



# Entrenchment through corporate social responsibility: Evidence from CEO network centrality

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## ABSTRACT

This paper investigates whether CEOs with high network centrality entrench themselves when taking CSR decisions and how that affects firm value. Evidence portrays that CSR in firms with more central CEOs is negatively associated with firm-value, and this association is mitigated by better corporate governance mechanisms and by geographic areas of higher social capital. This negative association is lower during disasters which reflect periods of positive exogenous shocks to the societal demand for CSR. Furthermore, CSR by more central CEOs is positively associated with future increases in CEO compensation and future improvement in a CEO's network position. The findings reveal that, in general, central CEOs use CSR to entrench themselves and gain private benefits rather than increase shareholder value.

## 1. Introduction

Corporate social responsibility (CSR) has become an important initiative in the corporate world in recent years. Firms are increasingly moving beyond the expectations of shareholders and attempting to respond to growing institutional pressures for more responsible practices (Freeman, Harrison, & Wicks, 2007). However, a strand of literature argues that CSR represents an allocation of resources that may not be in the best interests of shareholders (e.g., Borghesi, Houston, & Naranjo, 2014; Borisov, Goldman, & Gupta, 2016; Krüger, 2015; Margolis & Walsh, 2003; Masulis & Reza, 2015; Petrenko, Aime, Ridge, & Hill, 2016), suggesting that CSR could lead to waste of corporate resources. On the other hand, recent research on social networks has emphasized the importance of the social ties of a firm's CEO to the allocation of its resources (e.g., El-Khatib, Fogel, & Jandik, 2015; Faley, Kovacs, & Venkateswaran, 2014; Fang, Francis, & Hasan, 2018; Fracassi, 2017; Ishii & Xuan, 2014). Within this context, our paper investigates the role of CEO network centrality, which measures the extent and strength of a CEO's social ties, in the CSR-value relation.

Prior research on social networks suggests that economic agents are influenced by their social ties (Coleman, 1988). Social ties may be formed via various channels, including former employment activities, educational institutions, or other networks such as clubs and charitable

organizations (Fracassi & Tate, 2012). There are two perspectives on the relation between social ties and corporate investment policies. The first perspective supports the *information-access hypothesis*, whereby personal connections are deemed to increase access to more valuable information and facilitate information dissemination within a social network (e.g., Calvo-Armengol & Jackson, 2004; Granovetter, 1995; Holzer, 1987). Moreover, a position of centrality within a social network is a significant source of power. The holder of that position enjoys greater control of information flow relative to others located on the periphery (Brass, 1992; Brass & Burkhardt, 1992; Burt, 1982). Building on these arguments, several studies have empirically shown that social ties and dominant positions in social networks result in value-increasing investment policies through information transfer among the individuals in a social network (e.g., Cohen, Frazzini, & Malloy, 2008, 2010; Faley et al., 2014; Hochberg, Ljungqvist, & Lu, 2007).

The second perspective supports the *entrenchment hypothesis*, which posits that social ties might be used by CEOs to promote themselves to become more reputable and influential within their networks (Bearden & Mintz, 1987; Galaskiewicz, 1985; Mizruchi, 1992, 1996; Useem, 1986). In that regard, several studies suggest that social ties may create an incentive for CEOs to reap private benefits and entrench themselves rather than to increase firm value (e.g., Chikh & Filbien, 2011; El-Khatib et al., 2015; Fracassi & Tate, 2012; Hwang & Kim, 2009; Ishii &

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Xuan, 2014). For instance, El-Khatib et al. (2015) find that high-centrality CEOs engage in value-destroying mergers and acquisitions to increase their private wealth and avoid the discipline of the markets for corporate control and the executive labor market. Overall, this stream of literature suggests that CEOs may use network centrality to entrench themselves, resulting in a misuse of corporate resources.

We argue that CSR expenditures provide a suitable setting to examine whether more central CEOs access value-increasing information (*information-access hypothesis*) or entrench themselves (*entrenchment hypothesis*). If social networks indeed facilitate the dissemination of business information that improves the quality of strategic decisions (e.g., Cohen et al., 2010; Faleye et al., 2014), then CEOs who are socially better connected (i.e., more central to their networks) are likely to have greater access to information related to socially responsible activities than are CEOs located on the periphery of a social network. However, CEOs have considerable discretion regarding decisions related to CSR expenditures because such decisions are difficult to evaluate (Margolis & Walsh, 2003; Waldman & Siegel, 2008). Hence, if the *entrenchment hypothesis* holds, we would observe more central CEOs opportunistically directing some of their firm's CSR expenditures towards advancing their own interests at the expense of shareholders, in an attempt to maintain or enhance their personal reputations and social positions.<sup>1</sup>

Using a sample of 1518 unique CEOs managing 1008 U.S. firms from 2000 through 2010, and four measures of network centrality, we investigate the impact of a CEO's network centrality on the CSR-value relation. Following Lys, Naughton, and Wang (2015), we split CSR expenditures into two components: (1) the predicted component based on CSR determinants and (2) the residual (i.e., discretionary) component that is unrelated to CSR determinants. We find that CSR residuals are negatively related to firm value in firms with more central CEOs. Our results are robust to firm fixed effects and to CEO fixed effects. We also find that better corporate governance mechanisms mitigate the negative relation between CSR residuals by more central CEOs and firm value. To provide more insights, we find that CSR residuals by more central CEOs are positively associated with CEOs' private benefits in terms of future increase in compensation and improvement in social status within their networks. Overall, these findings support the *entrenchment hypothesis* on CEO network centrality and suggest that more central CEOs use CSR to reap private benefits rather than to increase shareholder value.

Disasters (e.g., the Midwest floods of June 2008) will shift the societal demand for CSR (Liang & Renneboog, 2017). Hence, firms are expected to change their CSR strategies to respond to the increased interest in CSR by investors and other stakeholders during disaster periods. We find that the negative association between CSR residuals by more central CEOs and firm value is lower during disaster periods. This finding suggests that more central CEOs are better disciplined when investors and other stakeholders strongly demand the firms to be more involved in value-increasing CSR activities.

Finally, we examine how more central CEOs would behave in regions that differ in social capital, defined as the propensity for people in a society to collaborate and produce socially efficient outcomes

<sup>1</sup> As a classic example of CEOs reaping private benefits from CSR at the expense of shareholders is Occidental Petroleum's decision to fund the building of a museum named in honor of its CEO and founder, Armand Hammer. The shareholders instigated a lawsuit against the firm, and subsequently the firm agreed to limit its construction spending to a total of \$95 million (Monk & Minow, 2004; Masulis & Reza, 2015). Another classic example is related to Tyco's CEO: "Mr. Kozlowski was known for spending his own time and money on worthy causes. But he was also very generous with Tyco's money, donating tens of millions of corporate dollars to charities he favored – often getting credit in his own name rather than Tyco's. A Maine private school attended by his daughters got \$1.7 million in Tyco money for its Kozlowski Athletic Center, while his alma mater, New Jersey's Seton Hall University, received a \$5 million Tyco pledge for Kozlowski Hall." (Wall Street Journal, August 7, 2002).

(Putnam, 1993, 2001). Prior research suggests that the higher the social capital of the region/county where the firm is headquartered, the less likely are managers to behave opportunistically; they will rather behave in a way that conforms to the expectations of social peers in their communities (e.g., Hasan, Hoi, Wu, & Zhang, 2017; Hilary & Hui, 2009; Hoi, Wu, & Zhang, 2016; Jha & Cox, 2015; Kohlberg, 1984; McGuire, Omer, & Sharp, 2012). Our results show that the negative relation between CSR residuals by more central CEOs and firm value is significantly weaker in counties with high social capital, suggesting that the opportunistic behavior of more central CEOs is constrained in those counties.

Our contributions to the extant literature are three-fold. First, we contribute to the important debate as to whether CSR increases firm value (for a discussion, see Moser & Martin, 2012; Ferrell, Liang, & Renneboog, 2016). If firms can align their social goals with corporate goals, CSR can then be used as a strategic tool to maximize value, which leads to superior shareholder value (Manchiraju & Rajgopal, 2017). However, decision making regarding CSR and the implementation of such decisions depend on managers, who may have personal incentives to be socially responsible. While the literature has largely acknowledged the value-enhancing role of firms' social and environmental activities (e.g., Deng, Kang, & Low, 2013; Dhaliwal, Li, Tsang, & Yang, 2011; Hong & Liskovich, 2016; Lins, Servaes, & Tamayo, 2017), several major studies also indicate otherwise (e.g., Borisov et al., 2016; Krüger, 2015; Masulis & Reza, 2015; Petrenko et al., 2016). These inconsistent findings call for new theories and empirical evidence to further understand this issue. Our study examines the CSR-value relation in the U.S. while considering a CEO's relative position within a social network, which reflects an important CEO trait not examined in prior literature on CSR. Servaes and Tamayo (2017) suggest that, while studying CSR is clearly useful, future research would yield further insights by examining the networks of executives and understanding what factors could lead to suboptimal behavior in CSR. Hence, our paper addresses this unexplored territory in the literature. Our paper also calls for future international studies that explore what institutional factors, such as governance, cultural, and political factors, may cause the role of CEO network centrality in the CSR-value relation to be different from that we document in the U.S.

Second, we add new evidence on the relationship between leadership characteristics and CSR outcomes. Over the past decade, academic research continues to highlight the importance of CEO incentives in shaping organizational behavior with regards to socially responsible investment (e.g., Brown & Treviño, 2014). However, to our knowledge, no existing study has investigated how a CEO's interconnectedness in the corporate elite social networks could affect their decision-making on CSR. Our findings document that social-network position does affect a CEO's incentives to allocate resources to CSR activities. Specifically, being centrally located within a social network exposes the CEO to more personal gains from CSR investments and, as a result, does not necessarily improve firm value. This new evidence supports the *entrenchment hypothesis* argued by prior social-network studies. We also demonstrate that the misallocation of resources can be mitigated, however, under high-quality corporate governance.

Finally, our study provides new insights into the value implications of social ties and network centrality. Existing research has linked CEO social networks to various firm investment policies, but the evidence so far is conflicting and inconclusive with regard to firm value (El-Khatib et al., 2015; Faleye et al., 2014; Fracassi, 2017; Ishii & Xuan, 2014). Recognizing the growing importance of CSR investments as a business strategy to enhance corporate reputation, we examine whether CEO social networks alter firm value implication of CSR. Our findings lend support to the dark-side effect of CEO social networks, which is that more central CEOs use CSR to reap private benefits rather than to increase shareholder value.

The rest of the paper is organized as follows. Section 2 reviews the related literature and develops the hypotheses. Section 3 discusses the

data and the methodology. Section 4 presents the main results, followed by further investigations in Section 5. Section 6 concludes.

## 2. Literature review and hypotheses

Existing empirical studies find inconsistent evidence on whether CSR increases firm value (e.g., Ferrell et al., 2016; Margolis & Walsh, 2003; Moser & Martin, 2012). The upper-echelons theory argues that executives decide on the strategic approach to tackle corporate-related social issues, and the personal characteristics or traits of executives greatly influence organizational outcomes in terms of strategic choices they make and performance levels they achieve (Hambrick, 2007; Hambrick & Mason, 1984). Hence, CEOs will have a significant influence on the firm's CSR decisions and therefore might make CSR choices directed towards fulfilling their personal needs, which are derived from their personal traits (Chatterjee & Hambrick, 2007; Gerstner, König, Enders, & Hambrick, 2013; Petrenko et al., 2016). However, scant research has examined the impact of a CEO's personal traits on the relation between CSR and firm value (Petrenko et al., 2016). Hence, this study examines whether network centrality, an important CEO personal trait that reflects the extent and strength of his/her social connections, impacts the CSR-value relation.

Social science and management research suggests that network centrality is an important CEO trait for strategic decision making (Engelberg, Gao, & Parsons, 2013). Network centrality grants CEOs the power for better information access because it makes it possible for them to reach other individuals more efficiently (e.g., Freeman, 1978; Hanneman & Riddle, 2005). Network centrality can also facilitate the route for CEOs towards obtaining information from trustworthy individuals relatively cheaply (Borgatti & Cross, 2003).

Hochberg et al. (2007) find that better-networked venture capital firms experience a higher proportion of successful exits through an IPO or a sale to another company. Their results suggest that network centrality provides privileged access to better information flow about deals, and that well-networked venture capital firms can better serve their portfolio companies, thus leading to higher performance. Furthermore, Cohen et al. (2010) show that sell-side analysts use their educational ties with firms to gather superior information, which helps them outperform other analysts on their stock recommendations. Faley et al. (2014) find that firms with CEOs with stronger personal connections (employment, educational, and social) invest more in research and development and generate more patents of higher quality. They argue that CEOs use their personal network to access information, which enhances the identification, evaluation, and exploitation of innovative ideas. In sum, the findings of these studies support the *information-access hypothesis*, which predicts that higher network centrality allows CEOs access to information that facilitates value-increasing corporate decisions.

While this study focuses on CEOs' social networks, other related studies have focused on boardroom networks. Some of these studies find that boardroom networks lead to value-increasing activities. For instance, Cai and Sevilir (2012) show that acquirers have a higher deal announcement return when they and their targets have a director (or directors) in common. In addition, Larcker, So, and Wang (2013) find that firms with central boards of directors formed by shared directorates earn superior risk-adjusted stock returns, consistent with firms benefiting from information and resources exchanged through boardroom networks. However, other studies find that boardroom networks can have a negative impact on shareholder value. For example, evidence shows a positive association between boardroom networks and the spread of options backdating and earnings management (e.g., Armstrong & Larcker, 2009; Bizjak, Lemmon, & Whitby, 2009; Chiu, Teoh, & Tian, 2013). Moreover, well connected boards may devote less attention to monitoring efforts that could result in value-decreasing management practices (e.g., Core, Holthausen, & Larcker, 1999; Fich & Shivdasani, 2006).

Consistent with the perspective that access to information is one important channel of CEO network centrality, we argue that CEOs with greater network centrality can use their personal social connections to better understand the social challenges of the community and the social needs of their employees and consumers, in addition to the CSR expectations of other stakeholders. For example, a more central CEO can obtain access to network information useful for initiating innovative human resource programs through his/her personal connections with other executives. Such initiatives can add firm value by creating a favorable working environment that boosts employee satisfaction, and other stakeholders, such as consumers, may be more willing to patronize firms with such CSR initiatives (Edmans, 2011). Therefore, more central CEOs are in a better position to engage in CSR expenditures that increase firm value than are others who are located on the periphery of their social networks with reduced access to network information. Hence, we present our first hypothesis:

**H1.** Information-access hypothesis. CEOs with higher network centrality are more likely to engage in value-increasing CSR expenditures relative to those with lower network centrality.

Another stream of literature suggests that CEOs might use their social ties to entrench themselves and reap private benefits. For instance, Hwang and Kim (2009) show that firms whose boards are socially independent (i.e., have no social ties with the CEO) award a significantly lower level of compensation, exhibit stronger pay-performance sensitivity, and have stronger turnover-performance sensitivity than firms whose boards are not socially independent. Their results suggest that social ties negatively affect how directors monitor and discipline CEOs. Fracassi and Tate (2012) find that CEO-director social ties adversely affect firm value, especially in the absence of good governance mechanisms that substitute for board monitoring. They also find that firms with higher CEO-director social ties are involved in bad acquisitions, which suggests that CEOs' social ties with directors negatively affect the role played by board monitoring. In addition, Ishii and Xuan (2014) investigate the social ties between directors and top managers in both acquiring and target firms, and show that acquirer CEOs receive higher bonuses and are better compensated for concluding acquisitions of targets that are highly connected to the acquiring firms. Nevertheless, they find that such acquisitions are more likely to be subsequently divested for performance-related reasons. El-Khatib et al. (2015) provide further support that M&A deals by high-centrality CEOs are more frequent and have a higher negative effect on the value of both the acquirer and the combined entity than are deals by low-centrality CEOs.

Using the entrenchment perspective on network centrality, which is supported by the findings in the above studies, we argue that more central CEOs may make CSR choices to fulfill their personal needs at the expense of shareholders. For example, more central CEOs may find themselves needing to use corporate resources in the form of CSR expenditures to attract attention and maintain or improve their personal reputations and social positions. Therefore, we present the following hypothesis:

**H2.** Entrenchment hypothesis. CEOs with higher network centrality are more likely to engage in value-decreasing CSR expenditures relative to those with lower network centrality.

## 3. Data and methodology

### 3.1. Data

Our empirical analysis is based on data from U.S. public firms from 2000 through 2010. We collect the studied data from a variety of sources. We first collect data on CEO social networks from the BoardEx database provided by Management Diagnostics Limited. The BoardEx database includes comprehensive biographical information on top

management and boards of directors, as well as relational links between these individuals for U.S. and European public firms. We obtain data on social ties for 14,589 CEO-year observations, excluding data on financial institutions, utilities, and nonprofit organizations.

We match CEO social-network data with data on CSR for sample firms from the MSCI database (previously referred to as KLD), which has been widely used to measure CSR activity (e.g., Chatterji, Levine, & Toffel, 2009; Hoi, Wu, & Zhang, 2013; Kim, Park, & Wier, 2012). This matching results in a sample of 7123 firm-year observations from 2000 through 2010. After merging the data with the Compustat database to obtain financial data, our sample drops to 6232 firm-year observations. Finally, we merge the data with the GMI Ratings database to obtain governance data and with ExecuComp to obtain ownership data for CEOs and board members, which results in a final sample of 4639 firm-year observations.

### 3.2. Methodology

#### 3.2.1. Research design

Following prior research (e.g., Barnea & Rubin, 2010; Lys et al., 2015), we use a firm's CSR score as a proxy for its actual CSR expenditures.<sup>2</sup> To test our hypotheses, we follow Lys et al. (2015) and split the CSR score into predicted and residual components. We estimate the predicted CSR component based on factors that prior research has shown to affect the level of CSR score. The residual component represents the deviation from the predicted component and, therefore, is unexplained by those factors. Hence, we run a first-stage regression that includes factors that affect CSR expenditures. The fitted values from this regression is *Predicted CSR*, and the difference between the actual and *Predicted CSR* is *Residual CSR*. We then take the fitted values and residuals from the first-stage regression and test the association between *Tobin's Q* in year  $t + 1$ , our proxy for firm value, and the interaction between *Residual CSR* and *CEO Centrality*. Hence, our main empirical model is as follows:

$$\begin{aligned} \text{Tobin's } Q_{t+1} = & \beta_0 + \beta_1 \text{ Predicted CSR}_t + \beta_2 \text{ Residual CSR}_t \\ & + \beta_3 \text{ CEO Centrality}_t + \beta_4 \text{ Residual CSR}_t * \text{CEO Centrality}_t \\ & + \text{Controls}_t + \eta \end{aligned} \quad (1)$$

All variables are defined below. We cluster standard errors at the firm-level in all regressions. Following Lys et al. (2015), we also calculate standard errors in the second-stage regressions by bootstrapping the two-step process to correct for first-stage estimation error. *Tobin's Q* is the market value of the firm divided by the replacement value of its assets. The predicted CSR reflects the normal level of CSR expenditures based on public information and, hence, we assume that the average CEO in the social network has access to such information. Therefore, if CEOs of higher network centrality have access to more information that allows them to make value-increasing CSR expenditures (*information-access hypothesis*), then we expect the estimated coefficient on the interaction of *CEO Centrality* and *Residual CSR* to be significantly positive. Also, the higher is the *Residual CSR*, the more likely that the firm over-invests in CSR. Thus, given that *CEO Centrality* is always positive, a positive estimated coefficient on the interaction of *CEO Centrality* and *Residual CSR* indicates whether over-investments in CSR by more central CEOs are value-increasing. On the contrary, if CEOs of higher network centrality use CSR as a channel to entrench themselves rather than to increase shareholder value (*entrenchment hypothesis*), then we expect the estimated coefficient on the interaction of *CEO Centrality* and *Residual CSR* to be significantly negative. This methodological approach of identifying associations using the fitted and residual values is not

<sup>2</sup> Firms do not have to make formal disclosures of CSR investments, so determining actual CSR expenditures is fraught with problems (Servaes & Tamayo, 2017).

new to the CSR literature. Lys et al. (2015) take this approach to investigate the association between CSR and firm performance. This methodology has been also used in other areas of research, such as executive compensation (e.g., Bebchuk & Grinstein, 2005; Core et al., 1999).

#### 3.2.2. Variables description

The CSR score is measured as the difference between total CSR strengths and total CSR concerns reported in the MSCI database (e.g., Chatterji et al., 2009; Di Giuli & Kostovetsky, 2014; Kim et al., 2012; Servaes & Tamayo, 2013). The MSCI database (previously referred to as KLD) uses various sources, such as stock exchange filings, surveys, and government reports to measure the firm's CSR activity in terms of the number of corporate strengths and corporate concerns (or weaknesses) for six dimensions: i) community; ii) diversity; iii) employee relations; iv) environment; v) human rights; and vi) product quality. For each of these CSR dimensions, firms may receive positive or negative scores according to their practices. If the firm has a strength (concern) indicator, it gains (loses) one point in its CSR score.<sup>3</sup> Following prior CSR studies, we exclude the corporate governance dimension reported in the database from the CSR score since corporate governance is perceived as a distinct construct from CSR (e.g., Di Giuli & Kostovetsky, 2014; Kim et al., 2012; Servaes & Tamayo, 2013).

*CEO Centrality* is calculated using the social links between individuals as per the BoardEx database. In line with prior literature (e.g., Cohen et al., 2008; Engelberg et al., 2013; Engelberg, Gao, & Parsons, 2012; Fang et al., 2018; Fracassi, 2017; Fracassi & Tate, 2012), we construct our measure of *CEO Centrality* using three types of social links between two individuals: those who (i) have worked for the same employer (work ties),<sup>4</sup> (ii) have graduated from the same university within three year of each other (school ties), or (iii) have memberships in the same country clubs and nonprofit organizations, such as government organizations, charities and the military (other social ties). Consistent with Fracassi (2017) and Fang et al. (2018), we focus on individuals with an active role in their selected organizations, such as "Trustee," "President," "Advisor," and "Board Member."

We employ four diverse measures of network centrality: degree, betweenness, closeness, and eigenvector (e.g., Andrikopoulos & Economou, 2015; Fracassi, 2017; Larcker et al., 2013). According to graph theory, centrality degree is the most straightforward measure to capture whether an individual is in the central position of a network (Scott, 2000). It is calculated using number of direct ties divided by the maximum possible pairs in the network. Betweenness captures the extent to which an individual lies between others and makes pass-through communications within the network. An individual with high betweenness centrality is supposed to hold an important intermediary role, and is therefore central to the network (Freeman, 1978). It is calculated as the proportion of all the paths linking any two individuals that pass through individual  $i$  normalized by the maximum possible betweenness degree in an  $n$ -actor network. Closeness is another key centrality measure in the networks. It is defined as the inverse of total distances to all other individuals in the network (Freeman, 1978). We take the normalized scores that are between zero and one, i.e., the score is zero if the individual is not connected to anyone and one if the individual is directly connected to all others. Finally, eigenvector centrality is a more sophisticated measure to assess the importance of an

<sup>3</sup> The maximum number of reported strengths and concerns per dimension varies over time. In further robustness tests, we scale the total strengths and concerns for each dimension by their maximum numbers on an annual basis. This leads to strength and concern scores ranging from zero to one per dimension and per year. We obtain an average adjusted CSR score of  $-0.111$  and we repeat our empirical tests accordingly. The results remain consistent with those reported in the paper.

<sup>4</sup> All the work ties are external, meaning that the networks do not include individuals who currently work within the same firm.

individual in the network. This measure considers both the number of connections and the relative importance of the connected individuals based on their degree centrality (Bonacich, 1972; Bonacich, 1987). Normalized by the highest possible eigenvector centrality in an  $n$ -actor network, the eigenvector centrality measure tells how an individual is connected with other well-connected individuals.

We control for a wide array of variables that could affect CSR and its value relevance including several CEO, board and firm characteristics (e.g., Di Giuli & Kostovetsky, 2014; Ding, Ferreira, & Wongchoti, 2016; Lys et al., 2015; Servaes & Tamayo, 2013). We control for *CEO Duality*, which is a dummy variable that equals one if the CEO is chairman of the board, and zero otherwise. *CEO Ownership* represents the number of shares owned by the CEO as a fraction of the total number of shares outstanding. *CEO Age* is the age of CEO in years, and *CEO Academic* is a dummy variable that equals one if the CEO has a PhD, and zero otherwise. *CEO Female* is a dummy variable that equals one if the CEO is a female, and zero otherwise. In terms of board characteristics, we control for *Board Independence*, *Director Ownership*, *Director Ties*, *Director Age*, and *Director Academic*. *Board Independence* represents the proportion of independent directors on the board. *Director Ownership* represents the cumulative board ownership. *Director Ties* is the average number of educational, professional, and other social ties of directors as per BoardEx. *Director Age* is the average age of board members and *Director Academic* is the proportion of directors holding a PhD degree.

Regarding firm characteristics, we control for *Geographic Social Capital*, which is equal to the social capital of the state where the firm's headquarters are located, since Jha and Cox (2015) and Hoi et al. (2016) find that *Geographic Social Capital* is positively associated with CSR score. Following Rupasingha, Goetz, and Freshwater (2006), we measure *Geographic Social Capital* as the first component in a principal-component analysis based on four variables: (1) percentage of persons who voted in presidential elections; (2) response rate to the Census Bureau's decennial census; (3) sum of tax-exempt non-profit organizations divided by population per 10,000; (4) sum of social organizations (religious, civic, business, political, professional, labor, fitness facilities, sport clubs, bowling centers, public golf courses) divided by population per 100,000. Data for *Geographic Social Capital* is obtained from the Northeast Regional Center for Rural Development (NERCRD) at Pennsylvania State University.

We further control for firm size, which is the natural logarithm of total assets. *Hi-Tech Dummy* is a dummy variable that equals one if the 2-digit SIC industry of the sample firm is 48 or 73, or the 3-digit SIC industry is 283, and zero otherwise. In addition, we control for firm age, operating income, advertising expenses, and leverage, which is the ratio of total debt to total assets. We also control for cash, research and development expenses (R&D), and capital expenditures. Finally, we include year and industry (2-digit SIC code) fixed effects. All variables are listed and defined in Appendix A.

## 4. Empirical results

### 4.1. Descriptive statistics

Table 1 presents the descriptive statistics for our main variables. It provides the summary statistics using the mean, standard deviation, and the quartiles for the entire sample. The results show an average CSR score of 0.089, indicating the existence of slightly more CSR strengths than CSR concerns for the average sample firm. Furthermore, the results show that the average predicted CSR is also equal to 0.089 and the average residual CSR is null. The results exhibit significant variation in the residual CSR, however, with a standard deviation of 2.219, which is almost twice as large as the standard deviation of the predicted CSR. Our sample CEOs have an average centrality degree of 0.012, an average betweenness of 0.001, an average closeness of 0.007, and an average eigenvector of 0.077. It is worth noting that CEO centrality by construction is always positive. An average CEO owns 1.2% of shares

**Table 1**

Descriptive statistics.

This table reports the descriptive statistics for the main variables used in our analysis. The sample consists of 4639 observations from 2000 till 2010. All variables are measured in year  $t$  except Tobin's Q measured in year  $t + 1$ . All variables are defined in Appendix A.

Variables	Mean	s.d.	Q1	Q2	Q3	Q4
CSR	0.089	2.510	-1.000	0.000	1.000	14.000
Predicted CSR	0.089	1.172	-0.595	0.122	0.831	4.612
Residual CSR	0.000	2.219	-1.260	-0.138	1.121	12.032
CEO centrality: degree	0.012	0.013	0.003	0.008	0.017	0.096
CEO centrality: betweenness	0.001	0.002	0.000	0.000	0.001	0.023
CEO centrality: closeness	0.007	0.002	0.006	0.006	0.007	0.011
CEO centrality: eigenvector	0.077	0.100	0.011	0.039	0.103	0.672
CEO duality	0.574	0.495	0.000	1.000	1.000	1.000
CEO ownership	0.012	0.036	0.000	0.001	0.010	0.562
CEO age	55.357	6.928	51.000	55.000	60.000	94.000
CEO academic	0.054	0.226	0.000	0.000	0.000	1.000
CEO female	0.031	0.175	0.000	0.000	0.000	1.000
Board independence	0.747	0.136	0.667	0.778	0.857	1.000
Director ownership	0.009	0.020	0.000	0.002	0.007	0.203
Director ties	2.102	0.706	1.792	2.197	2.639	3.664
Director age	60.521	3.832	58.182	60.667	63.000	76.833
Director academic	0.063	0.084	0.000	0.000	0.111	0.500
Tobin's Q	1.501	0.883	0.917	1.291	1.837	8.960
Geographic social capital	-0.486	0.838	-1.138	-0.403	0.097	4.306
Total assets (in \$mil.)	4615	6730	757	1955	5196	57211
Hi-tech dummy	0.151	0.358	0.000	0.000	0.000	1.000
Firm age	29.122	17.011	14.000	23.000	45.000	61.000
Operating income	0.146	0.085	0.099	0.143	0.190	0.713
Advertising	0.011	0.027	0.000	0.000	0.009	0.322
Leverage	0.203	0.159	0.059	0.197	0.310	1.121
Cash	0.151	0.162	0.031	0.087	0.221	0.938
R&D	0.061	0.207	0.000	0.012	0.061	7.158
CAPEX	0.050	0.048	0.021	0.036	0.062	0.496

outstanding and is 55 years old. Around 57% of sample firms are led by CEOs who are also chairmen of their boards of directors. In addition, 5.4% of CEOs hold a PhD and 3.1% are female. Almost three-quarters of board members are independent and are on average 61 years old. Around 6% of board members hold a PhD and they collectively own an average of 0.9% of shares outstanding. The average number of social ties per director is 2.102.

Furthermore, the results in Panel A show that our sample CEOs lead firms with an average Tobin's Q of 1.5 that are located in counties with an average geographic social capital of  $-0.486$ . Around 15% of sample firms are in hi-tech industries and an average sample firm has total assets of \$4615 million, has been in business for 29 years, and has an operating income of 14.6%. Also, an average sample firm spends 1.1% of its sales on advertising, has total debts of around 20% of total assets, and has roughly 15% of its total assets in cash. Finally, the results show that an average sample firm spends 6.1% of its sales on R&D and 5% of its total assets on capital expenditures.

### 4.2. Information access or entrenchment?

Model (1) of Table 2 reports the regression results of CSR on various economic determinants, including industry and year fixed effects. Our results show that CSR is higher in firms run by female CEOs ( $p$ -value = 1%) and firms with stronger director social ties ( $p$ -value = 10%), but is lower in firms with older directors ( $p$ -value = 5%). Model (1) also shows that CSR is positively related to firm size, profitability, advertising expenses, cash, R&D, and capital expenditures (at the 10% significance level or better). Overall, these results are in line with those of prior studies on the determinants of CSR (e.g., Di Giuli & Kostovetsky, 2014; Lys et al., 2015).

**Table 2**  
Information access or entrenchment?

This table reports the results on the effects of CEO centrality and residual CSR on firm value. *Predicted CSR* and *Residual CSR* are estimated from Model (1), and used in Models (2a) to (2d). All variables are defined in Appendix A. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. The *t*-statistics are two-tailed. Standard errors are clustered at the firm-level in all regressions. In Models (2a) to (2d), standard errors are also calculated by bootstrapping the two-step process to correct for first-stage estimation error. The standard errors are in italic.

CEO centrality measure used:	Tobin's $Q_{t+1}$				
	Degree		Betweenness	Closeness	Eigenvector
	CSR				
	(1)	(2a)	(2b)	(2c)	(2d)
Constant	-4.059*** 1.357	3.530*** 0.399	3.546*** 0.706	3.573*** 0.775	3.521*** 0.260
Predicted CSR		0.948*** 0.190	0.953*** 0.141	0.943*** 0.016	0.947*** 0.056
Residual CSR		0.030*** 0.003	0.028*** 0.004	0.028 0.022	0.026** 0.011
CEO centrality		1.426 0.992	7.303 13.941	-7.029 14.228	0.124 0.200
Residual CSR * CEO centrality		-0.567*** 0.139	-3.838*** 0.604	-1.113* 0.600	-0.056** 0.027
CEO duality	-0.156 0.116	0.129*** 0.002	0.128*** 0.046	0.125* 0.066	0.127*** 0.024
CEO ownership	-1.169 1.276	2.657*** 0.137	2.661*** 1.011	2.644*** 1.327	2.664*** 0.586
CEO age	0.007 0.009	-0.008* 0.004	-0.008** 0.004	-0.008*** 0.002	-0.008 0.005
CEO academic	0.118 0.230	-0.040*** 0.007	-0.040 0.091	-0.036 0.032	-0.039 0.054
CEO female	1.961*** 0.565	-1.921*** 0.354	-1.927*** 0.306	-1.920*** 0.136	-1.921*** 0.153
Board independence	0.554 0.434	-0.507*** 0.007	-0.508*** 0.150	-0.493*** 0.187	-0.504** 0.229
Director ownership	-2.697 2.855	3.683*** 0.756	3.699** 1.766	3.683** 1.659	3.667* 2.093
Director ties	0.156* 0.090	-0.107** 0.050	-0.106*** 0.032	-0.101*** 0.027	-0.105** 0.042
Director age	-0.039** 0.018	0.031** 0.015	0.032*** 0.004	0.031*** 0.008	0.031*** 0.007
Director academic	-0.018 1.409	0.297 0.459	0.301 0.577	0.273 0.353	0.292 0.254
Geographic social capital	0.086 0.094	-0.044 0.062	-0.044* 0.024	-0.045*** 0.017	-0.045 0.042
Ln (total assets)	0.409*** 0.079	-0.371*** 0.052	-0.372*** 0.048	-0.365*** 0.007	-0.369*** 0.031
Hi-tech dummy	0.502 0.464	-0.051 0.168	-0.057 0.089	-0.053 0.233	-0.048 0.246
Firm age	0.002 0.006	-0.003** 0.002	-0.003* 0.002	-0.003*** 0.001	-0.003*** 0.001
Operating income	3.987*** 0.815	0.668*** 0.252	0.646 0.769	0.677 0.735	0.672*** 0.212
Advertising	7.887** 3.153	-4.770*** 0.272	-4.813*** 1.642	-4.755*** 0.556	-4.776*** 1.129
Leverage	-0.615 0.485	0.352** 0.144	0.363* 0.186	0.332*** 0.067	0.348* 0.180
Cash	1.526*** 0.413	-0.499*** 0.027	-0.504** 0.244	-0.490 0.318	-0.497** 0.224
R&D	0.464* 0.258	0.197 0.264	0.197 0.551	0.204 0.322	0.202 0.201
CAPEX	3.691** 1.590	-3.287*** 1.093	-3.298*** 0.784	-3.283*** 0.314	-3.292*** 0.504
Industry effects	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes
N.	4639	4639	4639	4639	4639
Adjusted R-squared	0.218	0.357	0.358	0.357	0.357

In Models (2a) to (2d), we investigate the interaction effect of *Residual CSR* and *CEO Centrality* on *Tobin's Q* based on Eq. (1), using our four proxies for CEO centrality, i.e., degree, betweenness, closeness, and eigenvector. *Tobin's Q* is positively related to *Predicted CSR* (at the 1% significance level) across all models and to *Residual CSR* (at the 5% significance level or better) in three out of four models. However, results show that the estimated coefficient on the interaction of *Residual CSR* and *CEO Centrality* is consistently negative (at the 10% significance

level or better). The findings provide support for the *entrenchment hypothesis* (H2). With respect to control variables, the results show that, across all models, *Tobin's Q* is negatively related to firm size, *CEO Female*, *Board Independence*, *Director Ties*, *Firm Age*, *Advertising* and *CAPEX*, but is positively related to *CEO Duality*, *CEO Ownership*, *Director Ownership*, *Director Age* and *Leverage* (at the 10% significance level or better). Overall, the results in Table 2 are not consistent with the *information-access hypothesis* (H1). However, the results are consistent

with the *entrenchment hypothesis* (H2) and show that CEOs with higher network centrality are more likely to engage in value-decreasing CSR expenditures compared to their peers with lower network centrality.<sup>5</sup>

## 5. Further investigations

### 5.1. The role of corporate governance

Next, we analyze how the existence of effective corporate-governance mechanisms, such as a greater proportion of independent directors, would interact with CSR decisions taken by CEOs with higher network centrality. Prior research suggests that effective corporate-governance mechanisms, which are set to ensure that a firm operates in the best interest of shareholders, play a significant role in the association between CSR and firm value (e.g., Cheng, Hong, & Shue, 2016; Ferrell et al., 2016; Masulis & Reza, 2015). Therefore, if the entrenchment perspective prevails, we expect effective corporate governance mechanisms to better monitor and discipline more central CEOs in their CSR decisions. In this case, the negative effect on firm value documented in Table 2 would be weaker.

Table 3 reports the results on the role of corporate governance. We use two proxies for corporate governance: *Board Independence* in Panel A, and *CEO Duality* in Panel B. For each governance variable, we divide our sample into two-subsamples and we re-run our empirical tests. Specifically, in Panel A, we split our sample into firms with high board independence (i.e., higher than the sample median board independence) and firms with low board independence (lower or equal to the sample median board independence). In Panel B, we split firms into those with CEO duality and those with no CEO duality.

When using board independence, the results in Panel A of Table 3 indicate that the interaction of *Residual CSR* and *CEO Centrality* remains negative and significant across all models in firms with low board independence, whereas it is not significant across all models in firms with high board independence. Consistent with the view that the presence of independent board members could alleviate agency issues (e.g., Carcello, Hermanson, Neal, & Riley, 2002; Klein, 2002), the results for most models in Panel A suggest that high board independence mitigates potential entrenchment concerns in firms with higher residual CSR and CEO centrality. On the other hand, CEO-chair duality could lead to greater agency conflicts with shareholders (e.g., Dechow, Sloan, & Sweeney, 1996), and thus could increase CEO entrenchment concerns. The results in Panel B indicate that the interaction of *Residual CSR* and *CEO Centrality* is negative and significant in firms with CEO duality across most models, but it is not significant in firms with no CEO duality. Taken together, the results suggest that effective corporate-governance mechanisms mitigate the negative association between CSR and value in firms with more central CEOs.<sup>6</sup>

<sup>5</sup> As a robustness test, we add to our models in Table 2 the interaction of *Predicted CSR* and *CEO Centrality*. The results still hold for the interaction of *Residual CSR* and *CEO Centrality*. However, the interaction of *Predicted CSR* and *CEO Centrality* is not significant.

<sup>6</sup> While greater CEO ownership share is in general associated with better monitoring (Shleifer & Vishny, 1997), it may also lead to entrenchment (Morck, Shleifer, & Vishny, 1990). Hence, it is not clear whether CEO ownership is a governance mechanism that would mitigate entrenchment. We examine the interaction with high and low CEO ownership based on the sample median, and while we find some evidence that the negative effect of residual CSR and CEO centrality on firm value is lower in firms with high CEO ownership, we find no significant effect in most specifications. Overall, the results suggest that CEO ownership is not a significant governance mechanism in our setting. This evidence is consistent with that of El-Khatib et al. (2015) who also find no significance between merger performance and the interaction between CEO ownership and CEO centrality.

### 5.2. Future CEO private benefits

To provide further evidence to support the *entrenchment hypothesis*, we examine whether more central CEOs engage in value-decreasing CSR expenditures to extract private benefits. We first investigate whether more central CEOs use CSR to improve their social positions within their networks. Since network centrality brings power and ability to influence and attract followers, more central CEOs could entrench themselves by directing some CSR expenditures towards achieving higher future CEO centrality. CSR activities could lead to new social connections for a CEO that could increase his/her network centrality. Table 4 reports the impact of the interaction of *Residual CSR* and *CEO Centrality* on the dependent variable, future *CEO Centrality* measured over one- and two-year periods (Panels A and B, respectively). The results in Table 4 show that, across all models, the interaction is significantly positive, suggesting that CEOs of higher centrality are likely to benefit from having more residual CSR by increasing their future centrality within their networks.

CEOs might use CSR strategically to build connections with stakeholders and then receive better future compensation contracts (e.g., Cespa & Gestone, 2007; Masulis & Reza, 2015). Hence, we also examine whether central CEOs engage in CSR activities to entrench themselves in the form of higher future compensation. Table 5 reports the impact of the interaction of *Residual CSR* and *CEO Centrality* on the dependent variable, future CEO compensation over one- and two-year periods (Panels A and B, respectively), after controlling for the current level of CEO compensation. CEO compensation is the natural logarithm of the sum of salary, bonus, and restricted stocks grants as reported by ExecuComp. The results in both Panels A and B indicate that, across all models, more central CEOs are likely to use residual CSR to increase their future compensation.

### 5.3. Using disasters as positive exogenous shocks to the societal demand for CSR

To shed more light on the role of CEO network centrality in the CSR-value relation, we use disasters as positive exogenous shocks to the societal demand for CSR. Disasters, such as the Midwest floods of June 2008, will increase the societal demand for CSR (Liang & Renneboog, 2017). We argue that more central CEOs will modify their CSR strategies when the demand for CSR exogenously changes. We specifically predict that, in periods when stakeholders including investors have increased interest in CSR, more central CEOs, on average, will behave less opportunistically in their CSR decisions.

To test our prediction, we divide our sample into two-subsamples based on whether the firm passes through a disaster period. Disaster period is defined as the year during which the state where the firm is headquartered faced a disaster (e.g., hurricane, flooding, wildfires). The disaster data is extracted from the SHELDUS database at the University of South Carolina as in the study of Barrot and Sauvagnat (2016). The results reported in Table 6 show that the interaction of *Residual CSR* and *CEO Centrality* is not significant during disaster periods and is negative and significant only during periods of no disasters. Therefore, as predicted, the negative association between residual CSR by more central CEOs and firm value is lower when a disaster hits the firm's state. This finding suggests that more central CEOs become less opportunistic in their CSR choices when stakeholders including investors expect their firms to be more responsive to the increase in the societal demand for CSR.

### 5.4. The role of geographic social capital

Prior research indicates that CEOs of firms headquartered in regions/counties with high social capital are less likely to behave opportunistically since they will wish to conform to the expectations of social peers in their communities (e.g., Hasan et al., 2017; Hilary & Hui,

**Table 3**

The role of corporate governance.

This table reports the results on the role of corporate governance on the association between firm value and the interaction between residual CSR and CEO centrality. We use two proxies for corporate governance: Board independence (Panel A) and CEO duality (Panel B). High (low) board independence equals one if the board independence is above (equal or below) the sample median, and zero otherwise. All other variables are defined in Appendix A. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. The estimated coefficients of the control variables are suppressed to save space. The *t*-statistics are two-tailed. Standard errors are clustered at the firm-level and are calculated by bootstrapping the two-step process to correct for first-stage estimation error. The standard errors are in italic.

Panel A: Board independence	Low board independence				High board independence			
	Degree	Betweenness	Closeness	Eigenvector	Degree	Betweenness	Closeness	Eigenvector
	Tobin's $Q_{t+1}$							
	(3a)	(3b)	(3c)	(3d)	(4a)	(4b)	(4c)	(4d)
Constant	-0.780 <i>9.209</i>	-0.816 <i>4.296</i>	-0.780 <i>4.206</i>	-0.748 <i>9.258</i>	3.114*** <i>0.605</i>	3.204*** <i>0.459</i>	3.179*** <i>0.315</i>	3.104*** <i>0.652</i>
Predicted CSR	-1.158 <i>3.856</i>	-1.156 <i>1.615</i>	-1.167 <i>1.549</i>	-1.151 <i>3.726</i>	0.963*** <i>0.220</i>	0.977*** <i>0.183</i>	0.974*** <i>0.208</i>	0.970*** <i>0.237</i>
Residual CSR	0.037*** <i>0.007</i>	0.033*** <i>0.009</i>	0.055** <i>0.024</i>	0.034*** <i>0.013</i>	0.020 <i>0.015</i>	0.020*** <i>0.007</i>	-0.001 <i>0.015</i>	0.018 <i>0.014</i>
CEO Centrality	0.663 <i>2.919</i>	-4.160 <i>14.264</i>	-3.814 <i>15.312</i>	0.138 <i>0.143</i>	3.167 <i>4.172</i>	31.717* <i>17.006</i>	-6.974 <i>9.383</i>	0.193 <i>0.329</i>
Residual CSR * CEO centrality	-0.720*** <i>0.232</i>	-3.940*** <i>1.049</i>	-4.338* <i>2.546</i>	-0.082** <i>0.038</i>	-0.475 <i>0.819</i>	-4.972 <i>4.485</i>	2.528 <i>2.838</i>	-0.040 <i>0.089</i>
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N.	2380	2380	2380	2380	2259	2259	2259	2259
Adjusted R-squared	0.381	0.382	0.380	0.381	0.356	0.358	0.355	0.355

  

Panel B: CEO duality	CEO duality				No CEO duality			
	Degree	Betweenness	Closeness	Eigenvector	Degree	Betweenness	Closeness	Eigenvector
	Tobin's $Q_{t+1}$							
	(5a)	(5b)	(5c)	(5d)	(6a)	(6b)	(6c)	(6d)
Constant	3.494*** <i>0.372</i>	3.527*** <i>0.339</i>	3.627*** <i>1.314</i>	3.468*** <i>0.048</i>	3.098 <i>2.185</i>	3.106*** <i>1.010</i>	3.069*** <i>1.183</i>	3.093*** <i>0.229</i>
Predicted CSR	0.894*** <i>0.212</i>	0.899*** <i>0.050</i>	0.883*** <i>0.256</i>	0.893*** <i>0.184</i>	0.662 <i>1.077</i>	0.673*** <i>0.146</i>	0.678 <i>0.651</i>	0.661** <i>0.324</i>
Residual CSR	0.035*** <i>0.004</i>	0.030*** <i>0.004</i>	0.018 <i>0.040</i>	0.030** <i>0.015</i>	0.019 <i>0.026</i>	0.021 <i>0.020</i>	0.042 <i>0.027</i>	0.018*** <i>0.002</i>
CEO Centrality	1.734 <i>1.352</i>	13.477 <i>10.821</i>	-18.038* <i>10.686</i>	0.118 <i>0.180</i>	1.214 <i>3.110</i>	0.506 <i>18.563</i>	4.330 <i>7.039</i>	0.121* <i>0.064</i>
Residual CSR * CEO centrality	-0.794*** <i>0.250</i>	-4.835*** <i>1.133</i>	0.148 <i>4.192</i>	-0.078*** <i>0.030</i>	-0.079 <i>0.884</i>	-1.286 <i>5.023</i>	-3.202 <i>2.965</i>	0.005 <i>0.085</i>
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N.	2661	2661	2661	2661	1978	1978	1978	1978
Adjusted R-squared	0.398	0.398	0.397	0.397	0.350	0.350	0.350	0.350

2009; Hoi et al., 2016; Jha & Cox, 2015; Kohlberg, 1984; McGuire et al., 2012). Therefore, we expect geographic social capital to mitigate the negative association between firm value and the interaction of *Residual CSR* and *CEO Centrality*. Hence, we compare the behaviors of more central CEOs in regions with high social capital to those in regions with low social capital. The results in Table 7 provide support for our prediction and show that the interaction of *Residual CSR* and *CEO Centrality* is negative and significant in firms located in low social capital regions, but it is not significant in firms located in high social capital regions. These results are consistent with those in prior research and suggest

that more central CEOs of firms headquartered in regions/counties with high social capital are less likely to behave opportunistically in their CSR choices.

### 5.5. Robustness tests

Servaes and Tamayo (2013) show that the well-known relation between CSR and firm value disappears when firm fixed effects are included. Hence, we include firm fixed effects in our model. The results in Table 8 show that the interaction of *Residual CSR* and *CEO Centrality*

**Table 4**

Future CEO centrality.

This table reports the results on the effects of current CEO centrality and residual CSR on future CEO centrality over one- and two-year periods in Panels A and B, respectively. All variables are defined in Appendix A. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. The estimated coefficients of the control variables are suppressed to save space. The t-statistics are two-tailed. Standard errors are clustered at the firm-level and are calculated by bootstrapping the two-step process to correct for first-stage estimation error. The standard errors are in italic.

Panel A: Future CEO centrality over a one-year period				
CEO centrality measure used:	Degree <sub>t+1</sub>	Betwenness <sub>t+1</sub>	Closeness <sub>t+1</sub>	Eigenvector <sub>t+1</sub>
	(7a)	(7b)	(7c)	(7d)
Constant	-0.004*** <i>0.001</i>	-0.001* <i>0.000</i>	0.006*** <i>0.000</i>	-0.068*** <i>0.007</i>
Predicted CSR	-0.001 <i>0.001</i>	0.000 <i>0.000</i>	0.000 <i>0.000</i>	-0.013*** <i>0.004</i>
Residual CSR	0.000 <i>0.000</i>	0.000 <i>0.000</i>	0.000*** <i>0.000</i>	0.000 <i>0.001</i>
CEO centrality	0.904*** <i>0.011</i>	0.866*** <i>0.024</i>	0.640*** <i>0.051</i>	0.870*** <i>0.017</i>
Residual CSR * CEO centrality	0.005*** <i>0.001</i>	0.003* <i>0.002</i>	0.007*** <i>0.002</i>	0.009*** <i>0.002</i>
Control variables	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
N.	4102	4102	4102	4102
Adjusted R-squared	0.884	0.874	0.812	0.853

  

Panel B: Future CEO centrality over a two-year period				
CEO centrality measure used:	Degree <sub>t+2</sub>	Betwenness <sub>t+2</sub>	Closeness <sub>t+2</sub>	Eigenvector <sub>t+2</sub>
	(8a)	(8b)	(8c)	(8d)
Constant	-0.007*** <i>0.000</i>	-0.001*** <i>0.000</i>	0.010*** <i>0.000</i>	-0.137*** <i>0.042</i>
Predicted CSR	-0.001 <i>0.001</i>	0.000 <i>0.001</i>	0.000*** <i>0.000</i>	-0.034*** <i>0.013</i>
Residual CSR	0.000 <i>0.000</i>	0.000 <i>0.000</i>	0.000 <i>0.000</i>	0.000 <i>0.001</i>
CEO centrality	0.808*** <i>0.012</i>	0.794*** <i>0.006</i>	0.397*** <i>0.068</i>	0.771*** <i>0.032</i>
Residual CSR * CEO centrality	0.008*** <i>0.001</i>	0.005*** <i>0.001</i>	0.007* <i>0.007</i>	0.017*** <i>0.005</i>
Control variables	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
N.	3215	3215	3215	3215
Adjusted R-squared	0.789	0.824	0.717	0.740

remains negative and significant after including firm fixed effects in addition to all the control variables as in Table 2. Furthermore, since time-invariant CEO personal traits may affect both CEO centrality and CSR, we include CEO fixed effects to our model. The results in Table 9 indicate that the interaction of *Residual CSR* and *CEO Centrality* remains negative and significant after including CEO fixed effects in addition to all the control variables as in Table 2. These findings provide further support to our main results and mitigate the omitted variable bias concern.

Throughout the paper, we assume that CEO centrality will affect how CSR expenditures are directed or used (i.e., strategically to increase value or non-strategically to fulfill personal needs) rather than the level of CSR expenditures per se. Theoretically, there is no reason to assume that a CEO's social position within a network will affect the level of CSR expenditures. As a robustness test, we relax this assumption and we consider that CEO centrality indeed affects the level of CSR expenditures. Hence, we repeat our analysis by including CEO

centrality as an independent variable in Model (1). As before, we interact the residual CSR in our second-stage regression analysis of Tobin's Q with CEO centrality. Our untabulated results remain consistent with the *entrenchment hypothesis*.

In addition, we examine the robustness of our results if we assume that CEO centrality is endogenous. We first regress CEO centrality on CEO (including compensation), director, and firm characteristics and retain the residuals. We then repeat our regression tests with residual centrality and our results still hold.

Finally, to mitigate reverse-causality concerns between current CSR expenditures and current CEO centrality, we repeat our regression tests using lagged ( $t-1$ ) of CEO centrality. Again, our results remain robust.

## 6. Conclusion

Using U.S. data, we examine the role of CEO centrality within a social network in the CSR-value relation. One perspective supporting

**Table 5**

Future CEO compensation.

This table reports the results on the effects of CEO centrality and residual CSR on future CEO compensation. CEO compensation is the natural logarithm of the sum of salary, bonus, and restricted stock grants as reported by ExecuComp. It is calculated over one- and two-year periods in Panels A and B, respectively. All other variables are defined in Appendix A. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. The estimated coefficients of the control variables are suppressed to save space. The *t*-statistics are two-tailed. Standard errors are clustered at the firm-level and are calculated by bootstrapping the two-step process to correct for first-stage estimation error. The standard errors are in italic.

Panel A: Future CEO compensation over a one-year period				
CEO centrality measure used:	Degree	Betweenness	Closeness	Eigenvector
	Ln (CEO Compensation) <sub>t+1</sub>			
	(9a)	(9b)	(9c)	(9d)
Constant	4.150*** <i>0.349</i>	4.146*** <i>0.289</i>	4.117*** <i>0.883</i>	4.159*** <i>0.217</i>
Predicted CSR	0.190** <i>0.076</i>	0.205*** <i>0.040</i>	0.208* <i>0.122</i>	0.195*** <i>0.067</i>
Residual CSR	0.002 <i>0.015</i>	0.009 <i>0.008</i>	0.030*** <i>0.008</i>	0.005 <i>0.013</i>
CEO centrality	2.785** <i>1.126</i>	4.691 <i>6.680</i>	-0.170 <i>11.473</i>	0.317* <i>0.169</i>
Residual CSR * CEO centrality	0.591* <i>0.322</i>	2.916* <i>1.686</i>	1.844*** <i>0.710</i>	0.070** <i>0.035</i>
Ln (CEO compensation)	0.214*** <i>0.022</i>	0.214*** <i>0.033</i>	0.214*** <i>0.031</i>	0.213*** <i>0.019</i>
Control variables	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
N.	4627	4627	4627	4627
Adjusted R-squared	0.411	0.409	0.408	0.410

  

Panel B: Future CEO compensation over a two-year period				
CEO centrality measure used:	Degree	Betweenness	Closeness	Eigenvector
	Ln (CEO Compensation) <sub>t+2</sub>			
	(10a)	(10b)	(10c)	(10d)
Constant	4.582*** <i>0.404</i>	4.568*** <i>0.295</i>	4.584*** <i>0.737</i>	4.587*** <i>0.696</i>
Predicted CSR	0.254*** <i>0.055</i>	0.265*** <i>0.092</i>	0.270*** <i>0.044</i>	0.260** <i>0.110</i>
Residual CSR	-0.003 <i>0.007</i>	0.004 <i>0.003</i>	0.008*** <i>0.003</i>	0.001 <i>0.009</i>
CEO centrality	1.971** <i>0.840</i>	0.810 <i>9.201</i>	-2.023 <i>9.418</i>	0.177 <i>0.267</i>
Residual CSR * CEO centrality	0.712*** <i>0.082</i>	4.044** <i>1.732</i>	0.830* <i>0.500</i>	0.083*** <i>0.026</i>
Ln (CEO compensation)	0.193*** <i>0.023</i>	0.193*** <i>0.038</i>	0.193*** <i>0.034</i>	0.193*** <i>0.048</i>
Control variables	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
N.	4522	4522	4522	4522
Adjusted R-squared	0.380	0.380	0.378	0.380

the *information-access hypothesis* argues that network centrality allows CEOs to access information that would help them better understand their stakeholders' social needs and, hence, engage in value-increasing CSR expenditures. The second perspective supporting the *entrenchment hypothesis* argues that network centrality helps CEOs entrench themselves by using corporate resources to reap private benefits.

We find that CEOs who are more centrally located in their social networks engage in CSR expenditures that decrease firm value, because they use those expenditures to improve their future network

position and increase their future compensation. These results support the *entrenchment hypothesis*, but not the *information-access hypothesis*. We also find that effective governance mechanisms, positive shocks to the societal demand for CSR, and geographic social capital mitigate the negative association between firm value and CSR by more central CEOs.

Our study contributes to the extant literature by examining the CSR-value relation, while considering an important CEO trait, network centrality, which has not been previously investigated in the CSR

**Table 6**

Exogenous shock to CSR demand: Disaster.

This table reports the results on the effects of CEO centrality and residual CSR on firm value during a disaster. Disaster period is defined as the year during which the state where the firm is headquartered faced a disaster (e.g., hurricane, flooding, wildfires). The disaster data is extracted from SHELDDUS database at the University of South Carolina as in the study of Barrot and Sauvagnat (2016). All other variables are defined in Appendix A. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. The estimated coefficients of the control variables are suppressed to save space. The *t*-statistics are two-tailed. Standard errors are clustered at the firm-level and are calculated by bootstrapping the two-step process to correct for first-stage estimation error. The standard errors are in italic.

CEO centrality measure used:	Disaster period				Non-disaster period			
	Degree	Betweenness	Closeness	Eigenvector	Degree	Betweenness	Closeness	Eigenvector
	Tobin $Q_{t+1}$							
	(11a)	(11b)	(11c)	(11d)	(12a)	(12b)	(12c)	(12d)
Constant	0.941 <i>1.702</i>	0.985 <i>0.980</i>	1.213 <i>1.486</i>	0.851*** <i>0.074</i>	3.794*** <i>0.191</i>	3.789*** <i>0.514</i>	3.823*** <i>0.605</i>	3.787*** <i>0.655</i>
Predicted CSR	0.150 <i>0.175</i>	0.148 <i>0.531</i>	0.127 <i>0.299</i>	0.127 <i>0.214</i>	0.941*** <i>0.039</i>	0.942*** <i>0.238</i>	0.933*** <i>0.011</i>	0.938*** <i>0.092</i>
Residual CSR	0.048 <i>0.030</i>	0.045 <i>0.037</i>	0.063 <i>0.057</i>	0.049** <i>0.021</i>	0.027*** <i>0.002</i>	0.024*** <i>0.007</i>	0.018 <i>0.040</i>	0.023*** <i>0.009</i>
CEO centrality	2.143 <i>4.989</i>	19.088*** <i>5.368</i>	-25.246 <i>52.519</i>	0.022 <i>0.371</i>	0.735 <i>0.459</i>	1.862 <i>10.031</i>	-4.763 <i>9.192</i>	0.070 <i>0.108</i>
Residual CSR * CEO centrality	-0.308 <i>0.408</i>	-1.992 <i>10.929</i>	-2.885 <i>7.479</i>	-0.037 <i>0.103</i>	-0.635** <i>0.268</i>	-4.083*** <i>1.544</i>	-0.481* <i>0.274</i>	-0.066* <i>0.039</i>
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N.	696	696	696	696	3943	3943	3943	3943
Adjusted R-squared	0.436	0.436	0.436	0.435	0.356	0.357	0.355	0.356

**Table 7**

The role of geographic social capital.

This table reports the results on the role of the geographic social capital of the county where the firm's headquarters is located in the association between firm value and the interaction between residual CSR and CEO centrality. High (low) geographic social capital equals one if the geographic social capital is above (equal or below) the sample median, and zero otherwise. All variables are defined in Appendix A. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. The estimated coefficients of the control variables are suppressed to save space. The *t*-statistics are two-tailed. Standard errors are clustered at the firm-level and are calculated by bootstrapping the two-step process to correct for first-stage estimation error. The standard errors are in italic.

CEO centrality measure used:	Low geog. social capital				High geog. social capital			
	Degree	Betweenness	Closeness	Eigenvector	Degree	Betweenness	Closeness	Eigenvector
	Tobin $Q_{t+1}$							
	(13a)	(13b)	(13c)	(13d)	(14a)	(14b)	(14c)	(14d)
Constant	2.139 <i>1.388</i>	2.160*** <i>0.455</i>	2.028*** <i>0.447</i>	2.131 <i>1.344</i>	-0.778 <i>0.986</i>	-0.815*** <i>0.261</i>	-0.273 <i>1.178</i>	-0.786 <i>0.662</i>
Predicted CSR	0.796*** <i>0.158</i>	0.796*** <i>0.096</i>	0.791*** <i>0.041</i>	0.796*** <i>0.001</i>	-1.219*** <i>0.295</i>	-1.226** <i>0.530</i>	-1.227* <i>0.679</i>	-1.223** <i>0.478</i>
Residual CSR	0.029*** <i>0.010</i>	0.026*** <i>0.007</i>	0.057*** <i>0.017</i>	0.026*** <i>0.009</i>	0.031*** <i>0.006</i>	0.027*** <i>0.003</i>	0.016 <i>0.045</i>	0.028 <i>0.027</i>
CEO Centrality	-0.102 <i>2.247</i>	2.528 <i>17.055</i>	9.243*** <i>2.384</i>	-0.127* <i>0.077</i>	1.540 <i>2.478</i>	4.939 <i>13.580</i>	-52.879** <i>25.590</i>	0.179 <i>0.209</i>
Residual CSR * CEO Centrality	-0.633* <i>0.355</i>	-4.532*** <i>0.033</i>	-5.474* <i>3.079</i>	-0.062* <i>0.037</i>	-0.597 <i>0.459</i>	-3.034 <i>1.962</i>	0.620 <i>6.242</i>	-0.067 <i>0.107</i>
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N.	2320	2320	2320	2320	2319	2319	2319	2319
Adjusted R-squared	0.378	0.378	0.379	0.378	0.397	0.397	0.398	0.397

**Table 8**

Robustness test using firm fixed effects.

This table reports the results on the effects of CEO centrality and residual CSR on firm value using firm fixed effects. *Predicted CSR* and *Residual CSR* are estimated from Model (1), and used in Models (15a) to (15d). All variables are defined in Appendix A. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. The estimated coefficients of the control variables are suppressed to save space. The *t*-statistics are two-tailed. Standard errors are clustered at the firm-level and are calculated by bootstrapping the two-step process to correct for first-stage estimation error. The standard errors are in italic.

CEO centrality measure used:	Degree	Betweenness	Closeness	Eigenvector
	Tobin's $Q_{t+1}$			
	(15a)	(15b)	(15c)	(15d)
Constant	4.196*** <i>0.585</i>	4.254*** <i>0.595</i>	4.151*** <i>0.539</i>	4.209*** <i>0.589</i>
Predicted CSR	0.199* <i>0.112</i>	0.196 <i>0.124</i>	0.197* <i>0.126</i>	0.203* <i>0.125</i>
Residual CSR	-0.012 <i>0.013</i>	-0.021* <i>0.011</i>	-0.002 <i>0.022</i>	-0.018 <i>0.012</i>
CEO centrality	-2.430 <i>2.959</i>	-21.083 <i>20.402</i>	-5.953 <i>17.736</i>	-0.420 <i>0.301</i>
Residual CSR * CEO Centrality	-0.649* <i>0.345</i>	-2.084* <i>1.242</i>	-3.014* <i>1.690</i>	-0.055* <i>0.031</i>
Control variables	Yes	Yes	Yes	Yes
Firm effects	Yes	Yes	Yes	Yes
Industry effects	No	No	No	No
Year effects	Yes	Yes	Yes	Yes
N.	4639	4639	4639	4639
R-squared	0.205	0.205	0.204	0.205

**Table 9**

Robustness test using CEO fixed effects.

This table reports the results on the effects of CEO centrality and residual CSR on firm value using CEO fixed effects. *Predicted CSR* and *Residual CSR* are estimated from Model (1), and used in Models (16a) to (16d). All variables are defined in Appendix A. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. The estimated coefficients of the control variables are suppressed to save space. The *t*-statistics are two-tailed. Standard errors are clustered at the firm-level and are calculated by bootstrapping the two-step process to correct for first-stage estimation error. The standard errors are in italic.

CEO centrality measure used:	Degree	Betweenness	Closeness	Eigenvector
	Tobin's $Q_{t+1}$			
	(16a)	(16b)	(16c)	(16d)
Constant	3.807*** <i>0.625</i>	3.873*** <i>0.633</i>	3.900*** <i>0.649</i>	3.814*** <i>0.626</i>
Predicted CSR	0.052 <i>0.144</i>	0.042 <i>0.145</i>	0.056 <i>0.149</i>	0.055 <i>0.144</i>
Residual CSR	0.003 <i>0.011</i>	-0.011 <i>0.009</i>	0.023 <i>0.023</i>	-0.002 <i>0.010</i>
CEO centrality	-4.075 <i>2.798</i>	-33.103** <i>16.533</i>	2.070 <i>11.724</i>	-0.600* <i>0.322</i>
Residual CSR * CEO centrality	-1.119** <i>0.519</i>	-3.780* <i>2.312</i>	-5.442* <i>2.898</i>	-0.131** <i>0.066</i>
Control variables	Yes	Yes	Yes	Yes
CEO effects	Yes	Yes	Yes	Yes
Industry effects	No	No	No	No
Year effects	Yes	Yes	Yes	Yes
N.	4639	4639	4639	4639
R-squared	0.198	0.196	0.194	0.198

literature. Thus, our study adds new evidence on the relationship between leadership characteristics and CSR outcomes. Our study also contributes to the literature on the value implications of CEO social ties and network centrality. The evidence so far in the literature is conflicting, and relatively few studies have examined CEO network centrality. While we provide strong support for the entrenchment perspective of CEO network centrality in the case of CSR using U.S. data, our results do not suggest that CEO network centrality reduces firm value in other corporate cases or international settings. Future research may provide further support or refute our findings by examining

international settings with governance, cultural and other institutional factors that differ from those in the U.S.

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## Appendix A. Variable definitions.

Variable	Definition	Source
CSR	A score variable equals to the sum of the difference between strengths and concerns for each one of the six CSR dimensions: i) community; ii) diversity; iii) employee relations; iv) environment; v) human rights; and vi) product quality.	MSCI
Predicted CSR	Fitted value from the regression of CSR on various economic determinants as per Model (1) of Table 2.	MSCI
Residual CSR	The difference between the actual and predicted CSR.	MSCI
CEO characteristics		
CEO centrality	A measure of network position of the CEO, calculated by either centrality <i>Degree</i> , <i>Betweenness</i> , <i>Closeness</i> , or <i>Eigenvector</i> of the CEO's professional network. <i>Degree</i> : Number of nodes to which a focal node is adjacent, normalized by the maximum possible degree in the entire network. <i>Betweenness</i> : Proportion of all the paths linking any two nodes that pass through a focal node, normalized by the maximum possible betweenness in the entire network. <i>Closeness</i> : Inverse of the sum of the shortest distances between a focal node and every other node in the network. <i>Eigenvector</i> : The largest eigenvalue of the standardized matrix of the network.	BoardEx
CEO duality	A dummy variable equals to 1 if the CEO is also the chairman of the board, and zero otherwise.	BoardEx
CEO ownership	The number of shares owned by the CEO as a fraction of the total number of shares outstanding.	ExecuComp
CEO age	CEO age in years.	BoardEx
CEO academic	A dummy variable equals to one if the CEO has a PhD, and zero otherwise.	BoardEx
CEO female	A dummy variable equals to one if the CEO is female, and zero otherwise.	BoardEx
Board & director characteristics (excluding the CEO)		
Board independence	The proportion of independent directors on board.	GMI Ratings
Director ownership	Cumulative board ownership in the firm's shares.	ExecuComp
Director ties	Average number of education, profession, and other social ties of directors.	BoardEx
Director age	Average age in years of board members.	BoardEx
Director academic	The proportion of directors holding a PhD.	BoardEx
Firm characteristics		
Tobin's Q	A measure of firm value in year $t + 1$ calculated as follows: (total assets + market value of equity - book value of common equity - deferred taxes)/total assets.	Compustat
Geographic social capital	A measure of the social capital at the county level following Rupasingha et al. (2006). It is equal to the first principal component from a principal component analysis based on four variables: (1) Percentage of voters who voted in presidential elections; (2) response rate to the Census Bureau's decennial census; (3) sum of tax-exempt non-profit organizations divided by populations per 10,000; (4) sum of social organizations (religious, civic, business, political, professional, labor, bowling centers, fitness facilities, sport clubs, public golf courses) divided by populations per 100,000. Data is obtained from the Northeast Regional Center for Rural Development (NERCRD) at the Pennsylvania State University.	NERCRD
Ln (total assets)	The natural logarithm of total assets.	Compustat
Hi-tech dummy	A dummy variable equals to one if the 2-digit SIC industry of the firm is 48 or 73, or the 3-digit SIC industry is 283, and zero otherwise.	Compustat
Firm age	The number of years since the firm's inception.	GMI ratings
Operating income	Income before interest, taxes, and depreciation scaled by total assets.	Compustat
Advertising	Advertising expenses scaled by total sales.	Compustat
Leverage	The ratio of total debt to total assets.	Compustat
Cash	Cash scaled by total assets.	Compustat
R&D	Research and development expenses scaled by total sales.	Compustat
CAPEX	Capital expenditures scaled by total assets.	Compustat

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