t} = {} & \alpha_0 + \alpha_1 CONFIDENCE_{i,t-1} + \alpha_2 GENDER_{i,t-1} + \alpha_3 AGE_{i,t-1} \\ & + \alpha_4 TENURE_{i,t-1} + \alpha_5 ROA_{i,t-1} + \alpha_6 LNAT_{i,t-1} + \alpha_7 DEBT_{i,t-1} \\ & + \alpha_8 ADEXP_{i,t-1} + \alpha_9 RDEXP_{i,t-1} + \alpha_{10} CAPITALEXP_{i,t-1} \\ & + \alpha_{11} EINDEX_{i,t-1} + \alpha_{12} BLOCKHOLDINGS_{i,t-1} + \varepsilon_{i,t} \end{aligned} \quad (1.1)$$

The variables are as previously defined.

In the fourth column of Table 4, we report the results of Model 1.1. The CONFIDENCE variable enters Model 1.1 with a significantly negative coefficient. This indicates that the level of CEO confidence is negatively related to the level of CSR. The other control variables remain similar to Model 1 without the CONFIDENCE variable. In the fifth column of Table 4, we report the results using panel regression with firm and year fixed effects and standard errors clustered on firm, excluding the CONFIDENCE variable. As shown in the fifth column, the results are quite different from those in the third column. Many of the signs on the variables switch and/or lose their significance. This indicates that taking account of fixed effects and standard errors clustered on firms can have important implications

[6] The number of observations for age and tenure is lower than that for other variables due to missing data.

Table 3
Pearson Correlation Matrix Among Variables.

	CSR	CONFIDENCE	GENDER	AGE	TENURE	ROA	LNAT	DEBT	ADEXP	RDEXP	CAPITALEXP	EINDEX	BLOCKHOLDINGS
CONFIDENCE	−0.021												
GENDER	−0.099	0.039											
AGE	−0.025	0.019	0.077										
TENURE	−0.034	0.115	0.060	0.414									
ROA	0.063	0.246	−0.007	−0.009	−0.001								
LNAT	0.156	−0.051	0.039	0.097	−0.090	−0.211							
DEBT	−0.077	−0.084	0.015	0.032	−0.041	−0.053	0.172						
ADEXP	0.126	0.020	−0.041	−0.047	−0.035	0.162	−0.011	−0.019					
RDEXP	0.104	0.028	−0.003	−0.113	0.029	0.022	−0.251	−0.221	0.004				
CAPITALEXP	−0.042	0.074	0.000	−0.001	0.015	0.384	−0.113	0.117	0.011	−0.053			
EINDEX	−0.024	−0.136	−0.005	0.006	−0.025	−0.060	−0.058	0.019	−0.057	−0.050	−0.016		
BLOCKHOLDINGS	−0.136	−0.102	−0.072	−0.073	0.019	−0.066	−0.347	0.032	−0.009	−0.066	−0.038	0.114	
VIF	1.11	1.12	1.03	1.26	1..26	1.36	1.40	1.11	1.05	1.15	1.22	1.04	1.21

This table presents the Pearson correlation matrix and variance inflation factors (VIFs) for the main variables used in this study.

Table 4
Relation between CSR and CEO overconfidence.

Variables	Predicted Sign	Model 1-OLS Excluding CONFIDENCE No fixed effects	Model 1.1-OLS Including CONFIDENCE No fixed effects	Model 1 Excluding CONFIDENCE Fixed effects Clustered standard errors	Model 1.1	Importance
Independent Variable						
$CONFIDENCE_{i,t-1}$	-			−0.565***	−0.413***	1.361
				(0.094)	(0.151)	
Control Variables						
$GENDER_{i,t-1}$	−	−1.934***	−1.907***	−0.239	−0.233	
		(0.145)	(0.145)	(0.363)	(0.364)	
$AGE_{i,t-1}$	?	−0.008**	−0.008**	−0.015*	−0.014*	1.346
		(0.003)	(0.003)	(0.008)	(0.008)	
$TENURE_{i,t-1}$	?	−0.000	0.001	0.014*	0.015*	1.429
		(0.003)	(0.003)	(0.008)	(0.008)	
$ROA_{i,t-1}$	+	2.970***	3.354***	1.160**	1.429***	1.668
		(0.285)	(0.292)	(0.529)	(0.530)	
$LNAT_{i,t-1}$	+	0.337***	0.334***	−0.173	−0.199*	4.424
		(0.015)	(0.015)	(0.114)	(0.113)	
$DEBT_{i,t-1}$	–	−1.101***	−1.146***	0.762**	0.702**	1.432
		(0.152)	(0.152)	(0.325)	(0.324)	
$ADEXP_{i,t-1}$	+	11.26***	11.160***	−0.437	−0.451	
		(0.885)	(0.884)	(2.749)	(2.725)	
$RDEXP_{i,t-1}$	+	8.639***	8.624***	−2.365	−2.462	
		(0.508)	(0.507)	(2.106)	(2.091)	
$CAPITALEXP_{i,t-1}$	+	−2.886***	−2.933***	−0.606	−0.663	
		(0.506)	(0.505)	(0.955)	(0.953)	
$EINDEX_{i,t-1}$	−	0.041***	0.029*	−0.117***	−0.116***	2.193
		(0.015)	(0.015)	(0.044)	(0.044)	
$BLOCKHOLDINGS_{i,t-1}$	?	−1.697***	−1.792***	−1.448***	−1.500***	2.807
		(0.183)	(0.184)	(0.287)	(0.288)	
Year fixed effects		NO	NO	YES	YES	
Firm fixed effects		NO	NO	YES	YES	
Intercept		−0.655**	−0.474*			
		(0.278)	(0.279)			
Observations		14,385	14,385	14,385	14,385	
Adjusted R^2		0.096	0.098	0.119	0.121	
F-statistic		138.14***	129.92	26.70***	26.04***	

Corporate social responsibility (CSR) is regressed on standard control variables without any controls for year and firm fixed effects. CEO Confidence (CONFIDENCE) is introduced and then fixed effects. The economic importance of the variables is also shown. Standard errors clustered on firm are given in parentheses, except in the column 3. *, **, *** indicate coefficients are significant at 10%, 5% and 1% respectively. The sample contains 14,385 observations.

for panel data analyses in explaining CSR. We then re-introduce the CONFIDENCE variable into our model with both year and firm fixed effects and standard errors clustered on firm.

The results of re-estimating Model 1.1 are shown in the sixth column of Table 4. As shown, the model is highly significant, and has an adjusted R^2 of approximately 12 percent. The CONFIDENCE variable enters the model with a significant negative coefficient. As the level of CEO confidence increases, it is correlated with a negative relationship with the level of CSR. This is after controlling for other variables previously found to relate to the level of CSR undertaken by firms. The control variables remain similar in sign and significance to results with the confidence variable excluded (fifth column). The gender dichotomous variable is insignificant. This means that there is no difference between CEO gender and the level of CSR. This is in contrast to the existing literature regarding female CEOs and CSR (Manner, 2010; Marquis and Lee, 2013 and Zhang et al., 2013). Although we find a significant univariate difference between male and female CEOs on confidence, CSR, tenure, and age (as shown in Table 2), this does not manifest in a multivariate setting in relation to CSR. Although we find a negative (positive) relationship between CEO age (CEO tenure) and CSR on a multivariate basis, it is significant only at the 10 percent level.

In relation to other control variables, we find a significant positive relationship between profitability (ROA) and CSR, which supports Campbell's (2007) institutional argument and the empirical evidence of Ruf et al. (2001). Because higher profitability provides resources to firms, they have a higher propensity to engage in CSR. Although our initial OLS results were consistent with the findings of Chih et al. (2010) that firm size (LNAT) positively correlates with CSR, we do not find support for this result controlling for year and firm fixed effects and standard errors clustered on firms. A positive relationship between CSR and leverage (DEBT) is found. Advertising expense (ADEXP) and R&D expense (RDEXP) are not significant. We find that managerial entrenchment (EINDEX) is significantly negatively related to CSR. Blockholder ownership (BLOCKHOLDINGS) negatively impacts a firm's CSR engagement, consistent with Barnea and Rubin (2010) and Woidtke (2002), but inconsistent with Jo and Harjoto (2012).

The last column in Table 4 shows the economic importance of the coefficients. For a one standard deviation change in CONFIDENCE, the mean level of CSR changes by 1.361. This can be compared to the other significant coefficients. Generally, the impact of confidence on CSR is equally important as CEO age and tenure, as well as the debt level of the firm. This also implies that, if a CEO is overconfident by one standard deviation from that of the average firm CEO, the firm is going to generate a CSR score of −0.098 (−0.413 × 0.239). Although converting this to any accurate dollar value is beyond the scope of the current paper, a recent study by Flammer (2015) provides some evidence of the value of CSR. Flammer has indicated that the adoption of a CSR initiative leads to an increase in stockholder value of 1.77%. As a very rough calculation, if we assume that the adoption of one CSR initiative increases the KLD CSR score by 1, it correspondingly increases stockholder value by 1.77%. A change in confidence by one standard deviation will change the average CSR score by −0.098 (from −0.072 to −0.170), which equates to a 0.173% decrease in value (1.77% x −0.098). Given that the average firm in our sample has a market value of equity of approximately $10billion, a 0.173% reduction in value equates to approximately $17 million. Therefore, a CEO who is overconfident by one standard deviation from the average will reduce CSR, resulting in a $17 million reduction in stockholder value.

The positive relationship between CSR and CEO confidence, which is indicative of the impact of narcissism, is not evident. To further investigate these relationships with CSR, we separate CSR into institutional and technical components. As shown in our literature review, institutional components of CSR (COM, DIV, ENV and HUM) are expected to have a greater hedging impact than the technical aspects of CSR (CGOV, EMP and PRO). Similarly, institutional aspects of CSR are expected to have a greater impact for narcissism. We expect a positive relationship between institutional components of CSR if the narcissistic aspect of CEO confidence dominates, while we expect a negative relationship if the hedging effect dominates. Therefore, to test the second hypothesis, we estimate a similar model to Model 1.1, but replace the CSR variable with the summation of the individual scores for the institutional components (INST – Model 2) and similarly for the technical components (TECH –Model 3):

$$\begin{aligned}\mathrm{INST}_{i,t}\ or\ \mathrm{TECH}_{i,t} &= \alpha_0 + \alpha_1 \mathrm{CONFIDENCE}_{i,t-1} + \alpha_2 \mathrm{GENDER}_{i,t-1} + \alpha_3 \mathrm{AGE}_{i,t-1} \\ &+ \alpha_4 \mathrm{TENURE}_{i,t-1} + \alpha_5 \mathrm{ROA}_{i,t-1} + \alpha_6 \mathrm{LNAT}_{i,t-1} + \alpha_7 \mathrm{DEBT}_{i,t-1} \\ &+ \alpha_8 \mathrm{ADEXP}_{i,t-1} + \alpha_9 \mathrm{RDEXP}_{i,t-1} + \alpha_{10} \mathrm{CAPITALEXP}_{i,t-1} \\ &+ \alpha_{11} \mathrm{EINDEX}_{i,t-1} + \alpha_{12} \mathrm{BLOCKHOLDINGS}_{i,t-1} + \varepsilon_{i,t} \quad (2\&3)\end{aligned}$$

The variables are as previously defined.

To explore further the relationship between CSR overconfidence and institutional CSR, we created a dummy variable equal to one if the firm is in the highest quartile of institutional CSR, and zero otherwise (INSTHI)[7]:

$$\begin{aligned}\mathrm{CSR}_{i,t} = \alpha_0 &+ \alpha_1 \mathrm{CONFIDENCE}_{i,t-1} + \alpha_2 \mathrm{CONFIDENCE}_{i,t-1} \mathrm{x} \mathrm{INSTHI}_{i,t-1} \\ &+ + \alpha_3 \mathrm{INSTHI}_{i,t-1} + + \alpha_4 \mathrm{GENDER}_{i,t-1} + \alpha_5 \mathrm{AGE}_{i,t-1} \\ &+ \alpha_6 \mathrm{TENURE}_{i,t-1} + \alpha_7 \mathrm{ROA}_{i,t-1} + \alpha_8 \mathrm{LNAT}_{i,t-1} + \alpha_9 \mathrm{DEBT}_{i,t-1} \\ &+ \alpha_{10} \mathrm{ADEXP}_{i,t-1} + \alpha_{11} \mathrm{RDEXP}_{i,t-1} + \alpha_{12} \mathrm{CAPITALEXP}_{i,t-1} \\ &+ \alpha_{13} \mathrm{EINDEX}_{i,t-1} + \alpha_{14} \mathrm{BLOCKHOLDINGS}_{i,t-1} + \varepsilon_{i,t} \quad (4)\end{aligned}$$

The variables are as previously defined. The results of estimating Models 2, 3, and 4 are reported in Table 5.

Table 5
Impact of confidence on institutional and technical components of CSR.

	$INST_{i,t}$	$TECH_{i,t}$	$CSR_{i,t}$
Independent Variables			
$CONFIDENCE_{i,t-1}$	−0.366***	−0.053	−0.006
	(0.099)	(0.089)	(0.129)
Control Variables			
$CONFIDENCE_{i,t-1}$ x $INSTHI_{i,t-1}$	–	–	−1.416***
	–	–	(0.283)
$INSTHI_{i,t-1}$	–	–	3.327***
	–	–	(0.120)
$GENDER_{i,t-1}$	−0.507**	0.271	0.044
	(0.223)	(0.184)	(0.295)
$AGE_{i,t-1}$	−0.009*	−0.003	-0.012*
	(0.005)	(0.004)	(0.007)
$TENURE_{i,t-1}$	0.011**	0.002	0.012*
	(0.005)	(0.004)	(0.007)
$ROA_{i,t-1}$	0.187	1.292***	1.124**
	(0.378)	(0.313)	0.447
$LNAT_{i,t-1}$	−0.090	−0.121**	−0.277***
	(0.084)	(0.054)	(0.088)
$DEBT_{i,t-1}$	0.778***	−0.053	0.415
	(0.217)	(0.193)	(0.278)
$ADEXP_{i,t-1}$	0.968	−1.366	−1.079
	(1.707)	(1.700)	(2.665)
$RDEXP_{i,t-1}$	-0.209	-2.390**	-3.050*
	(1.473)	(1.078)	(1.555)
$CAPITALEXP_{i,t-1}$	−0.812	−0.076	−0.590
	(0.704)	(0.547)	(0.779)
$EINDEX_{i,t-1}$	−0.075**	−0.048*	−0.088**
	(0.030)	(0.025)	(0.038)
$BLOCKHOLDINGS_{i,t-1}$	−0.928***	−0.621***	−0.869***
	(0.201)	(0.178)	(0.250)
Year fixed effects	YES	YES	YES
Firm fixed effects	YES	YES	YES
Observations	14,385	14,385	14,385
Adjusted R^2	0.135	0.206	0.319
F-statistic	13.22***	44.48***	63.40***

Individual components of CSR (Institutional and Technical) are regressed on CEO Confidence along with control variables. An alternative specification with the institutional component of CSR included as an interaction term is also included. Standard errors clustered on firm are given in parentheses. *, **, *** indicate coefficients are significant at 10%, 5% and 1% respectively. The sample contains 14,385 observations.

For Models 2, 3, and 4 there is an increase in the adjusted R^2 over Model 1.1. All models are highly significant, as shown by the F-statistics. Also shown in Table 5, the coefficient on CONFIDENCE enters the regression for the institutional components of CSR with a negative and significant value (column 2), but is insignificant for the technical components of CSR (column 3). This further supports the link that CSR has with hedging and confidence. In relation to interaction effects (Model 4), we find a significant negative interaction between confidence and high levels of institutional CSR. There is no evidence of the impact of narcissism. The control variables generally remain consistent (in sign and/or significance) across all models, although there is some variation.

To obtain an even greater understanding of the individual components of CSR and CEO confidence, Table 6 reports the results for

[7] We thank the referee for suggesting this approach.

Table 6
Relation between subsections of CSR and CEO overconfidence.

Dependent Variables	Institutional components of CSR				Technical components of CSR		
Variable	$COM_{i,t}$	$DIV_{i,t}$	$HUM_{i,t}$	$ENV_{i,t}$	$CGOV_{i,t}$	$EMP_{i,t}$	$PRO_{i,t}$
Independent Variable							
$CONFIDENCE_{i,t-1}$	−0.144***	−0.176***	0.003	−0.041	−0.007	−0.152***	0.121***
	(0.033)	(0.058)	(0.015)	(0.049)	(0.041)	(0.056)	(0.040)
Control Variables							
$GENDER_{i,t-1}$	0.0317	−0.457***	−0.027	0.006	−0.018	0.400***	−0.100
	(0.044)	(0.125)	(0.034)	(0.118)	(0.112)	(0.108)	(0.067)
$AGE_{i,t-1}$	0.000	−0.006*	−0.001*	−0.001	−0.002	0.000	−0.001
	(0.001)	(0.003)	(0.000)	(0.002)	(0.002)	(0.002)	(0.002)
$TENURE_{i,t-1}$	−0.000	0.007**	0.001	0.003	−0.000	−0.000	0.003*
	(0.001)	(0.003)	(0.000)	(0.002)	(0.002)	(0.002)	(0.002)
$ROA_{i,t-1}$	−0.013	0.361	−0.082	−0.099	−0.016	1.072***	0.184
	(0.141)	(0.234)	(0.053)	(0.179)	(0.146)	(0.213)	(0.125)
$LNAT_{i,t-1}$	0.025	0.114**	−0.031***	−0.198***	−0.120***	0.034	−0.040
	(0.025)	(0.046)	(0.011)	(0.042)	(0.025)	(0.039)	(0.024)
$DEBT_{i,t-1}$	0.106	0.250*	0.049*	0.371***	0.081	−0.184	0.078
	(0.073)	(0.133)	(0.027)	(0.108)	(0.086)	(0.124)	(0.082)
$ADEXP_{i,t-1}$	0.904	0.191	0.164	−0.642	−0.643	0.884	−1.538*
	(0.725)	(0.988)	(0.346)	(0.844)	(0.598)	(1.041)	(0.798)
$RDEXP_{i,t-1}$	0.070	1.320	−0.160	−1.271**	−0.478	−0.910	−0.844**
	(0.513)	(0.920)	(0.140)	(0.642)	(0.530)	(0.716)	(0.407)
$CAPITALEXP_{i,t-1}$	−0.051	−0.457	−0.010	−0.294	−0.615**	0.375	0.158
	(0.232)	(0.389)	(0.086)	(0.353)	(0.277)	(0.374)	(0.236)
$EINDEX_{i,t-1}$	-0.010	-0.019	-0.002	-0.033**	-0.050***	0.003	0.005
	(0.011)	(0.019)	(0.004)	(0.015)	(0.012)	(0.016)	(0.011)
$BLOCKHOLDINGS_{i,t-1}$	-0.091	-0.460***	-0.112***	-0.249**	-0.341***	-0.207*	-0.002
	(0.071)	(0.128)	(0.033)	(0.098)	(0.087)	(0.118)	(0.079)
Year fixed effects	YES	YES	YES	YES	YES	YES	YES
Firm fixed effects	YES	YES	YES	YES	YES	YES	YES
Observations	14,385	14,385	14,385	14,385	14,385	14,385	14,385
Adjusted R^2	0.045	0.163	0.047	0.207	0.117	0.120	0.077
F-statistic	6.62***	23.89***	6.44***	16.15***	43.43***	19.49***	9.20***

This table presents the regression results for each individual component of CSR. Controls for year and firm fixed effects are included. Standard errors clustered on firm are given in parentheses. *, **, *** indicate coefficients are significant at 10%, 5% and 1% respectively.

models where the dependent variable is the individual components of CSR.

The F-statistics for these models are all significant at the 1 percent level, which indicate that all these seven models are significant, with the adjusted R^2 ranging from approximately 4.5 percent to 20 percent. A significant negative relationship is found for two of the four institutional components of CSR and for one of the three technical components of CSR. Specifically, CEO confidence is negatively related to communities (COM) and the workforce diversity (DIV) components of CSR. A negative coefficient occurs for the environment (ENV), but it enters the model insignificantly, while a positive but insignificant coefficient occurs for human resources (HUM). For the technical components of CSR, a significant negative coefficient occurs for employment (EMP). There is no significant relationship between the CEO confidence and corporate governance (CGOV), and we find a significant and positive relationship between product quality score (PRO) and CEO confidence level. Hirshleifer et al. (2012) theorize that overconfident CEOs are strong innovators and achieve greater innovative success for given research and development expenditures. This may explain the positive relationship between CEO confidence and product quality that we document. We discuss this relationship in more detail later. Overall, the results generally support the hedging aspects of the CSR-overconfidence relationship. In relation to the impact of narcissism, we expect a positive relationship with the community component of CSR. As the community component includes charity giving, it is here that narcissism effects would most likely occur (Petrenko et al., 2015). We find no evidence of this.

Although the KLD measure of CSR has been used extensively in research, an issue regarding the construct validity of the aggregation of the individual components has been raised (Mattingly and Berman 2006). The individual components of the KLD measure comprise a range of strengths and a range of concerns. To investigate the impact of the strengths and concerns we re-estimate Model 1.1 on the strengths and concerns, separately, for each individual qualitative KLD area of CSR. A summary of these results is shown in Table 7.

Table 7
CEO overconfidence and strengths and concerns of CSR qualitative areas.

CSR qualitative issues areas		$CONFIDENCE_{i,t-1}$ (Std.Err)
Institutional components		
$COM_{i,t}$	- Strengths	−0.121*** (0.031)
	- Concerns	0.030 (0.019)
$DIV_{i,t}$	- Strengths	−0.207*** (0.052)
	- Concerns	−0.025 (0.028)
$HUM_{i,t}$	- Strengths	−0.023** (0.009)
	- Concerns	0.004 (0.019)
$ENV_{i,t}$	- Strengths	−0.058 (0.044)
	- Concerns	−0.013 (0.029)
Technical components		
$CGOV_{i,t}$	- Strengths	−0.050** (0.22)
	- Concerns	−0.048 (0.034)
$EMP_{i,t}$	- Strengths	−0.152*** (0.047)
	- Concerns	0.028 (0.041)
$PRO_{i,t}$	- Strengths	−0.019 (0.020)
	- Concerns	−0.145*** (0.034)

This table presents the regression results where strengths and weaknesses of the individual components of CSR are considered. *, **, *** indicate coefficients are significant at 10%, 5% and 1% respectively.

The negative relationship is significant for strengths in Community, Diversity, and Human Rights (75 percent of institutional components), and significant for corporate governance and em-

ployee relations (67 percent of the technical components). Furthermore, the results document that confidence is generally related only to reductions in the components of CSR that are regarded as strengths. In other words, more confident CEOs do not increase or decrease components of CSR that are regarded as concerns. More confident CEOs simply do less positive CSR relative to less confident CEOs, and this is more associated with institutional aspects of CSR than with technical aspects of CSR. This assertion supports the theoretical development of CSR's insurance-like features, as documented by Godfrey (2005). There is no evidence that CSR is impacted by narcissism traits linked to confident CEOs.

It should be stressed that the hedging hypothesis does not predict that CSR is going to be evident only in institutional components of CSR. Additionally, the division of CSR into institutional and technical components is not definitive. For example, Godfrey et al. (2009) include only Community and Diversity in their categorisation of institutional components of CSR. If we include only these two components into our definition of institutional CSR, our results would be more supportive of the hedging hypothesis.

Interestingly, there is no significant relationship between confidence and environment strengths or weaknesses. Mattingly and Berman (2006) also find an intriguing result with the environment variable. They suggest that their result might be due to the fact that firms that do good for the environment are also those that cause harm or extract from it. That is, it may be that environmental issues have such a large impact that even overconfident managers are driven to undertake environment hedging behaviour. This issue needs to be explored further and is beyond the scope of the current paper.

A possible reason for the negative relationship between CEO confidence and the employment component of CSR (both overall and with the strength component of CSR) may be the insurance aspects of maintaining a workforce that is less prone to industrial relation disputes; more confident CEOs may underestimate the risks associated with industrial disputes. The diversity component that is categorised as having institutional impact includes a range of issues that are also related to employment. For example, employee benefits or other programs addressing work/life concerns are categorised as diversity strength. This component may also help reduce industrial relation disputes. Therefore, although the employment component of CSR is classified as a technical area, it has considerable risk-reducing advantages for the firm. The more confident the CEO, the less interest they have in reducing risks associated with industrial disputes and employment relations.

In relation to the product component of CSR, we find that CEO confidence is not related to the strengths of the product component of CSR, but rather, is related to concerns associated with the firm's product. Specifically, there is a negative relationship between CEO confidence and product concerns. In other words, the more confident the CEO, the fewer concerns there are regarding the firm's products. This detracts somewhat from Hirshleifer et al. (2012); however, as our model also controls for R&D expenditures, it is somewhat unclear what the exact driver is for this result. More research needs to be undertaken in this area to understand the reasons for this relationship.

5. Robustness tests

5.1. Alternative proxy for overconfidence

The relationship between the level of CEO confidence and CSR is examined by using different proxies for overconfidence. Hirshleifer et al. (2012) and Malmendier and Tate (2005a, 2005b) offer a dummy variable to gauge CEO overconfidence by constructing the moneyness of a CEO's year-end option holding. This is achieved as follows:

$$\text{Average realizable value} = \frac{\text{Value of the CEO option holdings}}{\text{No.of options held by the CEO}}$$

Average strike price = Year end stock price-Average realizable value.

$$\text{Moneyness} = (\text{Year end stock price}/\text{Average strike price}) - 1$$

If Moneyness > 0.67, and the CEO fails to exercise the options for two periods, the CEO is classified as overconfident and given the value of unity and zero otherwise (CONFIDENCE67).[8] We re-estimate our regressions using this alternative proxy for CEO confidence. In addition to this measure, there are numerous other proxies of CEO confidence (Hill et al., 2014). To add further robustness to our results, we consider previous stock performance as another proxy of CEO confidence. Recent stock performance has been shown to be associated with CEO hubris, which is related to confidence (Hayward and Hambrick, 1997). We define previous stock performance (PP) as the stock return of the firm including dividends over the previous 12 months. Relative CEO compensation (RC) has also been shown to proxy aspects of confidence (Hayward and Hambrick, 1997). We define RC as the salary and bonus of the CEO divided by the salary and bonus of the next highest executive, as per Hayward and Hambrick (1997). These results are shown in Table 8 as Model 1.1a, 1.1b and 1.1c respectively.

As shown in Table 8, the results are relatively similar to those previously reported. There is a significant negative relationship between CSR overall for CONFIDENCE67 and previous stock performance (PP). Although relative CEO compensation (RC) enters the model with a negative coefficient, it is not significant. This tends to support the results of Hill et al. (2014) that the proxy measures of confidence may measure different aspects of CEO confidence. The results for the other control variables are consistent with those previously reported.

Banerjee et al. (2015a) adjust their measure of confidence by taking the natural logarithm of one plus the level of confidence in order to account for potential non-linearity in the confidence/promotion relation. Owing to potential non-linearity in the confidence/CSR relation, we also adjust the CONFIDENCE variable by taking one plus the level of confidence. Our results remain robust to this adjustment. Generally, CEO confidence negatively relates to the level of CSR score, which is most evident for institutional characteristics of CSR.[9]

5.2. Alternative proxy for CSR

KLD occasionally adds or deletes rating items, which causes concern that the variations in scores for CSR and subsections of CSR are caused by this addition and deletion, rather than by the variations in CEO confidence. Therefore, we follow Baron et al. (2011) to alleviate this concern in a four-step process: First, we subtract the total number of concerns from total number of strengths for each subsection of CSR in a given year. Second, we scale the score for each section of CSR by the total number of rated strengths and concerns in a given year to construct a scaled subsection score. Third, we total the scaled score for each subsection, and divide this sum by the number of rated subsections in a given year to obtain a scaled CSR overall score. Finally, we re-run all models and obtain similar results.[10] That is, CSR negatively

[8] This contrasts to our continuous measure which follows Banerjee et al. (2015a and 2015b):Confidence = $\frac{\text{Value of option holding}}{\text{No. of options held}}$/Year end stock price. A difference between Banerjee et al. (2015a and 2015b) and Hirshleifer et al. (2012) is that in Hirshleifer et al. (2012) the denominator is less the average realizable value.

[9] These results are available on request.

[10] These results are available on request.

Table 8
Relation between CSR and alternative measurement of CEO overconfidence.

	Model 1.1a	Model 1.1b	Model 1.1c
Independent Variables			
$CONFIDENCE67_{i,t-1}$	−0.350***		
	(0.110)		
$PP_{i,t-1}$		−0.065*	
		(0.039)	
$RC_{i,t-1}$			−0.056
			(0.046)
Control Variables			
$GENDER_{i,t-1}$	−0.182	−0.238	−0.239
	(0.373)	(0.363)	(0.363)
$AGE_{i,t-1}$	−0.013*	−0.015*	−0.014*
	(0.008)	(0.008)	(0.008)
$TENURE_{i,t-1}$	0.019**	0.014*	0.0149*
	(0.008)	(0.008)	(0.008)
$ROA_{i,t-1}$	1.300**	1.178**	1.186**
	(0.527)	(0.529)	(0.530)
$LNAT_{i,t-1}$	−0.175	−0.175	−0.176
	(0.113)	(0.114)	(0.114)
$DEBT_{i,t-1}$	0.695**	0.735**	0.755**
	(0.323)	(0.324)	(0.324)
$ADEXP_{i,t-1}$	−0.407	−0.457	−0.409
	(2.694)	(2.747)	(2.732)
$RDEXP_{i,t-1}$	-2.390	-2.545	-2.398
	(2.078)	(2.122)	(2.104)
$CAPITALEXP_{i,t-1}$	−0.613	−0.752	−0.633
	(0.942)	(0.958)	(0.957)
$EINDEX_{i,t-1}$	-0.116***	−0.117***	-0.117***
	(0.044)	(0.044)	(0.044)
$BLOCKHOLDINGS_{i,t-1}$	−1.480***	−1.451***	−1.433***
	(0.297)	(0.295)	(0.295)
Year fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Observations	14,385	14,375	14,385
Adjusted R^2	0.122	0.120	0.119
F-statistic	26.00***	25.75***	26.07***

This table presents the regression results for different proxies of CEO confidence. Standard errors clustered on firm are given in parentheses. *, **, *** indicate coefficients are significant at 10%, 5% and 1% respectively.

relates to CEO confidence, which is dominant for institutional aspects of CSR, thus supporting both the hedging aspect of CSR and reduced hedging for more confident CEOs.

5.3. Endogeneity and omitted variables

Most finance research poses problems associated with endogeneity. Endogeneity occurs when the independent variable of interest is correlated with the error term. Sources of endogeneity include omitted variables, measurement errors, and simultaneity, and cause bias in regression models. Although, in our models, we have included many variables as controls (to minimise omitted variable problems), and measure variables differently (to minimise the impact of measurement errors), these problems, along with other sources of endogeneity, remain. However, to add further robustness to our initial results and to further reduce the impact of endogeneity, we re-do our analysis using propensity score matching, which was originally proposed by Rosenbaum and Rubin (1983).[11] The propensity score matching approach we use is explained below.

Certain firms may treat overconfidence as a criterion when selecting a CEO. Thus, the firm characteristics may simultaneously impact upon the choice of a CEO and the decision to engage in CSR. We first estimate the probability that a firm will hire an overconfident CEO by running a probit regression, where the dependent variable is a dummy variable equal to one if the CEO is overconfident and zero otherwise. This is a model that predicts the probability that a firm will hire an overconfident CEO, and follows Banerjee et al. (2015a). The model is as follows:

$$OC_{i,t} = \alpha_0 + \alpha_1 LNAT_{i,t-1} + \alpha_2 ROA_{i,t-1} + \alpha_3 BV/MV_{i,t-1} + \alpha_4 DEBT_{i,t-1} + \alpha_5 RDEXP_{i,t-1} + \alpha_6 ADEXP_{i,t-1} + \alpha_7 CAPITALEXP_{i,t-1} + \varepsilon_{i,t} \quad (5)$$

Where $OC_{i,t}$ is a dummy variable equal to one if the firm hires an overconfident CEO in year t and zero otherwise, and where $BV/MV_{i,t-1}$ is the book-to-market value of equity of firm i at the beginning of year *t-1*. The other variables are as previously defined.

The result from estimating Model 5 is the probability that a firm will hire an overconfident CEO. This is the propensity score. We then match two firms with the same propensity score, where one hires an overconfident CEO, and the other does not. Finally, we compare the level of CSR between the two matched firms. Using the CONFIDENCE67 variable, we obtain a coefficient of −0.306 at 1% significance.[12] This further supports our result of a negative relationship between overconfidence and CSR, and also helps alleviate issues associated with endogeneity.

Other possible reasons for explaining the relationship between CSR and CEO confidence include the possibility that highly acquisitive firms hire overconfident managers, and that these types of firms are less likely to spend resources on CSR.[13] To test this possible reason we created three variables to tease out highly acquisitive firms. First, we created an index that ranked firms depending upon the number of acquisitions it had during the sample period. Second, we created a variable based on the number of acquisitions the firm completed over the previous 5 years. Finally, we created a dummy variable if the firm made an acquisition announcement in the previous year and zero otherwise. None of these approaches changed the negative and significant relationship between CSR and CEO confidence. We also explored the potential for higher CSR firms to incur higher SG&A expenses. The results were robust to these additional tests.[14].

5.4. Momentum effects

CEOs may choose to postpone their option exercise because they believe that the stock price will continue upwards from a previous upward trend. To control for this momentum effect, we augment into our models a variable representing the past five-year buy and hold stock returns as per Malmendier and Tate (2008). The results remain relatively robust to this additional control. CONFIDENCE is negatively related to CSR but insignificant; INST (Institutional component of CSR) is negative and significant, while TECH (Technical component of CSR) is positive and insignificant.[15]

5.5. Financial constraints

Given that overconfident CEOs are more likely to overinvest (Malmendier and Tate, 2005a), firms with overconfident CEOs are more likely to face financial constraints. However, firms with financial constraints are less likely to invest in CSR. In other words, financial constraints are negatively related to CSR. To consider the impact of financial constraints on the relationship between CEO overconfidence and CSR, we include a proxy for financial constraints.

[11] For an introduction to propensity score matching see Austin (2011).

[12] Propensity score matching requires the variable of interest, in this case overconfidence, to be an integer. This is why we use CONFIDENCE67.

[13] We thank a referee for these suggestions.

[14] These results are available on request.

[15] These results are available on request. We also used 2-year and 3-year buy and hold returns with similar results.

The WW index of Whited and Wu (2006) is used to estimate financial constraints as follows:

$$WW_{i,t} = -0.091\left(\frac{CF_{i,t}}{TA_{i,t-1}}\right) - 0.062(DIVDUM_{i,t}) + 0.021\left(\frac{LTD_{i,t}}{TA_{i,t-1}}\right) - 0.044(LNAT_{i,t}) + 0.012(INDSG_{i,t}) - 0.035(SG_{i,t}) \quad (6)$$

where $CF_{i,t}/TA_{i,t-1}$ is firm i cash flow at time t over book value of firm i total assets at t-1; $DIVDUM_{i,t}$ equals 1 if firm i pays cash dividends at time t and zero otherwise; $LTD_{i,t}/TA_{i,t-1}$ is firm i long-term debt at time t over book value of firm i total assets at t-1; $LNAT_{i,t}$ is as previously defined; $INDSG_{i,t}$ is firm i three-digit industry sales growth at time t; and $SG_{i,t}$ is the firm i sales growth at time t. A firm with a higher WW index is perceived to be more financially constrained. When we include the control for financial constraint in Model 1.1, the results for the CONFIDENCE variable remain consistent (negative for CSR, negative for the institutional component of CSR, and insignificant for the technical components).[16]

5.6. Interactions

Studies have documented links between CEO overconfidence and CEO characteristics. For example, Huang and Kisgen (2013) have reported that male CEOs exhibit relative overconfidence in significant corporate decision making compared to females, and Malmendier and Tate (2008) control for CEO age and CEO tenure. The results reported in Table 2 regarding CEO characteristics suggest that there is possible interaction between gender, CSR, and confidence. To control for this, we re-estimated our models excluding female CEOs. The results are similar to those reported, and are available on request.

6. Summary and conclusions

Extensive research examines different dimensions of CEO confidence as well as the impacts of CEO confidence on various corporate policies. In this study, we examine the relationship between CEO confidence and firm CSR. Research shows that CSR has a hedging feature. CEOs who are overconfident underestimate firm risks, which leads overconfident CEOs to undertake less hedging. This predicts a negative relationship between CEO confidence and CSR. There is also evidence that overconfident managers have narcissistic tendencies. This predicts a positive relationship between overconfidence and CSR. We find that CEO confidence is negatively related to the level of CSR. This effect is stronger in the institutional aspects of CSR (particularly community and workforce diversity), which has a greater hedging effect, than in the technical aspects of CSR (corporate governance and employee relation), which has less of a hedging effect. Although we also find a negative relationship with confidence and employee relations, this is also explained through the hedging hypothesis. Our research finds a positive relationship between CEO confidence and product quality aspect of CSR. This may be explained by the existing research that overconfident CEOs are found to be better innovators, although further work needs to be done in this area. Furthermore, there is no evidence supporting a positive relationship between CEO confidence and CSR, suggesting that narcissism characteristics are not influencing CSR. Our results are relatively robust to different competing explanations and alternative proxies for CSR and CEO confidence and a range of controls. The findings offer important implications from an agency problem perspective. As overconfident CEOs overestimate the probability of success and underestimate risk, they are involved in less CSR, which ironically could mitigate the negative effects of damaging events on firm value.

[16] These results are available on request.

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