

董事連結與確信服務專家對企業 社會責任績效之影響

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摘要

本研究旨在探討董事連結對公司企業社會責任(CSR)績效的影響。本文認為當公司董事同時兼任其他公司之董事時,其他公司所選擇的企業社會責任揭露策略將藉由此一網絡連結影響公司自身之策略選擇,進而影響其企業社會責任績效之表現,文中以是否獲得企業社會責任相關獎項作為公司企業社會責任績效之替代變數。研究結果發現,公司之企業社會責任績效與其董事連結至高績效表現公司的程度呈顯著正相關,此一結果說明企業社會責任績效可以透過董事社會網絡的連結而產生資訊外溢之效果。此外,當董事對外所連結的高績效表現公司,其企業社會責任報告是由該產業之確信服務專家所提供確信者,相較於連結至由非確信服務專家所提供確信之高績效表現公司,前者對公司企業社會責任績效的影響效果更為顯著。再者,當公司與董事連結之高績效表現公司聘用同一產業確信服務專家時,董事連結所傳遞之企業社會責任績效的外溢效果更為明顯。上述結論即使改以類似 KLD 方式衡量企業社會責任績效時,董事連結所揭示的資訊外溢效果仍然維持相當的穩定。整體而言,本研究提供了董事連結的特徵對公司企業社會責任績效表現具有相當重要影響的證據。

關鍵詞：董事連結、企業社會責任績效、企業社會責任確信服務專家

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The Impact of Board Interlocks and Specialized CSR Assurance Providers on Corporate Social Responsibility Performance

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Abstract

This paper investigates the influence of director interlock on firms' corporate social responsibility (CSR) performance. We argue that firm managers will follow their interlocking partner's CSR disclosure practice when managing their own disclosure strategy and then affect their CSR performance. Using board interlocks to proxy for network connections and CSR award-winning as a surrogate for CSR performance, we find that corporate CSR performance is positively related to its ties to high CSR firms. Such finding indicates that CSR performance can spread across firms through director interlock. In addition, board ties to high CSR firms assured by a specialized CSR assurance provider have more influence on the focal firms' CSR performance compared with ties to high CSR firms assured by a non-specialized CSR assurance provider. Further, board ties to high CSR firms are even more influential when the focal firm and its interlocking partners hire the same specialized CSR assurance provider. Our results are robust to alternative measure of CSR performance based on KLD ratings and remain essentially unchanged under alternative model specifications. Taken together, our findings suggest that the character of a firm's board ties plays a role in the effect of those ties on the firm's CSR performance.

Keywords: *Director interlock, CSR performance, Specialized CSR assurance provider.*

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1. INTRODUCTION

With corporate social responsibility (CSR) reports comes stakeholders' increasing demand for integrated and forward-looking information, there has been a growing body of literature on consequences of CSR by which the observed levels of CSR activity relates to firm value (see Huang and Watson (2015) for a recent review). Moser and Martin (2012) note that, although there are obvious benefits associated with reporting CSR, many of the determinants of firms' CSR activity remain unexplored. As such, this study examines board interlocks as one potential determinant of CSR disclosure strategy. Board interlocks occur when a board member of a particular company (which we describe as "the focal company") is also a board member of other companies ("interlocked companies") within the network. These economic ties have the potential to spread CSR practices and, as a consequence, influence the focal company's CSR disclosure strategy and then improve its CSR performance due to potential spillover effects from the interlocked companies. The lack of directly relevant evidence on CSR disclosure behavior spreads through interlocking corporate board is the primary motivation for this study.

The impact of network ties on firm behavior may depend on the type of knowledge being shared across those ties (Chiu, Teoh, and Tian 2013; Brown and Drake 2014; Chen, Chou, Duh, and Lin 2014; Hossain, Monroe, Wilson, and Jubb 2016). Knowledge shared by hiring specialized CSR assurance providers¹ is likely to be more influential. This is because these expert providers have excellent CSR strategy and broader CSR awareness to influence corporate disclosure behavior. Therefore, this study further examines whether board interlocks involving hiring specialized CSR assurance providers can amplify the effect of such direct ties.

Investigating the influence of board ties and specialized CSR assurance providers is important for at least two reasons. First, the social network literature shows that board connections are valuable resources to individual firms in both facilitating the spread of new ideas and picking up good practices from each other's experiences (e.g., Bizjak, Lemmon, and Whitby 2009; Brown 2011; Brown and Drake 2014; Wang, Lin, Lee, and Tsai 2019). It's well documented that interlocking board relationships could serve as a conduit for spreading behaviors from firm to firm (Chiu et al. 2013). Hence, more evidence of such a link is needed in order to obtain a more complete understanding of how firm's strategic behavior is affected by board linkages. Second, there is a dramatically increasing tendency for firms to issue stand-alone reports on CSR during the last decades. As documented by KPMG's global surveys, over 70 percent of the investigated firms regularly publicize their

¹ We use the term "specialized CSR assurance provider" to describe a CSR assurance provider with CSR-specific expertise.

CSR reports (KPMG 2013). To the extent that CSR assurance providers bring credibility to the evaluation of CSR reports, further insights into whether the effect of board interlocks on CSR performance varies depending on the extent of specialized CSR assurance providers is useful to policy makers and to the profession.

Recent works provide evidence that board connections have desirable economic consequences in firms' profitability (Larcker, So, and Wang 2013), in tax strategies (Brown 2011; Brown and Drake 2014), in earnings management or the quality of financial statement (Chiu et al. 2013), in auditor choice decision (Johansen and Pettersson 2013), and in accounting method choice (Han, Hu, Liu, and Tian 2017). Another line of research investigates the effect of audit committee director interlocks on earnings quality (e.g., DeZoort and Salterio 2001; Vafeas 2005; Sharma and Iselin 2012; Chen et al. 2014; Hossain et al. 2016), evidence on the association between board interlocks and specialized CSR assurance providers and CSR disclosure behavior is rather scarce. This study extends previous research by using a Taiwanese sample to examine the effect of the above-mentioned interlocks on CSR performance.

The implement of CSR in Taiwan is quite different from the practice in other developed areas, such as United States or Europe. Most companies in Taiwan are small and medium enterprises (SMEs). Even they are listed in trading market, many of them still keep the characteristics of SMEs. Hsu and Cheng (2012) argue that most Taiwanese SMEs do not have a clear strategy to link CSR and their business policy. In addition, they do not put effort to know the concerns of their shareholders about CSR since they usually have no full-time employees to deal with CSR practices. Obviously, the environment for CSR in Taiwan is not as good as in other developed countries. Therefore, board interlocks may be a way for the focal company to learn how to do CSR well. And this is also the concern of this paper.

To test our conjectures, we first derive corporate CSR award from three CSR rating institutions instead of CSR performance scores due to the unavailability of such data in Taiwan. Based on their annual rating results, we identify a full list of the award for excellence in CSR work as a proxy for firms' CSR performance (which we describe as "high CSR firms"). Nevertheless, in order to mitigate the concern about a crude measure and suffering from loss of information, we also hand-collect data to construct CSR scores by drawing on KLD evaluation framework to provide corroborating evidence on the impact of board interlocks on CSR performance. And then, we exploit Taiwan Economic Journal (TEJ) Directors and Managers-Education & Experience and CSR disclosure and visa situation database to construct our measure of interlocking network and specialized CSR assurance providers, respectively. Similar to several studies on network ties (Chiu et al. 2013; Brown and Drake 2014; Hossain et al. 2016), one important challenge that this

study encounters is potential endogeneity due to omitted variables or self-selection issues. To the extent that the incidence of board partner interlocks is unlikely to be randomly determined, endogeneity needs to be considered. We first employ the instrumental variable (IV) approach to deal with endogeneity, where instrumental variables are chosen based on suggestions by Han et al. (2017). In addition to this IV specification, we also conduct the main analysis using a propensity score matched (PSM) sample to check the robustness of results.

Using board interlocks as a proxy for network ties, we find that corporate CSR performance, indeed, spreads across firms through networks of board interlock, and the focal firms' CSR performance is positively related to its ties to high CSR firms. In addition, we also find that the influence of board interlocks on CSR performance varies with the nature of the focal firm's ties. Specifically, we indicate that network ties to high CSR firms assured by a CSR-specific industry expert have more influence on the focal firms' CSR performance compared with ties to high CSR firms assured by non CSR-specific industry expert. Furthermore, we indicate that board ties are more influential when the focal firm and its interlocking partners hire the same CSR-specific industry expert. These findings are robust when we use CSR scores as a proxy for CSR performance and remain essentially unchanged under alternative model specifications. Taken together, our findings suggest that the character of a firm's board ties matter in the effect of those ties on the firm's CSR performance.

This study contributes to the literature on nonfinancial disclosure and board interlocks in several important ways. First, we contribute to the growing and influential literature investigating cross-sectional determinants of CSR performances. While this stream of research has vigorously investigated various determinants and consequences of CSR disclosure (Huang and Watson 2015), this study is the first to provide evidence on whether board interlocks and specialized CSR assurance providers matter in CSR performance. In doing so, we answer a specific call in Moser and Martin (2012) for researchers to provide a deeper understanding of the drivers for CSR activities and performance. Second, we advance an important theory of inter-organizational networks, board interlocks, which has previously been given little attention in voluntary disclosure research. This study represents the attempt to add to the literature on board interlocks by showing whether such interlocks play an important role in corporate CSR decisions. Third, this study responds to Francis's (2011) call for continued research on the effects of industry expertise, we add to the industry expertise literature by providing evidence on specialized CSR assurance providers. This study is relevant to understanding the source of industry expertise and its relation to CSR performance.

The remainder of this paper is structured as follows. Section 2 reviews the related literature and develops the hypotheses. Section 3 describes the research design, sample and

data sources. Section 4 provides descriptive statistics and the results of our main analyses. Section 5 presents additional analysis and several robustness checks. Section 6 concludes.

2. LITERATURE REVIEW AND DEVELOPMENT

In this section, we lay out the prevailing view relating board interlocks and specialized CSR assurance providers to the spread of CSR performance and develop our hypotheses.

2.1 The Influence of Board Interlocks on Corporate CSR Performance

Board interlocks create a network structure to pass on knowledge and expertise between firms (Beckman 2010; Shropshire 2010). Board directors are inclined to mimic other directors on the board as they are generally viewed as members of an in-group (Chiu et al. 2013). Interlocked directors are therefore considered natural channels for the spread of corporate practices and culture. Such practices or strategies sharing between firms can be valuable to boards as they are likely to be used in decision making (Shropshire 2010). In the context of accounting practices, board interlocks have been demonstrated to influence a variety of accounting practices. The types of accounting practices examined have included firm performance, earnings management behavior, tax strategies, financial lawsuit, auditor choice decision and accounting method choice. Specifically, firms that share a common board member are more likely to earn superior risk-adjusted stock returns and experience higher profitability growth (Larcker et al. 2013), to diffuse the idea of stock option expensing (Reppenhagen 2010), to manage earnings (Chiu et al. 2013)², to spread the adoption of another form of earnings management-stock option backdating (Bizjak et al. 2009), to adopt similar tax shelter strategy (Brown 2011; Brown and Drake 2014), to face a fraud lawsuit (Fich and Shivdasani 2007), to bring prior experience with incoming auditors to the auditor choice decision in the focal company (Johansen and Pettersson 2013), and to adopt similar accounting methods (Han et al. 2017). Analogously, the existence of CEO or audit committee interlocks also facilitate the spread of earnings quality (DeZoort and Salterio 2001; Vafeas 2005; Sharma and Iselin 2012; Chen et al. 2014; Hossain et al. 2016; Wang et al. 2019). Overall, these papers provide evidence that board connections play an important role in the diffusion of accounting practices.

Given the fact that both accounting policy and CSR disclosure are decided by the management. Since prior studies have proved that board interlocks have influence on accounting policy (Chiu et al. 2013; Han et al. 2017), it seems plausible that board interlocks may also have influence on CSR disclosure. Because CSR disclosure strategy chosen by the management will finally influence CSR performance. High CSR

² Similarly, they also find evidence that a firm connected to a non-manipulator is less likely to manage earnings.

performance firms are privy to knowledge about CSR disclosure strategies and have practical experience in CSR disclosure strategies. This knowledge and experience can be shared through board interlocks. Under exposure to such disclosure techniques, an interlocked director at the focal firm perceiving CSR initiative in another firm may evaluate whether the benefits of conducting CSR initiative outweigh its costs, potentially leading to rational imitative behavior due to information spillover effect. Thus, a board linkage to firms with high CSR performance may shift the prevailing view of directors of the focal company toward aggressive CSR disclosure and then influence its CSR performance.

Based on the discussion above, we expect the number of board connections to matter as the focal company gains credibility in the CSR disclosure decision by being knowledgeable about experiences drawn from multiple board connections across those ties. The first hypothesis of this paper is stated as follows:

H1: Board interlocks to high CSR firms will be positively associated with CSR performance at the focal firm.

2.2 The Role of the Specialized CSR Assurance Providers in the Effectiveness of Board Interlocks in Enhancing CSR Performance

The concept of industry expertise suggests that professional knowledge possessed by experts may benefit firms in their practice area. In the context of industry specialist auditors, external audit firms develop client-specific industry expertise by investing in industry-specific skills for their professional competence and providing services to clients with similar operating characteristics (Solomon, Shields, and Whittington 1999; Ferguson, Francis, and Stokes 2003). Auditing literature shows that industry expertise plays a crucial role in improving clients' earnings or disclosure quality (Dunn and Mayhew 2004; Reichelt and Wang 2010; Chi and Chin 2011), aiding clients in shaping tax strategies (McGuire, Omer, and Wang 2012), and reflecting cost efficiencies in homogenous industries (Bills, Jeter, and Stein 2015).

Consistent with the benefit of auditor industry expertise, the CSR assurance provider probably creates CSR-specific industry expertise through investments in skills and practical experience gained through serving clients within the same industry. Thus, CSR experts are expected to possess better knowledge of the industry-specific CSR-disclosure strategies available from their clients compared with non-experts. Such deep CSR knowledge and disclosure practices can also be passed on to the focal firm through board interlocks to high CSR firms assured by a specialized CSR assurance provider. In the case of knowledge spread, Simunic (1984) indicates that the knowledge transfer between business practice areas is client-specific (e.g., knowledge of specific CSR-disclosure

strategies attributable to the client) or broad knowledge (e.g., knowledge of the varied CSR-disclosure strategies that are common adopted in a certain industry). Under this argument, it is plausible that the client-specific CSR knowledge can be spread through board interlocks to high CSR firms, while the broad CSR knowledge can be spread through those CSR firms that are assured by a specialized CSR assurance provider. Thus, the dissemination effects of CSR performance may be stronger for firms with ties to high CSR firms assured by a specialized CSR assurance provider than for those assured by a non-specialized one.

Based on the reasoning above, we expect that external CSR assurance providers develop CSR-specific industry expertise in a manner similar to audit-specific industry expertise. Namely, the external CSR assurance provider probably develops CSR-specific industry expertise through in-depth training in CSR issues and professional advancement by serving clients within the same industry. If CSR assurance providers with such expertise are viewed as possessing superior knowledge of CSR issues or are respected as experts, then we expect CSR performance effects to be stronger when a focal firm is connected to high CSR firms where these high CSR firms are meanwhile assured by a specialized CSR assurance provider. Therefore, we examine whether specialized CSR assurance providers can strengthen the effect of board interlocks to high CSR firms on focal firms' CSR performance. This leads to our second hypothesis.

H2: The effect of board interlocks on CSR performance is more pronounced for focal firms with network ties to high CSR firms assured by a specialized CSR assurance provider.

3. RESEARCH DESIGN

This study first explains and describes our measures of CSR performance. This is followed by an explanation and description of our measures of board interlocking and board ties to high CSR firms assured by a specialized CSR assurance provider, and then a discussion of the regression models used to address our research hypotheses.

3.1 Measuring CSR Performance

The dependent variable, *CSR AWARD*, is the proxy for the improvement of CSR performance. The CSR performance can be divided into three stages. Each stage means the improvement of the performance. The first stage is a company has no standalone CSR report, the second stage is a company releases standalone report, and the final stage is a company's standalone report is announced as high CSR performance by the following CSR rating institutions. These rating institutions include Global Views Monthly, Common Wealth Magazine and Taiwan Institute for Sustainable Energy. This study identifies a full

list of the award for excellence in CSR disclosure based on the annual rating results released by the above-mentioned bodies.

3.2 Measuring Board Interlocks

To test H1, this study uses board interlocks to proxy for a firm's network ties to high CSR firms. Our primary explanatory variable is *BoardIK*, measured as the number of high CSR firms the focal firm is tied to by board interlocks deflated by the focal firm's total board interlocks³. In each period, we identify high CSR firms as those firms listed in the list of the award for excellence in CSR disclosure.

3.3 Measure of Board Ties Involving Engaging a Specialized CSR Assurance Provider

Another possible factor that may affect CSR performance is CSR assurance provider. Like financial statements should be audited by auditing firms, CSR reports also need to be assured by CSR assurance provider. As mentioned before, if an auditing firm is an expertise in the given industry, it can provide higher audit quality. Analogously, if a CSR assurance provider is also the expertise in a given industry, it should also provide higher assurance quality. High CSR firms may be assured by a specialized CSR assurance provider or not. To investigate the incremental influence of specialized CSR assurance providers on CSR performance at the focal firm, this study splits *BoardIK* into two variables, *IKexpert* and *IKnonexpert*. *IKexpert* means high CSR firms are assured by a specialized CSR assurance provider and *IKnonexpert* means high CSR firms are assured by a non-specialized one, where specialized is defined as that CSR assurance provider is the expertise in that industry. A CSR assurance provider is identified as the expertise if the assurance provider has the largest market share in a given industry. Market share is calculated by an assurance provider's total number of clients who release standalone CSR reports in a specific industry relative to the total number of clients with the same commitment assured by all CSR assurance providers in the same industry (e.g., Balsam, Krishnan, and Yang 2003; Chin and Chi 2009).

We use the following example to explain how we calculate our main independent variable *BoardIK*, *IKexpert*, *IKnonexpert*, and *IKSexpert*. Suppose company A has 5 directors in its board, director I, director II, director III, director IV, and director V. Director I is also the director of company B, C, and D. Director II is also the director of company E and F. Director III is also the director of company G and H. Director IV and V has no interlock with other company. Suppose company B, C, E, and H are high CSR firms. Company B, C, and E are assured by the specialized CSR assurance providers that have the biggest market share in the given industry/industries. In this situation, *BoardIK* =

³ Following prior social network literature (Leenders 2002; Brown and Drake 2014), this study scales this measure by the focal firm's total board interlocks, computed as total number of firms that the focal firm is connected to by board interlocks.

4/7, $IKexpert = 3/7$, and $IKnonexpert = 1/7$. If company A is also assured by specialized CSR assurance providers, then $IKSexpert = 1$.

3.4 Regression Models

This study investigates the association between corporate network interlocks and CSR performance by estimating the following models (subscripts are omitted for notational convenience). Because the dependent variable is categorical and ordinal, we adopt the ordered probit regression model (Long 1997).

$$CSRAWARD = \alpha_0 + \beta_1 BoardIK_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 AGE_{i,t} + \beta_5 MTB_{i,t} + \beta_6 ROA_{i,t} + \beta_7 SORE_{i,t} + \beta_8 INDEP_{i,t} + \beta_9 CROSS_{i,t} + \Sigma Year + \Sigma Industry + \varepsilon_{i,t}. \quad (1)$$

$$CSRAWARD = \alpha_0 + \beta_1 IKexpert_{i,t} + \beta_2 IKnonexpert_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 AGE_{i,t} + \beta_6 MTB_{i,t} + \beta_7 ROA_{i,t} + \beta_8 FORE_{i,t} + \beta_9 INDEP_{i,t} + \beta_{10} CROSS_{i,t} + \Sigma Year + \Sigma Industry + \omega_{i,t}. \quad (2)$$

where the independent and dependent variables are described below and computed as defined in Appendix.

Eq. (1)-(2) have been used extensively in extant work (Purushothaman, Tower, Hancock, and Taplin 2000; Haniffa and Cooke 2005; Dhaliwal, Li, Tsang, and Yang 2011; Khan, Muttakin, and Siddiqui 2013; Dhaliwal, Li, Tsang, and Yang 2014; Di Giuli and Kostovetsky 2014). As discussed in Moser and Martin (2012), the idea behind these equations is to isolate the impact of the variable of interest on the chosen measures of CSR performance while controlling for the average CSR performance effects from other factors. In the two models above, this study uses the award for excellence in CSR disclosure (*CSRAWARD*) as a proxy for high CSR performance firm, which is described in Section 3.1.

Equation (1) investigates the effect of board interlocks (*BoardIK*). Equation (1) assumes that all board interlocks are equally influential and its estimated coefficient represents the average effect of possessing a connection to a high CSR network partner on CSR performance at the focal firm. To test H2, this study relaxes this assumption and uses Equation (2) to evaluate the effect of board ties involving engaging specialized CSR assurance providers (*IKexpert* and *IKnonexpert*). These explanatory variables are described in Section 3.2-3.3. Based on H1, we expect a positive coefficient on our explanatory variable, *BoardIK*. Since this study further expects ties formed by engaging specialized CSR assurance providers to be more influential; therefore, a finding that the coefficient on *IKexpert* is more positive than the coefficient on *IKnonexpert* would support H2.

3.5 Control Variables

Following extant research, this study employs a number of controls to isolate the effect of the variable of interest on CSR performance (Purushothaman et al. 2000; Haniffa and Cooke 2005; Dhaliwal et al. 2011; Khan et al. 2013; Dhaliwal et al. 2014; Di Giuli and Kostovetsky 2014). Prior literature indicates that larger companies (*SIZE*) receive higher attention from various groups in society and therefore would be under much pressure to disclose their social activities. Highly leveraged companies (*LEV*) may have closer relationships with their creditors and are willing to disclose social responsibility information. In doing so, they can assure creditors that shareholders and management meet their covenant requirements. The model controls for firm age (*AGE*) since a more matured firm would want to disclose more social responsibility information to build up a better reputation. The model also controls for firm profitability because profitable growth allows management the freedom and flexibility to engage in and reveal more comprehensive social responsibility activities to general shareholders. This study includes the market-to-book ratio (*MTB*) and returns on assets (*ROA*) to capture the effects of market-based and accounting-based corporate financial performance on CSR.

Additionally, the effect of foreign shareholders (*FORE*) on CSR performance is controlled, because foreign investors may demand higher disclosure on CSR due to cultural and geographical inaccessibility. Board independence (*INDEP*) is also controlled, since independent directors who are less aligned with managers' interests may be more likely to urge companies to engage in CSR disclosure. This study further controls for the impact of cross-listing (*CROSS*) on CSR performance, because companies that cross listed in foreign countries may have to adhere to rules and regulations pertaining to socially responsible information and respond to public awareness. Finally, all regressions include industry (two-digit SIC codes) and year dummies to control for industry and year fixed effects with robust standard errors corrected for firm clustering (Petersen 2009; Gow, Ormazabal, and Taylor 2010).

3.6 Sample Period and Data Sources

We construct our sample with data from several sources. We first derive corporate CSR award from the following CSR rating institutions. These rating institutions include Global Views Monthly, Common Wealth Magazine and Taiwan Institute for Sustainable Energy⁴. This study identifies a full list of the award for excellence in CSR work based on the annual rating results. These institutes represent one of the most credible sources of information on firms' socially responsible policies and practices. Based on above reason,

⁴ Following are the complete CSR award list links for each rating institution:
 Common Wealth Magazine: <http://topic.cw.com.tw/csr/report.aspx>
 Global Views Monthly: <https://www.gvm.com.tw/CSR/history.html>
 Taiwan Institute for Sustainable Energy: <https://tcsaward.org.tw/tw/about/harvest>

we utilize the data on the CSR rating announcement as our analytical base. Second, we use detailed board information from TEJ Directors and Managers-Education & Experience database to construct our measure of interlocking network. In order to build up data on board interlock between firms, we check directors' backgrounds (name, expertise, and working experience) of each firm with those of all the other firms in the same year. If one firm at least has a common director with another firm, those firms are regarded as interlocked firm pairs. An interlock relationship in practice is a bidirectional network (Larcker et al. 2013), when we focus on firm A's following behavior, firm A is the focal firm, and firm B is the interlocking firm. Likewise, the same logic is applied to an exchange of the two firms. Third, we gather information on the specialized CSR assurance providers from TEJ CSR disclosure and visa situation database to develop our measure of specialized CSR assurance providers. Finally, we collect the data on financial statements from the TEJ database to compute several control variables. The above data sets are merged to yield the final sample consisting of all the publicly listed firms on the Taiwan Stock Exchange (TWSE) or the Taiwan Over-the-Counter market (GTSM, Gre Tai Securities Market) for the period from 2010 through 2017⁵. The detailed sample selection procedures are presented in Table 1. All continuous independent variables are winsorized at the first and 99th percentiles.

Table 1 Sample Selection Procedure

Firms-years with TEJ data between 2010 and 2017	15,919
Less:	
firm-years operating in the Financial industries	(366)
firm-years with insufficient data to compute all board interlocks	(1,250)
firm-years with insufficient data to compute all control variables	(2,337)
Final observations	11,966
Mandatory CSR observations	912
Voluntary CSR observations	729
Final observations (after deleting the mandatory samples)	11,054

4. EMPIRICAL RESULTS

4.1 Sample Description

Table 2 Panel A reports descriptive statistics for the four board interlocking measures and additional independent variables used in our tests. *CSRAWARD* has a mean (median)

⁵ The sample period starts in 2010 because the assurance service of CSR report only became available in that year from the TEJ database.

of 0.180 (0.000) with a standard deviation of 0.481, indicating that the average award rate for all firms issuing standalone CSR reports is 18 percent. On average, 3.6 percent of the board interlocks is tied to high CSR firms, and 1.5 percent of the board interlocks with high CSR firms is assured by industry specialist CSR assurance providers. Furthermore, the average ties involving shared the same specialized CSR assurance provider (*IKSexpert*) is 0.001, indicating that there exists a slight connection between a focal firm and its interlocking partners, with network structures consisting of shared the same specialized CSR assurance provider. Panel B shows the change of mandatory and voluntary disclosure for CSR report before and after Kaohsiung explosions, a serious public safety accident. We can find that there is no mandatory observation before Kaohsiung explosions and more than 10% of observations are required to disclose standalone CSR report (higher than the percentage of voluntary observations) after the explosions. Panel C shows the percentage of observations that its CSR report is assured, assured by specialized CSR assurance providers, and assured by non-specialized CSR assurance providers. Overall, the percentage of CSR reports assured by the third party is increasing.

Table 3 presents the Pearson correlations among variables to enter the regression. We observe that there are significant positive correlations between four measures of board interlocks and CSR performance (*CSRAWARD*), evidenced by the coefficients 0.18 (*BoardIK*), 0.13 (*IKexpert*), 0.13 (*IKnonexpert*) and 0.22 (*IKSexpert*), respectively. Notably, board interlocks is positively correlated with firm size (*SIZE*), firm age (*AGE*), profitability (*ROA*), foreign shareholders (*FORE*), and cross-listing (*CROSS*). This provides initial evidence that board interlocks is inherently related to a firm's operating characteristics.

Table 2 Descriptive Statistics and Information on CSR Reporting and Assurance

Panel A: Descriptive statistics for regression variables					
	Mean	Median	Standard deviation	Minimum	Maximum
<i>CSRAWARD</i>	0.180	0.000	0.481	0.000	2.000
<i>BoardIK</i>	0.036	0.000	0.119	0.000	2.000
<i>IKexpert</i>	0.015	0.000	0.075	0.000	2.000
<i>IKnonexpert</i>	0.020	0.000	0.083	0.000	1.000
<i>IKSexpert</i>	0.001	0.000	0.017	0.000	0.500
<i>SIZE</i>	15.296	15.096	1.455	9.830	21.949
<i>LEV</i>	0.405	0.403	0.181	0.005	0.998
<i>AGE</i>	2.569	2.639	0.568	0.693	4.043
<i>MTB</i>	1.792	1.297	3.056	0.067	192.868

Table 2 Descriptive Statistics and Information on CSR Reporting and Assurance (Continued)

	Mean	Median	Standard deviation	Minimum	Maximum
<i>ROA</i>	0.037	0.041	0.103	-4.389	0.958
<i>FORE</i>	0.105	0.037	0.162	0.000	0.992
<i>INDEP</i>	0.243	0.286	0.169	0.000	0.800
<i>CROSS</i>	0.034	0.000	0.182	0.000	1.000
<i>Boardsize</i>	1.926	1.946	0.258	0.693	3.401
<i>Share</i>	0.221	0.196	0.125	0.000	0.943

Panel B: The percentage of total observations having standalone csr report before and after kaohsiung explosions

Year	Percentage of total observations (%)	Percentage of mandatory observations (%)	Percentage of voluntary observations (%)
Before Kaohsiung explosions			
2010	3.65	0	3.65
2011	3.41	0	3.41
2012	4.40	0	4.40
2013	10.18	0	10.18
After Kaohsiung explosions			
2014	16.38	11.15	5.23
2015	18.74	12.13	6.61
2016	21.39	14.61	6.78
2017	23.95	16.64	7.31
Average	13.71	7.62	6.09

Panel C: The percentage of total observations whose CSR report is assured

Year	Percentage of assurance(%)	Percentage of assurance with specialized CSR assurance providers(%)	Percentage of assurance without specialized CSR assurance providers(%)
2010	0.58	0.08	0.50
2011	0.70	0.08	0.62
2012	1.91	0.74	1.17
2013	4.54	2.89	1.65
2014	10.46	5.10	5.36
2015	11.02	5.14	5.88
2016	12.85	6.01	6.84
2017	13.70	6.73	6.97
Average	7.60	3.66	3.94

Notes: All continuous variables are winsorized at the 1 and 99 percentiles each year. The descriptive statistics are based on a sample of 11,966 observations during the 2010-2017 fiscal years. See the Appendix for variable definitions.

Table 3 Pearson Correlations Matrix among Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) <i>CSRAWARD</i>	1.00														
(2) <i>BoardIK</i>	0.18***	1.00													
(3) <i>IKexpert</i>	0.13***	0.67***	1.00												
(4) <i>IKnonexpert</i>	0.13***	0.78***	0.05***	1.00											
(5) <i>IKSexpert</i>	0.22***	0.21***	0.26***	0.06***	1.00										
(6) <i>SIZE</i>	0.43***	0.18***	0.15***	0.11***	0.15***	1.00									
(7) <i>LEV</i>	0.07***	0.02***	0.02**	0.01	0.03***	0.33***	1.00								
(8) <i>AGE</i>	0.18***	0.06***	0.05***	0.03***	0.08***	0.32***	0.15***	1.00							
(9) <i>MTB</i>	0.00	0.00	-0.00	0.01	0.00	-0.13***	0.03***	-0.11***	1.00						
(10) <i>ROA</i>	0.07***	0.04***	0.02**	0.03***	0.02**	0.19***	-0.16***	-0.08***	-0.04***	1.00					
(11) <i>FORE</i>	0.23***	0.10***	0.08***	0.07***	0.06***	0.35***	0.02**	-0.17***	0.08***	0.14***	1.00				
(12) <i>INDEP</i>	0.06***	0.02**	0.02**	0.01	0.02**	-0.11***	-0.07***	-0.42***	0.07***	0.02**	0.15***	1.00			
(13) <i>CROSS</i>	0.27***	0.07***	0.06***	0.05***	0.06***	0.37***	0.08***	0.12***	-0.03***	-0.03***	0.19***	0.03***	1.00		
(14) <i>Boardsize</i>	0.27***	0.15***	0.12***	0.10***	0.11***	0.33***	0.00	0.02**	0.01	0.05***	0.18***	0.03***	0.13***	1.00	
(15) <i>Share</i>	-0.02**	-0.01	-0.00	-0.02**	-0.01	-0.05***	0.07***	-0.01	0.07***	0.00	0.19***	0.04***	-0.06***	-0.16***	1.00

Notes: This table presents a Pearson correlation matrix based on a sample size of 11,966 observations during the 2010-2017 fiscal years. *, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively. All continuous variables are winsorized at the 1 and 99 percentiles each year. See the Appendix for variable definitions.

4.2 Effect of Board Interlock on the Spread of CSR Performance

Table 4 reports the ordered probit regression results. The model is significant, as indicated by its Chi-square value (p -value < 0.001). The pseudo R^2 of this model is relatively high (21.0%), representing a high goodness of fit. Wald chi-square statistics are used to test the significance of individual coefficients in this regression⁶.

Table 4 Ordered Probit Regression Results for Board Interlocks in Shaping CSR Performance

Variable	Predicted sign	CSR performance			
		Coefficient	z-value	Coefficient	z-value
<i>BoardIK</i>	+	0.870	8.341***		
<i>BoardIKDUM</i>	+			0.436	11.474***
<i>SIZE</i>	+	0.410	27.094***	0.393	25.742***
<i>LEV</i>	+	-0.844	-7.917***	-0.808	-8.502***
<i>AGE</i>	+	0.312	9.200***	0.333	9.864***
<i>MTB</i>	+	0.020	3.050***	0.020	3.386***
<i>ROA</i>	+	0.666	1.034	0.682	3.118***
<i>FORE</i>	+	0.382	3.448***	0.415	3.974***
<i>INDEP</i>	+	1.249	11.950***	1.190	11.423***
<i>CROSS</i>	+	0.217	3.192***	0.174	2.704***
<i>CUT1</i>	?	8.492		8.336	
<i>CUT2</i>	?	9.361		9.199	
Year dummy		Included		Included	
Industry dummy		Included		Included	
		Pseudo R^2	21.0%	Pseudo R^2	21.7%
		Chi-square	2436.51	Chi-square	2042.06
		(p -value)	<0.001***	(p -value)	<0.001***
		N	11,966	N	11,966

Notes: This table presents regression results based on equation (1). The dependent variable is CSR performance (*CSRAWARD*). The main explanatory variables are board interlocks (*BoardIK* and *BoardIKDUM*). Estimates on industry and year indicators are not reported for brevity. Significance is based on robust standard errors corrected for firm clustering. See the Appendix for variable definitions.

Hypothesis 1 predicts a positive association between board interlocks to high CSR firms and focal firms' CSR performance. Consistent with this argument, we find that the coefficient on *BoardIK* is positive and significant at the 1% level (p -value < 0.001). This result indicates that a focal firm's CSR performance is positively related to their interlock firms' CSR performance. In other words, firms' CSR performance can diffuse across firms

⁶ The variance inflation factors of all the independent variables are under 1.5, except for *SIZE*, which is 2.07. Therefore, multicollinearity does not seem to be a problem in interpreting the regression results.

through a network of director interlocks, thus supporting our hypothesis 1. The coefficients on our control variables are generally significant in the predicted direction, consistent with prior literature. Specifically, firms that are larger, more matured, and more profitable exhibit better CSR performance, as do firms with more foreign investors, more independent board, and cross-listing. In addition, we also use a dummy variable, whether a focal firm is tied to high CSR firms by board interlocks or not, to test our hypothesis and the result is still the same.

4.3 Effect of Board Interlock Involving CSR-Specific Industry Expert on the Spread of CSR Performance

Although board interlock facilitates the spread of CSR performance across firm, its effects could differ due to the nature of network ties. We conjecture that the impact of board interlock on CSR performance diffusion will be stronger when those network ties are assured by CSR-specific industry expert relative to non-CSR-specific industry expert. We partition *BoardIK* into *IKexpert* and *IKnonexpert* to test this hypothesis. The results are presented in Table 5. As it can be seen from the table, both the coefficient on *IKexpert* and the coefficient on *IKnonexpert* are all significantly positive ($p < 0.001$), indicating that board ties to high CSR firms matters to the focal firm's CSR performance, irrespective of the context of those ties. When we compare the coefficients on *IKexpert* and *IKnonexpert*, the test results show that the former is greater (more positive) than the latter. Namely, director interlocks to high CSR firms assured by a CSR-specific industry expert have more influence on the focal firms' CSR performance relative to interlocks to high CSR firms assured by non CSR-specific industry expert, thereby supporting our hypothesis 2.

Table 5 Ordered Probit Regression of CSR Performance on Board Interlocks to High-CSR firms through Assurance by CSR-Specific Industry Expert and Non CSR-specific Industry Expert

		CSR performance			
Variable	Predicted sign	Coefficient	Standard error	z-value	p-value
<i>IKexpert</i>	+	1.085	0.159557	6.8030	<0.001***
<i>IKnonexpert</i>	+	0.612	0.145109	4.2151	<0.001***
<i>SIZE</i>	+	0.409	0.015	26.9773	<0.001***
<i>LEV</i>	+	-0.839	0.107	-7.859	<0.001***
<i>AGE</i>	+	0.311	0.034	9.174	<0.001***
<i>MTB</i>	+	0.020	0.006	3.042	0.002***
<i>ROA</i>	+	0.672	0.646	1.040	0.149
<i>FORE</i>	+	0.384	0.111	3.458	0.001***
<i>INDEP</i>	+	1.246	0.105	11.915	<0.001***
<i>CROSS</i>	+	0.219	0.068	3.207	0.001***
<i>CUT1</i>	?	8.477	0.2177		
<i>CUT2</i>	?	9.347	0.223		
Year dummy		Included		Included	
Industry dummy		Included		Included	
		Pseudo R^2		21.0%	
		Chi-square		2440.96	
		(p-value)		<0.001***	
		N		11,966	
coefficient comparison					
difference		χ^2 -statistic		p-value	
0.473		4.685		0.015**	

Notes: This table presents regression results based on equation (2). The dependent variable is CSR performance (*CSRAWARD*). The main explanatory variables are ties to high CSR firms assured by a specialized CSR assurance provider (*IKexpert*) and ties to high CSR firms assured by a non-specialized provider (*IKnonexpert*). Estimates on industry and year indicators are not reported for brevity. Significance is based on robust standard errors corrected for firm clustering. See the Appendix for variable definitions.

5. ADDITIONAL ANALYSIS AND ROBUSTNESS CHECKS

In this section, we present additional analysis on the strength of interlocking directorate networks and conduct several robustness checks.

5.1 Further Test: Ties Involving Hiring the Same CSR-Specific Industry Expert

Prior research suggests that there is a notable tendency for interlocked companies to appoint the same auditor based on the concerns of building close network ties (Davison, Stening, and Wai 1984; Seabright, Levinthal, and Fichman 1992; Baydoun 1999; Courtney and Jubb 2005; Johansen and Pettersson 2013). Sharing the same auditor may determine the extent of knowledge transferred to recipients and reduces anxiety about the truth of the knowledge being shared (Argote, McEvily, and Reagans 2003). Likewise, Borgatti and Cross (2003) point out that expert status is important in predicting the successful transfer of knowledge across network partners. In terms of CSR assurance practice, the pool of CSR assurance providers in Taiwan typically includes accounting CSR assurance providers and non-accounting CSR assurance providers. We believe that specialized CSR assurance providers can play a crucial role in the diffusion of CSR performance, as do industry specialist auditors in the diffusion of audit quality. Hence, shared CSR-specific industry experts is thought to lend credence to an information spillover effect through board interlocks, reinforcing the influence of those ties on the focal firm's CSR performance.

To investigate the incremental influence of shared CSR-specific industry experts on CSR performance at the focal firm, we focus on the variable of "*IKexpert*" and add the interaction term of *IKexpert* and *IKSexpert* to our model, where *IKSexpert* is defined as the situation when the focal firm and its interlocking partners hire the same specialized CSR assurance provider. We expect the coefficient on this interaction term to be positive. The results are shown in Table 6. We find that the coefficient for the variable of *IKexpert* (z -value = 3.982, $p < 0.001$) remains positive at the 1% level of significance. Also, the coefficient for the interaction term of *IKexpert* × *IKSexpert* (z -value = 4.562, $p < 0.001$) is still positive at the 1% level of significance. These results are in line with a mosaic theory of information acquisition suggested by Solomon and Soltes (2015). Drawing on this view, CSR-specific industry experts act as conduits for the diffusion of information while directors are able to gather information through their network connections and proficiently process this information in a way that results in improved CSR performance. Therefore, we conclude that board interlocks to high-CSR firms are more influential when the focal firm and its interlocking partners appoint the same CSR-specific industry expert.

In addition, we also add a dummy variable (*assureddummy*), whether the focal firm's CSR report is assured by a specialized CSR assurance provider, to test our argument and the results⁷ are still the same.

⁷ The results of our main variables are shown here: *IKexpert* 1.072(<0.001***), *IKnonexpert* 0.377(<0.006***), and *assureddummy* 1.434(<0.001***).

Table 6 Ordered Probit Regression of CSR Performance on Board Interlocks to High-CSR Firms through Hiring the Same CSR-Specific Industry Expert

Variable	Predicted sign	CSR performance			
		Coefficient	Standard error	z-value	p-value
<i>IKexpert</i>	+	0.703	0.177	3.982	<0.001***
<i>IKSexpert</i>	+	0.333	0.265	1.257	0.2088
<i>IKexpert</i> × <i>IKSexpert</i>	+	6.607	1.448	4.562	<0.001***
<i>SIZE</i>	+	0.400	0.015	26.283	<0.001***
<i>LEV</i>	+	-0.852	0.107	-7.972	<0.001***
<i>AGE</i>	+	0.296	0.034	8.686	<0.001***
<i>MTB</i>	+	0.020	0.006	3.078	0.001***
<i>ROA</i>	+	0.683	0.642	1.063	0.144***
<i>FORE</i>	+	0.390	0.111	3.518	0.002***
<i>INDEP</i>	+	1.198	0.104	11.468	<0.001***
<i>CROSS</i>	+	0.234	0.069	3.383	0.004***
<i>CUT1</i>	?	8.281	0.219		
<i>CUT2</i>	?	9.160	0.225		
Year dummy		Included		Included	
Industry dummy		Included		Included	
		Pseudo R^2		22.0%	
		Chi-square		2565.09	
		(p-value)		<0.001***	
		N		11,966	

Notes: This table presents regression results based on further test. The dependent variable is CSR performance (*CSRAWARD*). The main explanatory variable is an interaction term of ties to high CSR firms assured by a specialized CSR assurance provider (*IKexpert*) and ties involving shared the same CSR-specific industry experts (*IKSexpert*). Estimates on industry and year indicators are not reported for brevity. Significance is based on robust standard errors corrected for firm clustering. See the Appendix for variable definitions.

5.2 Control the Effect of Mandatory Disclosure

As we mentioned before, the change of mandatory disclosure is a big difference before and after Kaohsiung explosions. To control this effect, we further test our hypotheses by using the sample that deletes mandatory observations. Table 7 shows the main results and we find the results are still the same.

Table 7 The Empirical Results after Deleting the Mandatory CSR Observations

Panel A: Ordered probit regression results for board interlocks in shaping CSR performance					
Variable	Predicted sign	CSR performance			
		Coefficient	z-value	Coefficient	z-value
<i>BoardIK</i>	+	0.762	6.402***		
<i>BoardIKDUM</i>	+			0.390	8.298***
Control Variables				Included	
Industry Dummies				Included	
Year Dummies				Included	
Panel B: Ordered probit regression of CSR performance on board interlocks to high-CSR firms through assurance by CSR-specific industry expert and non CSR-specific industry expert					
Variable	Predicted sign	CSR performance			
		Coefficient	Standard error	z-value	p-value
<i>IKexpert</i>	+	0.867	0.188	4.612	<0.001***
<i>IKnonexpert</i>	+	0.374	0.167	2.244	0.013**
Control Variables				Included	
Industry Dummies				Included	
Year Dummies				Included	
Panel C: Ordered probit regression of CSR performance on board interlocks to high-CSR firms through hiring the same CSR-specific industry expert					
Variable	Predicted sign	CSR performance			
		Coefficient	Standard error	z-value	p-value
<i>IKexpert</i>	+	0.594	0.206	2.883	0.002***
<i>IKSexpert</i>	+	0.771	0.651	1.221	0.118
<i>IKexpertxIKSexpert</i>	+	9.962	2.972	3.352	0.001***
Control Variables				Included	
Industry Dummies				Included	
Year Dummies				Included	

5.3 The Function of Board Member

Some may concern that each member has the different role in the board and the function the board member plays may also affect the validity of board interlocks. In light of this concern, we further divide board members into two groups, advisory and supervision, according to their main function in the board. Generally speaking, independent directors act in more of a monitoring role (Lanis and Richardson 2011; Richardson, Taylor, and Lanis 2013), while inside directors take on more of an advising role (Linck, Netter, and Yang 2008; Lehn, Patro, and Zhao 2009; Duchin, Matsusaka, and Ozbas 2010). Based on this view, we assign the independent directors to the supervision group and inside directors to the advisory group. We use two variables, *BoardIKadvisory* and *BoardIKsupervision*, to measure board interlocks derived from the advisory group and the supervision group. *BoardIKadvisory* is measured as the number of high CSR firms the focal firm is tied to by board interlocks from the advisory group deflated by the focal firm's total board interlocks. Similarly, *BoardIKsupervision* is measured as the number of high CSR firms the focal firm is tied to by board interlocks from the supervision group deflated by the focal firm's total board interlocks. In line with intuition, a board member will share his/her experience from other companies if his/her main function in the board is to provide advice to the management or the board. Thus, we predict that the interlocks from the inside directors will have more influence on CSR performance than from independent directors. The results are presented in Table 8. We find that the two types of director interlocks are all positively significant no matter what interlocks a board has. In other words, our main argument, board interlock facilitates the spread of CSR performance across firm, still exist. Furthermore, the results show that, although the coefficient has no significant difference, board interlocks from the inside directors seem to have more influence on the focal firms' CSR performance than from independent directors. This finding again confirms the earlier results.

Table 8 Ordered Probit Regression Results for Board Interlocks in Shaping CSR Performance According to Board Member's Function

Variable	Predicted sign	CSR performance			
		Coefficient	Standard error	z-value	p-value
<i>BoardIKadvisory</i>	+	0.905	0.143	6.353	<0.001***
<i>BoardIKsupervision</i>	?	0.536	0.308	1.739	0.082*
<i>SIZE</i>	+	0.350	0.019	18.212	<0.001***
<i>LEV</i>	+	-0.863	0.119	-7.240	<0.001***
<i>AGE</i>	+	0.105	0.040	2.666	0.004***
<i>MTB</i>	+	0.018	0.005	3.679	<0.001***
<i>ROA</i>	+	1.036	0.252	4.106	<0.001***
<i>FORE</i>	+	0.170	0.124	1.371	0.085*
<i>INDEP</i>	+	0.936	0.124	7.547	<0.001***
<i>CROSS</i>	+	0.149	0.097	1.542	0.062*
<i>ASSUREDUM</i>	+	1.746	0.072	24.317	<0.001***
<i>CUT1</i>	?	8.477	0.2177		
<i>CUT2</i>	?	9.347	0.223		
Year dummy		Included		Included	
Industry dummy		Included		Included	
		Pseudo R^2		20.3%	
		Chi-square		1618.21	
		(p-value)		<0.001***	
		N		11,054	
coefficient comparison					
difference		χ^2 -statistic		p-value	
0.369		1.15		0.284	

Notes: This table presents regression results based on equation (1). The dependent variable is CSR performance (*CSRAWARD*). The main explanatory variables are advisory or supervision board interlocks (*BoardIKadvisory* and *BoardIKsupervision*). Estimates on industry and year indicators are not reported for brevity. Significance is based on robust standard errors corrected for firm clustering. See the Appendix for variable definitions.

5.4 Instrumental Variables Approach

Another concern here is that the incidence of board partner interlocks is unlikely to be randomly determined and, therefore, the factors that prompt such interlocks may be correlated with our measures of CSR performance. To address potential endogeneity, this study executes a two-stage estimation procedure using an instrumental variable (IV) approach. Our objective is to utilize instrumental variables that are correlated with board interlocks, but not correlated with the proxy for CSR performance. In the first stage, we model board interlocks using valid instruments specified by Han et al. (2017): board size (*Boardsize*) and share ratio of the largest shareholder (*Share*). In the second stage, we estimate the CSR performance regression after replacing the board interlocks with the fitted values of this endogenous regressor from the first stage. To verify the relevance and validity of our instruments, we follow the approaches proposed by Larcker and Rusticus (2010) and specifically address whether the IVs for board interlocks meet the following two criteria: (1) correlated with board interlocks, (2) but uncorrelated with the error term in the second-stage model.

In evaluating the first criterion specified above, the partial F -statistics (30.392) of whether the coefficients on the instruments are jointly zero is greater than 10, the threshold that Stock, Wright, and Yogo (2002) use to identify strong instruments, suggesting the instruments do not suffer from the weak-instrument problem. Regarding the second criterion, we conduct a Sargan over-identification test after the two-stage estimation. The Chi-Square test statistics is 1.176 and the corresponding p -value is 0.278 which is well above 10 percent, suggesting that these two instruments are not correlated with the error term of the second stage at the conventional levels. The results from Table 9 show that our findings are robust to this specification.

Table 9 Ordered Probit Regression Results for Board Interlocks in Shaping CSR Performance: The Second Stage of Instrumental Variable Estimation

Variable	Predicted sign	CSR performance			
		Coefficient	Standard error	z-value	p-value
<i>BoardIK</i>	+	8.401	0.194	43.352	<0.001 ^{***}
<i>SIZE</i>	+	0.055	0.026	2.139	0.016 ^{**}
<i>LEV</i>	+	-0.167	0.092	-1.820	0.035 ^{**}
<i>AGE</i>	+	0.018	0.025	0.728	0.234
<i>MTB</i>	+	0.003	0.004	0.717	0.237
<i>ROA</i>	+	0.413	0.147	2.813	0.003 ^{***}
<i>FORE</i>	+	-0.157	0.082	-1.914	0.028 ^{**}
<i>INDEP</i>	+	0.293	0.098	2.982	0.002 ^{***}
<i>CROSS</i>	+	0.116	0.071	1.635	0.051 [*]
<i>ASSUREDUM</i>	+	0.403	0.136	2.954	0.002 ^{***}
<i>CUT1</i>	?	2.272	0.457		
<i>CUT2</i>	?	2.671	0.496		
Year dummy		Included		Included	
Industry dummy		Included		Included	
		Pseudo R^2	20.1%		
		Chi-square (p -value)	15586.04 (<0.001 ^{***})		
		N	11,054		
Weak instrument test:		F -statistic (p -value)	30.392 (<0.001 ^{***})		
Sargan over-identification test:		χ^2 -statistic (p -value)	1.176 (0.278)		

Notes: This table reports the results of the second stage of instrumental variable estimation based on equation (1) that treats board interlocks as endogenous. The dependent variable is CSR performance (*CSRWARD*). The main explanatory variable is board interlocks (*BoardIK*). Estimates on industry and year indicators are not reported for brevity. Significance is based on robust standard errors corrected for firm clustering. See the Appendix for variable definitions.

5.5 Propensity Score Matching Method

To further validate our inferences, this study verifies whether our inferences are robust to the propensity score matching model conditional on observable features. We first run a logistic regression with adding *Boardsize* and *Share* to explain the probability that a company engage in board partner interlocks in a given year (Han et al. 2017). Next we use the propensity scores obtained from the logistic estimation and perform a one-to-one nearest-neighbor matching technique with replacement (Armstrong, Jagolinzer, and Larcker 2010; Bédard and Courteau 2015). This procedure ensures that each board interlocked firm is paired with non-board interlocked firm. We pool the treatment sample and the matched sample together and examine the differences between board interlocking and non-board interlocking in terms of CSR performance. The results from Table 10 show that our findings are similar to the results reported in Table 4.

Table 10 Ordered Probit Regression Results for Board Interlocks in Shaping CSR Performance: Propensity-Score Matching Estimation

Variable	Predicted sign	CSR performance			
		Coefficient	Standard error	z-value	p-value
<i>BoardIK</i>	+	0.509	0.146	3.485	<0.001***
<i>SIZE</i>	+	0.350	0.029	11.921	<0.001***
<i>LEV</i>	+	-0.957	0.195	-4.905	<0.001***
<i>AGE</i>	+	0.064	0.056	1.154	0.124
<i>MTB</i>	+	0.018	0.007	2.490	0.007***
<i>ROA</i>	+	1.026	0.414	2.481	0.007***
<i>FORE</i>	+	0.180	0.190	0.947	0.172
<i>INDEP</i>	+	0.500	0.209	2.389	0.009***
<i>CROSS</i>	+	0.234	0.117	2.008	0.023**
<i>ASSUREDUM</i>	+	1.720	0.109	15.841	<0.001***
<i>CUT1</i>	?	6.900	0.432		
<i>CUT2</i>	?	7.601	0.436		
Year dummy		Included		Included	
Industry dummy		Included		Included	
		Pseudo R^2		21.4%	
		Chi-square (p -value)		728.83(<0.001***)	
		N		3,379	

Notes: This table reports the results of a propensity-score matching procedure based on equation (1) that treats board interlocks as endogenous. The dependent variable is CSR performance (*CSRWARD*). The main explanatory variable is board interlocks (*BoardIK*). Estimates on industry and year indicators are not reported for brevity. Significance is based on robust standard errors corrected for firm clustering. See the Appendix for variable definitions.

5.6 Alternative Measure of CSR Performance

As mentioned previously, we use whether a firm is awarded for the best CSR practices as a proxy for CSR performance. Some may concern that the variable we use to assess CSR performance cannot fully capture heterogeneity among individual CSR performance. Therefore, we construct CSR scores for each firm based on six dimensions (communities, employee relations, environment, products, diversity, and human rights) similar to KLD ratings⁸ to evaluate a firm's CSR performance. Each dimension is divided into several strength items or concern items. Operationally, we check whether sample companies meet the criteria of each item. If the answer is yes, the company will get 1 point, otherwise 0. For example, one of strength items for communities dimension is whether a company has charitable giving during the year. If a company declares that it has a significant donation, then it will get 1 point. The sample consists of all publicly listed firms from 2011 through 2015. Following previous literature on CSR, we create three indexes to measure a firm's CSR performance. We first construct the CSR strengths (*STRENGTHS*) and CSR concerns (*CONCERNS*) index by separately summing up strength and concern scores from six dimensions discussed above, and then calculate the total CSR performance index (*CSRSCORE*) by subtracting the summed concern scores from the summed strength scores.

We first test for difference in the mean (median) values of each CSR performance measure between firms with and without CSR awards by using a two-tailed t-test (Wilcoxon rank-sum test). Compared with the subsample of firms years without CSR awards, the average *CSRSCORE* and *STRENGTHS* for firms years that receive CSR awards are significantly higher (t -value=4.311, $p<0.001$; t -value=6.509, $p<0.001$). Similarly, the median *CSRSCORE* and *STRENGTHS* are significantly larger (z -value=4.404, $p<0.001$; z -value=5.882, $p<0.001$) in the subsample with CSR awards than without. But there is no significant difference between the two groups with respect to *CONCERNS* (t -value=-0.957, $p=0.170$; z -value=-0.561, $p=0.287$). These tests provide preliminary evidence that firms receiving CSR awards are more likely to have better CSR performance than those do not.

Next, we employ OLS regression to re-run regression analysis replacing discrete variables (*CSRAWARD*) with continuous variables (*CSRSCORE*, *STRENGTHS*, and *CONCERNS*). Table 11 and 12 show the results for our two hypotheses using this alternative model specification. The results are inferentially similar to those reported in Table 4 and 5, albeit insignificant for the measure of CSR concerns.

⁸ KLD score is constructed by Kinder, Lydenberg, and Domini to evaluate a firm's CSR performance.

Table 11 OLS Regression Results for Board Interlocks in Shaping CSR Performance-Alternative CSR Performance Measure

Variables	Predicted sign	CSRSCORE	STRENGTHS	CONCERNS	CSRSCORE	STRENGTHS	CONCERNS
<i>BOARDIK</i>	+	0.0745 ^{**} (2.245)	0.0821 ^{***} (5.849)	0.00768 (0.255)	0.0246 ^{**} (2.006)	0.0268 ^{***} (5.159)	0.00221 (0.198)
<i>BOARDIKDUM</i>	+				-0.0120 ^{***} (-2.821)	0.0231 ^{***} (12.806)	0.0352 ^{***} (9.092)
<i>SIZE</i>	+	-0.0117 ^{***} (-2.761)	0.0235 ^{***} (13.106)	0.0352 ^{***} (9.161)	0.0112 (0.405)	-0.0417 ^{***} (-3.568)	-0.0529 ^{**} (-2.113)
<i>LEV</i>	+	0.00981 (0.357)	-0.0431 ^{***} (-3.704)	-0.0530 ^{**} (-2.122)	0.0375 ^{***} (3.834)	0.0340 ^{***} (8.188)	-0.00356 (-0.401)
<i>AGE</i>	+	0.0367 ^{***} (3.749)	0.0330 ^{***} (7.973)	-0.00364 (-0.410)	0.00629 ^{**} (1.692)	0.00507 ^{***} (3.223)	-0.00121 (-0.360)
<i>MTB</i>	+	0.00638 ^{**} (1.720)	0.00517 ^{***} (3.294)	-0.00121 (-0.359)	-0.152 ^{**} (-1.733)	-0.0995 ^{***} (-2.681)	0.0523 (0.658)
<i>ROA</i>	+	-0.154 ^{**} (-1.759)	-0.102 ^{***} (-2.745)	0.0522 (0.657)	-0.0860 ^{**} (-2.329)	0.00890 (0.569)	0.0949 ^{***} (2.833)
<i>FORE</i>	+	-0.0847 ^{**} (-2.294)	0.0103 (0.662)	0.0950 ^{***} (2.837)	-0.0714 ^{***} (-2.329)	0.0233 ^{**} (2.027)	0.0946 ^{***} (3.853)
<i>INDEP</i>	+	-0.0703 ^{***} (-2.597)	0.0244 ^{**} (2.132)	0.0947 ^{***} (3.858)	0.0104 (0.375)	0.0298 ^{***} (2.543)	0.0194 (0.774)
<i>CROSS</i>	+	0.0135 (0.487)	0.0332 ^{***} (2.836)	0.0197 (0.786)	-0.111 [*] (-1.793)	-0.373 ^{***} (-14.259)	-0.262 ^{***} (-4.685)
<i>CONSTANT</i>	?	-0.113 ^{**} (-1.836)	-0.376 ^{***} (-14.406)	-0.263 ^{***} (-4.700)			
Observations		4,075	4,075	4,075	4,075	4,075	4,075
<i>R</i> ²		0.153	0.133	0.104	0.151	0.131	0.099
Adjusted <i>R</i> ²		0.149	0.131	0.102	0.147	0.129	0.097
<i>F</i>		69.47 ^{***}	69.22 ^{***}	23.09 ^{***}	68.32 ^{***}	68.26 ^{***}	23.09 ^{***}

Notes: This table reports OLS regression results using CSR performance scores as the dependent variables.

Table 12 OLS Regression of CSR Performance on Board Interlocks to High-CSR Firms through Assurance by CSR-Specific Industry Expert and Non CSR-Specific Industry Expert-Alternative CSR Performance Measure

Variables	Predicted sign	<i>CSRSCORE</i>	<i>STRENGTHS</i>	<i>CONCERNS</i>
<i>IKexpert</i>	+	0.0956** (1.823)	0.0921*** (4.686)	0.00850 (0.218)
<i>IKnonexpert</i>	+	0.0766** (1.785)	0.0851*** (4.150)	-0.00351 (-0.074)
<i>SIZE</i>	+	-0.0119*** (-2.805)	0.0234*** (13.030)	0.0353*** (9.167)
<i>LEV</i>	+	0.0105 (0.380)	-0.0428*** (-3.681)	-0.0533** (-2.136)
<i>AGE</i>	+	0.0366*** (3.743)	0.0330*** (7.970)	-0.00362 (-0.408)
<i>MTB</i>	+	0.00631** (1.701)	0.00513*** (3.268)	-0.00118 (-0.350)
<i>ROA</i>	+	-0.153** (-1.744)	-0.101*** (-2.727)	0.0516 (0.650)
<i>FORE</i>	+	-0.0848** (-2.297)	0.0103 (0.662)	0.0951*** (2.840)
<i>INDEP</i>	+	-0.0703*** (-2.597)	0.0245** (2.140)	0.0948*** (3.860)
<i>CROSS</i>	+	0.0135 (0.490)	0.0332*** (2.840)	0.0197 (0.785)
<i>CONSTANT</i>	?	-0.110* (-1.786)	-0.374*** (-14.325)	-0.264*** (-4.712)
Observations		4,075	4,075	4,075
R^2		0.156	0.134	0.099
Adjusted R^2		0.153	0.132	0.096
F		64.36***	63.10***	20.77***

Notes: This table reports OLS regression results using CSR performance scores as the dependent variables.

Finally, we also retest some of our sensitivity analyses using this alternative measure of CSR performance. The results are shown in Table 13 and Table 14. Again, the results remain qualitatively unchanged.

Table 13 OLS Regression of CSR Performance on Board Interlocks to High-CSR Firms through Hiring the Same CSR-Specific Industry Expert-Alternative CSR Performance Measure

Variables	Predicted sign	<i>CSRSORE</i>	<i>STRENGTHS</i>	<i>CONCERNS</i>
<i>IKexpert</i>	+	0.0971** (1.812)	0.106*** (4.667)	0.00874 (0.180)
<i>IKSexpert</i>	?	0.0903 (0.858)	0.185* (1.515)	0.0947 (0.993)
<i>IKexpert</i> × <i>IKSexpert</i>	+	0.142** (1.694)	0.621*** (4.060)	-0.479 (-0.460)
<i>SIZE</i>	+	-0.0118*** (-2.775)	0.0235*** (13.069)	0.0352*** (9.158)
<i>LEV</i>	+	0.00825 (0.300)	-0.0450*** (-3.865)	-0.0532** (-2.135)
<i>AGE</i>	+	0.0364*** (3.723)	0.0330*** (7.971)	-0.00342 (-0.386)
<i>MTB</i>	+	0.00638** (1.719)	0.00524*** (3.336)	-0.00114 (-0.339)
<i>ROA</i>	+	-0.153** (-1.752)	-0.102*** (-2.757)	0.0512 (0.645)
<i>FORE</i>	+	-0.0868*** (-2.348)	0.00789 (0.505)	0.0947*** (2.825)
<i>INDEP</i>	+	-0.0706*** (-2.603)	0.0253*** (2.210)	0.0959*** (3.901)
<i>CROSS</i>	+	0.0130 (0.469)	0.0318*** (2.718)	0.0188 (0.751)
<i>CONSTANT</i>	?	-0.109* (-1.769)	-0.373*** (-14.273)	-0.264*** (-4.710)
Observations		4,075	4,075	4,075
R^2		0.155	0.134	0.089
Adjusted R^2		0.152	0.131	0.087
F		56.36***	57.07***	19.08***

Notes: This table reports OLS regression results using CSR performance scores as the dependent variables.

Table 14 OLS Regression Results for Board Interlocks in Shaping CSR Performance According to Board Member's Function-Alternative CSR Performance Measure

Variables	Predicted sign	<i>CSRSORE</i>	<i>STRENGTHS</i>	<i>CONCERNS</i>
<i>BOARDIKadvisory</i>	+	0.126** (1.974)	0.0571*** (3.587)	0.0109 (0.315)
<i>BOARDIKsupervision</i>	?	0.046 (1.212)	0.0255* (1.471)	0.0093 (0.267)
<i>SIZE</i>	+	-0.0133*** (-3.126)	0.0212*** (11.905)	0.0345*** (8.910)
<i>LEV</i>	+	0.00695 (0.253)	-0.0437*** (-3.817)	-0.0507** (-2.033)
<i>AGE</i>	+	0.0355*** (3.636)	0.0321*** (7.870)	-0.00340 (-0.383)
<i>MTB</i>	+	0.00619** (1.669)	0.00457*** (2.952)	-0.00162 (-0.479)
<i>ROA</i>	+	-0.148** (-1.697)	-0.0904*** (-2.478)	0.0578 (0.728)
<i>FORE</i>	+	-0.0915*** (-2.483)	0.00163 (0.106)	0.0932*** (2.780)
<i>INDEP</i>	+	-0.0701*** (-2.584)	0.0200** (1.767)	0.0901*** (3.654)
<i>CROSS</i>	+	0.00667 (0.242)	0.0256** (2.223)	0.0190 (0.755)
<i>ASSUREDUM</i>	+	0.133*** (4.654)	0.143*** (12.039)	0.0107 (0.413)
<i>CONSTANT</i>	?	-0.0835 (-1.347)	-0.337*** (-13.006)	-0.253*** (-4.495)
Observations		4,075	4,075	4,075
R^2		0.221	0.161	0.070
Adjusted R^2		0.218	0.158	0.067
F		77.55***	70.69***	29.41***
test for difference in coefficients		0.078	0.032	0.0016
F value		1.86	2.01	1.28

Notes: This table reports OLS regression results using CSR performance scores as the dependent variables.

6. CONCLUSION

This study examines the impact of board interlocks and specialized CSR assurance providers on firms' CSR performance. We find that firms with larger high-CSR board connections exhibit better CSR performance themselves. The results are still robust after using an exogenous IV and PSM to remove the endogeneity bias. In addition, when we decompose the network into high CSR firms assured by a CSR-specific industry expert and high CSR firms assured by a non-CSR-specific industry expert connections, we find that both types of connections appear to be important, with the former having a somewhat larger effect. We also find that board ties are more influential when the focal firm and its interlocking partners share the same CSR-specific industry expert.

This study contributes to the literatures on nonfinancial disclosure and director interlocks by providing a more complete picture of the effect that board ties can have on firms' CSR performance. Our results demonstrate that director interlock is capable of the spread of the CSR performance among interlocking firms. We also add to the industry expertise literature by demonstrating that the specialized CSR assurance providers will strengthen the diffusion of firms' CSR performance in an interlock network. This study is relevant to understanding how board ties affect the observed variation in corporate CSR performance.

APPENDIX

Variable Definitions	
Variable	Definition
Dependent Variable	
<i>CSRAWARD</i>	= 2 if the firm is included in the list of the award for excellence in CSR disclosure released by the CSR rating institutions; 1 if the firm issues a standalone CSR report but not be awarded the excellence in CSR award; 0 if the firm doesn't release a standalone CSR report.
Testing Variables	
<i>BoardIK</i>	= Number of high CSR firms the focal firm is tied to by board interlocks deflated by the focal firm's total board interlocks, where high CSR firms are identified as those listed in the list of the award for excellence in CSR disclosure. All variants (these covers all test variables) that follow are scaled by the focal firm's total board interlocks, unless specified.
<i>IKexpert</i>	= Number of high CSR firms the focal firm is connected to by board interlocks where high CSR firms are assured by a specialized CSR assurance provider. Specialized is defined as CSR assurance provider with CSR-specific industry expertise. A CSR assurance provider is identified as a CSR-specific industry specialist if the assurance provider has the largest market share in a given industry. where the computation of market share follow those in Balsam et al. (2003) and Chin and Chi (2009).
<i>IKnonexpert</i>	= Number of high CSR firms the focal firm is connected to by board interlocks where high CSR firms are assured by a non-specialized CSR assurance provider.
<i>IKSexpert</i>	= 1 if the focal firm and its interlocking partners hire the same specialized CSR assurance provider; 0 otherwise.
Control Variables	
<i>SIZE</i>	= Natural logarithm of a firm's total assets.
<i>LEV</i>	= Ratio of book value of total debt and total assets.
<i>AGE</i>	= Natural logarithm of the number of year since the firm's inception.
<i>MTB</i>	= Natural logarithm of market value of common equity divided by the book value of common equity.
<i>ROA</i>	= Ratio of earnings before interest and taxes and total assets.
<i>FORE</i>	= Percentage of shares owned by the foreign investors.
<i>INDEP</i>	= Proportion of independent directors on board.
<i>CROSS</i>	= 1 if the firm cross-listed its shares on foreign exchange; 0 otherwise.
Instrumental Variables	
<i>Boardsize</i>	= The total number of directors on the firm's board.
<i>Share</i>	= The shareholding ratio of the largest shareholder in the firm.

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