Strategic Management Journal
Strat. Mgmt. J. (2014)
Published online EarlyView in Wiley Online Library (wileyonlinelibrary.com) DOI: 10.1002/smj.2219
Received 23 August 2012; *Final revision received 17 November 2013*

RESEARCH NOTES AND COMMENTARIES

CORPORATE SOCIAL PERFORMANCE, ANALYST STOCK RECOMMENDATIONS, AND FIRM FUTURE RETURNS

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This study posits that security analysts heed corporate social performance information and factor it into their recommendations to general investors. In particular, as corporate social performance is often uncertain and ambiguous to general investors, analysts may serve as the informational pathway connecting corporate social performance to firm stock returns. Thus, we argue that analyst recommendations mediate the relationship between corporate social performance and firm stock returns. On the basis of not only a qualitative study with literature searches and interviews of stock analysts but also a quantitative study with two longitudinal samples of large firms, we find support for these arguments. Our findings uncover an information-based underlying mechanism for the link between corporate social performance and financial performance. Copyright © 2013 John Wiley & Sons, Ltd.

INTRODUCTION

A large number of previous studies have analyzed the direct link between corporate social performance (CSP) and corporate financial performance (CFP). Despite these efforts, there are still on-going debates and controversial arguments about whether and how CSP influences CFP (e.g., Barnett and Salomon, 2006; Luo and Bhattacharya, 2006; Margolis and Walsh, 2003; Orlitzky, Schmidt, and Rynes, 2003; Ramchander, Schwebach, and Staking, 2012). Hence, there is a high need to penetrate the black box linking CSP and CFP and gain a better understanding of its underlying mechanisms.

This study uncovers an information-based mechanism for the CSP–CFP relationship, by examining the mediating role of analyst recommendations in the relationship. In particular, it recognizes that firm CSP is multidimensional in nature and hence generally complex, which renders it arduous for general investors to have an in-depth understanding of CSP and precisely gauge its quality. Despite the availability of professional ratings on firm CSP dimensions (e.g., KLD, Thomson Reuter's ASSET4), such information is too intricate to be directly understood and priced by general investors who are not certified

Keywords: corporate social performance; financial analysts; stock recommendations; stock returns

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industry experts and are often constrained by time and resources (Fombrun, Gardberg, and Barnett, 2000; Surroca, Tribo, and Waddock, 2010). Thus, not all CSP information can be automatically incorporated into firm stock performance efficiently (Godfrey, Merrill, and Hansen, 2009).

Security analysts, on the other hand, are certified industry experts skilled at obtaining *private* information that is not readily accessible to general investors and so are better able to assess the value relevance of firm CSP information (Ivkovic and Jegadeesh, 2004). Our qualitative aspect of the study based on a search of existing literature and interviews of analysts suggests that analysts do pay a great deal of attention to CSP and factor it into stock recommendations. Accordingly, we propose a mediation role of security analysts in the CSP–CFP link: analyst recommendations act as an informational pathway through which CSP affects CFP. To test this argument formally, we further collected quantitative data and conducted analyses with two longitudinal samples of large firms. Results of the quantitative analyses provide systematic support for the mediating role of analyst recommendations.

Our first contribution to the literature is to demonstrate the role of analysts as a key information intermediary for stock market participants to value CSP. Specifically, we explicate the mechanism by which CSP influences firm financial performance (i.e., by identifying how security analysts act as information channels to clarify the value and relevance of CSP for general investors). Our results suggest that the financial performance effect of CSP can be better materialized when security analysts heed firm CSP information. Indeed, without examining the information bridge of analysts, the CSP–CFP link can be distant or illusive. Yet, with it, the link can be made clearer. As strategy theories demonstrate growing concerns for the elusive "business case" of CSP and fund managers increasingly "invest with a conscience," our work places the spotlight on analysts and supports that information-based mechanisms account for the eventual shareholder value impact of CSP.

Second, the analyst mechanism helps reinterpret prior findings and advance future research in this regard. For example, we provide a potential explanation of mixed findings of the CSP–CFP relationship in prior studies, by pointing to an important information-based contingency (where analysts can reduce the information asymmetry between firm CSP and general investors) for the relationship. Our results imply that when security analysts are active in the firms' operational environment, the benefits that firms gain from CSP are more likely to be realized. We thus provide insights for how such research should be conducted by calling for future work to examine the specific contingencies underlying the information-based mechanism that links CSP to CFP.

Lastly, the findings of this study help, to a certain extent, reconcile the literature on shareholder vis-à-vis stakeholder primacy debate. While the classical finance theory suggests that the goal of a corporation is shareholder value maximization (Jensen, 2001), the stakeholder theory holds that corporations should be responsible for all relevant stakeholders (Freeman, 1984). One implication of this study is that as shareholders increasingly value corporate social performance, firms that take better care of their various stakeholders are more likely to attract shareholders to buy their stocks and enhance share returns ultimately. This echoes Stout's (2012) view of "universal investors," who recognize that valuable assets are not merely equity shares but also stakes in the community, the economy, and even the entire planet. Such broadly defined assets nowadays make it even more challenging for general investors to gauge precisely and price CSP (i.e., higher information asymmetry, Godfrey *et al.*, 2009). In this sense, stock analysts are more and more likely to be catalysts that help materialize the link between shareholder investment returns and firm social activities targeting broader stakeholder groups. The more shareholders as universal investors (Stout, 2012), the more analysts play a pivotal information-bridging role, through which shareholder and stakeholder views can be better aligned.

THE QUALITATIVE RESEARCH

This section reports the results of our literature search and interviews that suggest analysts do heed firm CSP information and incorporate it in their recommendations to investors.

Based on a joint survey of 388 fund managers and financial analysts initiated by CSR Europe, Deloitte, and Euronext (2003), 79 percent of fund managers and analysts indicated that social management has a positive impact on firm value in the long term, and around 50 percent of them

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DOI: 10.1002/smj

take into account corporate information on social and environmental performance. Most importantly, 51 percent of fund managers and 37 percent of financial analysts, respectively, would grant a stock price premium to socially responsible companies (CSR Europe *et al.*, 2003). Professional analysts such as investment banks and brokerage houses even have divisions that specifically analyze firm CSP data (e.g., Goldman Sachs, HSBC, and Credit Suisse).

Such analyst emphasis on Corporate Social Responsibility (CSR) is further evidenced by the increasing demand of investors for CSR (Dhaliwal *et al.*, 2012). According to the survey, 78 percent of investors discuss CSR issues with sell-side analysts (ECCE, 2007) and 56 percent of corporations indicate that investors requested information on nonfinancial goals including CSR metrics (BNY Mellon, 2012). Bruce M. Kahn, Director and Senior Investment Analyst at Deutsche Bank, reports that "a growing number of ... clients are asking for ESG [i.e., environmental, social, and corporate governance] criteria integrated" (BSR, 2009: 13).

Indeed, an increasing number of initiatives integrates ESG factors into mainstream investment analysis (Jemel-Fornetty, Louche, and Bourghelle, 2011) because "mainstream analysts ... were starting to pay more attention to the potential for ESG-related research to add investment value" (A4S, GRI, and Radley Yeldar, 2012; CAMRADATA, 2013; Eurosif and ACCA, 2013; PRI, 2013: 24). For example, Eccles, Serafeim, and Krzus (2011: 117) counted 44 million total queries in the Bloomberg database between November 2010 and April 2011 and conclude that while at Deutsche Bank (2012: 28) "mainstream corporate analysis considers key financial data ... main criteria, *but* analysts actively screen companies with poor ESG ratings or involvement in controversial ESG issues."

Our own in-depth interviews with analysts and those conducted by Fieseler (2011) provide further qualitative evidence of analysts' increasing attention to CSP. First, our own interviews (n = 28, each interview lasted about 30 minutes on average) confirm that the majority of these analysts monitor CSP closely in the firms they cover, albeit with diverse approaches. For example, analysts of a major European bank report that they rely on two data sources for CSP information. The first is RepRisk, which provides a quantitative indicator about the likelihood of reputation risks caused by activities related to poor working conditions, corruption, human rights violations, and environmental destruction. The second is RobecoSAM, which specializes in sustainability investing. Some other analysts we interviewed emphasize CSR as a key gatekeeper for stock recommendations. As one analyst states,

> *Even if financial analysis suggests a stock is undervalued, we do not issue a buy recommendation if the firm is likely to receive negative CSR reports*.... (Sell-side analyst, interview, August 29, 2013).

Based on interviews with 42 mainstream financial analysts, Fieseler (2011) holds that analysts use CSP to gauge management's long-term orientation and the financial well-being of firms, confirming that social responsibility strategies might have been converging with economic strategies to become part of the mainstream investment analysis (Fieseler, 2011: 138):

> *The reality is that we are interested in financial performance at the end of the day. But there is enough evidence to suggest that corporate governance, good sustainability and environmentally friendly behavior add value over the longer term—although it is hard to immediately measure that in financial terms*. (Buy-side analyst, interview, April 21, 2006).

> *I am interested in a company's strategic position regarding its core business—especially in the long term, not only right now. . . . I believe that [social and environmental issues] are part of this long-term perspective. They can be interesting criteria to back up an investment decision*. (Sell-side analyst, interview, May 8, 2006).

Our research also reveals that analysts discuss various types of CSR-related information, including issues regarding the environment, products, employee relations, corporate governance, community, and others, in their analyst reports. Table 1 provides examples of such information from analyst research reports issued between 2003 and

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2011. Taking environment-related information as an example, content analyses of European and American sell-side analysts' reports show that about 36 percent of those reports contain CSR information (Cerin, 2010; Nilsson, Cunningham, and Hassel, 2008). Analysts often regard green technology or new environmental-friendly practices such as wastewater treatment as meaningful corporate contributions to long-term growth. The analysts of Sal. Oppenheim initiated coverage of Petrotec with a "buy"-rating because "a rising environmental awareness is one of the initial drivers for renewable energies."

Another example can be found in KRChoksey's report on Praj Industries. In 2011, Praj Industries Limited (PIL), a firm engaged in the business of process and project engineering for brewery plants, decided to enter into water & wastewater treatment, customized engineering, and bio-consumables. KRChoksey reported that "regulatory changes in US and higher crude prices will make ethanol production more viable now. Fresh order resumption and the steady recovery of the global economy will bring business back to Praj." Considering such government shift toward cleaner fuels, KRChoksey estimated that this new plan would win "a business opportunity of USD 7–8 bn for PIL" and the company "has started receiving [investor] enquiries for the same." Analysts are also concerned about CSP-related accreditations such as ISO-14001 and OHSAS-18001, which are standards for occupational health and safety management (see Firstcall's report on Kansai Nerolac Paints in Table 1). Analysts use this information to highlight the superiority of corporate management and business operations, especially when few companies in this industry receive such accreditations, and thus provide "buy" recommendations to general investors.

RESEARCH QUESTION

The aforementioned qualitative study leads to the insights that (1) a significant proportion of analysts are aware of CSR information and consider it important and (2) analysts incorporate CSP information in their reports to general investors for buy or sell recommendations. This suggests that CSP is positively associated with analyst stock recommendations. Moreover, prior finance literature has established that investors depend on (and pay substantial fees to) analysts' recommendations to make buy, hold, sell decisions (Ivkovic and Jegadeesh, 2004). Womack (1996: 164) reports that stock prices adjust "either up five percent for changes to buy recommendations or 11 percent for changes to sell recommendations." This suggests that analyst recommendations have significant influences on firm stock returns.

Further, given the possible presence of information asymmetry between CSP information and investors, a mediating role of analyst recommendations in the relationship between CSP and future firm stock returns is expected to exist. As Howe, Unlu, and Yan (2009: 799) note, "analyst recommendations contain additional information content and forecast future returns." Thus, we can also expect that general investors reply on analysts to certify and convey the informational relevance of CSP (Ioannou and Serafeim, 2010). Indeed, Godfrey *et al.* (2009: 428) hold that only CSP activities that "capture the attention of outside evaluators (e.g., investment rating analysts) are substantial enough to be seen as a credible commitment," implying the importance of analyst recommendations in providing investors professional guidance about the quality of CSP.

Accordingly, we raised the following research question: *Do analyst stock recommendations mediate the relationship between firm CSP and future stock returns?*

THE QUANTITATIVE ANALYSES

Data and measures

To address the research question, we collected two longitudinal datasets on *firm CSP*: one with the Thomson Reuters data on firm environmental, social, and corporate governance (ESG) and the other with the Kinder, Lydenberg, Domini and Co. (KLD) data. Specifically, the ESG data source has covered more than 4,300 firms listed in the S&P 500, NASDAQ 100, STOXX 600, Russell 1000, FTSE 100, ASZ 300, MSCI World, MSCI Europe, and MSCI Merging Market (thomsonreuters.com). This dataset consists of four pillars (ASSET4): environmental, social, economic, and governance performance. For each firm, over 250 objective indicators are used to calculate the four pillar scores. Following previous studies (e.g., Dhaliwal *et al.*, 2012; Eccles *et al.*, 2011; Peiris and

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DOI: 10.1002/smj

Table 1. Anecdotic evidence on financial analysts' attention to firm CSP information

Analyst report	Year	Covered firm	CSP category (covered by KLD)	Cites from analyst report	Source
Goldman Sachs	2011	Yum!	***Product*** *Marketing/ contracting concern*: The company has recently been involved in major marketing or contracting controversies, or has paid substantial fines or civil penalties relating to advertising practices, consumer fraud, or government contracting.	"Taco Bell SSS has been very disappointing in 2011 at 0% in 1Q and -5% in 2Q. These results have been attributed to a highly publicized lawsuit filed mid-1Q that made accusations about the quality of Taco Bell's beef." (p. 10) *Background*: Lawsuit against Yum! brand Taco Bell because of using a meat mixture that contains binders and extenders and does not meet the minimum requirements set by the U.S. Department of Agriculture. The suit was filed to order Taco Bell to be honest in its advertising.	http://www.bluemaumau.org/files/YUM%20US%20deep%20dive%208.1.11.pdf
Thomas Weisel Partners	2003	Cerner	***Product*** *Other strength*: The company's products have notable social benefits that are highly unusual or unique for its industry.	"Computerized Physician Order Entry (CPOE) allows a physician to enter prescription orders into a computer to check potential drug interactions and allergies against an electronic medical record. While hospitals are concerned with cost containment and efficiency, patient safety appears to be the top driver for implementing a CPOE system. Various studies have proven that CPOE systems overall reduce adverse drug events by 86%. The Mayo Clinic also noted that CPOE systems can help avoid expensive malpractice lawsuits." (p. 1)	http://analystreports.som.yale.edu/internal/Professional%20Reports/stevenhalper/Heal062703-081844.pdf

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Table 1. *(Continued)*

Analyst report	Year	Covered firm	CSP category (covered by KLD)	Cites from analyst report	Source
Investology	2004	Premcor	***Employee relations*** *Health and safety strength*: The company has strong health and safety programs.	"At the same time, we think that there may be one potential concern that is related to operations . . . from investors' perspective, it is important to recognize that growth entails risks and one of them is potential lack of focus on operational aspects that could lead to unexpected financial costs. This may not be a significant factor but one might conclude that PCO's safety program, for whatever reason, is less visible than of the industry leaders." (p. 12)	http://analystreports.som.yale.edu/internal/Professional%20Reports/Premcor.pdf
Barclays Capital	2011	HCL Technologies	***Employee relations*** (general)	"The business continues to turn around, with losses for the quarter reduced by US$0.6mn. Hiring in the IT Services segment (a 6% q/q increase in manpower) indicates good business visibility. Attrition rates declined by 0.6%, implying better employee satisfaction." (p. 3)	http://pg.jrj.com.cn/acc/Res%5CCN_RES%5CINVEST%5C2011%5C10%5C19%5C4f26c1de-abb4-47a1-9588-e98f9d2c9852.pdf
Firstcall	2012	Kansai Nerolac Paints	***Employee relations*** *Health and safety strength*: The company has received OHSAS-18001 accreditation–a British Standard for occupational health and safety management.	"Company's manufacturing units have received ISO 9001-2000, ISO-14001 and OHSAS-18001 for its quality management . . . We recommend 'BUY' in this particular scrip with a target price of Rs.994.00 for Medium to Long term investment." (pp. 1, 9)	http://breport.myiris.com/firstcall/GOONERPA_20120203.pdf
Morningstar	2009	Hewlett-Packard	***Corporate governance*** *Limited compensation*: The company has recently awarded notably low levels of compensation to its top management or its board members. The limit for a rating is total compensation of less than $500,000 per year for a CEO or $30,000 per year for outside directors.	". . . bonus compensation strikes us as rich, despite the company's recent financial results." (p. 7)	http://analystreports.som.yale.edu/internal/F2010/profcomp/HP.pdf

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Table 1. *(Continued)*

Analyst report	Year	Covered firm	CSP category (covered by KLD)	Cites from analyst report	Source
Edelweiss	2012	Jain Irrigation Systems	***Community*** *Financial support and technology service*: The company launches a nonbanking finance company focusing on financing farmers for MIS, agriculture projects, small businesses, setting up solar pumps and other appliances.	"Jain Irrigation (JISL) has finally received RBI's approval to launch its NBFC. This, we believe, will help the company ease its stretched working capital cycle (steep gross receivable days of MIS at 340 days at FY12 end). JISL plans to expand this NBFC into a pan-India player over the next 3–4 years. Maintain 'BUY'." (p. 1)	http://breport.myiris.com/EDELWEISS/JAIIRRSY_20120706.pdf
Sal. Oppenheim	2007	Petrotec	***Environment*** *Beneficial products and services*: The company derives substantial revenues from innovative remediation products, environmental services.	"We see the market for biofuel offering strong growth opportunities resulting from numerous initiatives in the EU, as well as the US. Based on its strong technical know how, Petrotec has positioned itself in an attractive niche of this market, i.e. the collection and conversion of difficult-to-process low-cost feedstock into biodiesel. This gives the company a grip on sourcing, as well as a sizable cost advantage....We thus initiate coverage of Petrotec with a buy rating...[because] a rising environmental awareness is one of the initial drivers for renewable energies." (p. 1, 15)	http://www.equitystory.com/Download/Companies/petrotec/Rating Analysen/SalOpp_Initial_230107.pdf
Morgan Stanley	2010	Dow Chemical	***Environment*** *Beneficial products and services*: The company has developed innovative products with environmental benefits.	"Market underestimates innovations in Dow Agrosciences (the launch of SmartStax will have a material effect on Dow) and Advanced Materials (solar shingles and diesel particulate filters represent potentially disruptive technologies and large opportunities)." (p. 63)	http://www.morganstanley.com/views/perspectives/preparingfor_supercycle.pdf
KRChoksey	2011	Praj Industries	***Environment*** *Beneficial products and projects*: The company develops solutions for bio-ethanol, biodiesel, wastewater treatment, customized engineering and bio-consumables.	"Better days are coming ahead, BUY...US Government's shift toward cleaner fuels will present a business opportunity of USD 7–8 bn for PIL and the company has started receiving enquiries for the same...New Businesses to start making meaningful contribution from FY12: To diversify business risk, Praj has crafted plans to enter into water & wastewater treatment, customized engineering and bio-consumables." (p. 1)	http://www.valuenotes.com/uploads/article_pdf/A100591300850008.pdf

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Evans, 2010), we use the environmental and social pillars to measure CSP for each firm. *Environmental* performance refers to the firm's resources reduction, emission reduction, and product innovation benefiting the environment. *Social* performance refers to the firm's product responsibility, community, human rights, diversity, training and development, health and safety, and employment quality. To account for industry competition, we use the ratio of a firm's ESG to the average ESG of all competing firms in the industry as defined by Standard Industrial Classification (SIC) codes as the final measure of ESG in our analysis.

In addition, we used the KLD data, a data source widely employed in the strategy and management literature (e.g., Coombs and Gilley, 2005; Surroca *et al.*, 2010), to construct an alternative measure of CSP. Specifically, KLD compiles annual ratings of over 3,000 publicly traded U.S. firms, which consist of the Standard and Poor (S&P) 500 firms and 150 firms from the Domini Social Index. KLD rates companies on a wide range of activities that reflect how well companies perform in social responsibility and build relationships with various stakeholders. KLD captures over 94 measurement items along seven social dimensions: product safety, diversity, employee relations, community relations, corporate governance, environmental stewardship, and human rights (www.wharton.upenn.edu/wrds/ds/kld/). For each measure, KLD offers "strength" and "concern" (e.g., Waddock and Graves, 1997; Waldman, Siegel, and Javidan, 2006) for each firm year. Because prior studies suggest a theoretical distinction between primary/technical stakeholder dimensions (employee relations, product safety, and governance) and secondary/institutional stakeholder dimensions (community relations, environmental stewardship, diversity, and human rights) of CSP (Godfrey *et al.*, 2009: 434; Mattingly and Berman, 2006), we also test the relevance of this distinction by using the primary versus secondary CSP types. To account for industry competition, we use the ratio of a firm's CSP to the average CSP of all competing firms in the industry as the final measure of CSP in our analysis.

Both ESG and KLD data sources have dramatically increased their coverage of firms over time.[1] However, because not all firms covered in KLD are publically traded, to match with firm stock prices data, we have to drop these firms. In addition, because we want to test the relationships between CSP and analyst stock recommendations from I/B/E/S, we have to merge data sources across firms covered by I/B/E/S, COMPUSTAT, and CRSP, as well as ESG or KLD. After merging these various data sources, we are left with a dataset for 349 firms over 11 years (2000–2010) for a total of 3,839 firm-year data points with KLD-based CSP. Also, we have 857 firms over nine years (2002–2010) for a total of 7,713 firm-year observations with ESG-based CSP because ESG data starts from 2002. However, because we employed a differences-in-differences model, we lost one year of data in analyses.

To match the CSP data, we obtained financial *analysts' stock recommendations* from I/B/E/S. Essentially, I/B/E/S provides comprehensive data on analyst recommendations, firm earnings forecasts, and other financial items for publicly traded companies (Ivkovic and Jegadeesh, 2004; Womack, 1996). It presents a unique opportunity for testing the relevance of CSP in guiding investment decisions in the stock market. I/B/E/S covers more than 45,000 companies from 70 markets worldwide. Because multiple financial analysts follow each publicly traded company and each analyst provides multiple investment recommendations for each firm, we originally collected a total of 126,598 observations of analyst stock recommendations. I/B/E/S measures analyst recommendations as the median consensus of buy, hold, sell recommendations provided by analysts to investors (e.g., Howe *et al.*, 2009; Luo, Homburg, and Wieseke, 2010; Womack, 1996). Originally, this measure is reported in a reversed Likert scale with 1 = strong buy, 2 = buy, 3 = hold, 4 = underperform, and 5 = sell. For ease of exposition, we transformed this reverse coding.

In addition, we obtained stock price data from CRSP to derive *firm stock returns*. Specifically, firm stock return is measured as the abnormal return beyond what is expected from the broad financial markets. To measure expected return from the broad financial markets, we use the Fama-French-Carhart model (Carhart, 1997; Fama and

[1] For example, KLD has expanded the coverage of firms over time, from about 650 firms in 2000 to the largest 1,000 firms in 2001 and the largest 3,000 firms in 2010 by market capitalization (Dhaliwal *et al.*, 2011: 64).

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DOI: 10.1002/smj

French, 1993; Luo *et al.*, 2014) at the firm level as follows:

$$R_{it} - R_{ft} = \beta_{0i} + \beta_{1i}\left(R_{mt} - R_{ft}\right) + \beta_{2i}SMB_t + \beta_{3i}HML_t + \beta_{4i}MOM_t + \varepsilon_{it}, \quad (1)$$

where R_{it} are stock returns for firm i in time t; R_{m} are average market returns; R_f is the risk-free rate; SMB are size effects; HML are value effects; MOM are Carhart's momentum effects; β_{0i} is the intercept; and ε_{it} is the model residual. We then calculate *abnormal returns* (ASR_{it}) as the difference between the observed returns and the expected returns, as follows:

$$ASR_{it} = \left(R_{it} - R_{ft}\right) - \left[\widehat{\beta}_{0i} + \widehat{\beta}_{1i}\left(R_{mt} - R_{ft}\right) + \widehat{\beta}_{2i}SMB_t + \widehat{\beta}_{3i}HML_t + \widehat{\beta}_{4i}MOM_t\right]. \quad (2)$$

Data for the Fama–French–Carhart factors and momentum (R_m, R_f, MKT, SMB, HML, and MOM) are from http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html. Appendix 1 reports a comprehensive set of firm- and industry-level covariates, following the widely used models of financial analyst metrics (Jegadeesh *et al.*, 2004) and firm financial value in finance and accounting (Lui, Markov, and Tamayo, 2007). This allows us to calibrate the extent to which CSP contributes new information in explaining analyst recommendations and firm value.

Analyses and results

Because the dataset is cross-sectional and time-series in nature, empirical analyses should accommodate several features. First, we need to control for observable and unobservable heterogeneity. Regarding observable heterogeneity in results, we have included many (firm-, analyst-, and industry-level) covariates to rule out multilevel alternative explanations of the modeling results. To accommodate firm-specific unobservable heterogeneity, we adopt the changes-in-changes model and test the impact of changes in CSP on changes in analyst recommendations and firm financial value. Also, to account for the biases of endogeneity, heteroskedasticity, and serial correlation in cross-sectional and time-series data, we employ the generalized method of moments (GMM) for estimations. Endogeneity may exist in that firms with more favorable analyst recommendations and higher value can afford more CSP investments. To account for endogeneity, we use instrumental variables with the lagged business segment at *t-2* and lagged industry CSP at time period *t-2*. To test the validity of these instruments, we conducted the Hansen (1982) test. GMM also employs the White heteroskedasticity and autocorrelation robust covariance matrix $\widehat{\Phi}_{HAC}$:

$$\widehat{\Phi}_{HAC} = \widehat{\Gamma}(0) + \left(\sum_{j=1}^{T-1} k(j,q)\left(\widehat{\Gamma}(j)\right) + \widehat{\Gamma}'(j)\right),$$

$$\widehat{\Gamma}(j) = \frac{1}{T-k}\left(\sum_{t=j+1}^{T} Z_{t-j}{}'\varepsilon_t\varepsilon_{t-j}{}'Z_t\right), \quad (3)$$

where $\varepsilon =$ the vector of the White residuals, $k =$ the kernel, $q =$ the bandwidth, and $Z_t =$ a $k \times p$ matrix in GMM (see Hamilton, 1994: 409–422).

To rule out reverse causality from analyst recommendations to CSP, we conducted the Granger causality test (Granger, 1969) and confirmed the direction of influence from CSP to analyst recommendations ($F_{\text{Granger test}} = 28.089$ with KLD and 25.623 with ESG, both $p < 0.01$), rather than the reverse direction ($p > 0.10$).[2]

Testing mediation requires a system of equations. Specifically, we follow the commonly recommended approach (Baron and Kenny, 1986; Shaver, 2005: 338). The following regression equations are utilized, where $CSP =$ the independent variable of changes in CSP, $Recom =$ the mediator variable of analyst stock recommendations, $Perf =$ the final dependent variable of firm future return (at time $t+1$; see Dhaliwal *et al.*, 2011: 66).

$$\Delta Perf = \beta_{10} + \beta_{11}\Delta CSP + \Delta Controls + \varepsilon_1. \quad (4)$$

[2] Furthermore, we tested various model assumptions with the RESET test, the Durbin-Watson and White's test, the Jarque-Bera test, the Davidson-MacKinnon test of endogeneity, and the Breusch-Pagan test. None of the assumptions are violated in the results. Finally, the multicollinearity problem is not a serious threat to our results because all variance inflation factor results are less than 5 and the condition indices are less than 10.

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DOI: 10.1002/smj

Table 2. Results for CSP, analyst recommendations, and firm future returns from 2SLS estimation

	M1 (KLD) Analyst recom	M2 (KLD) Firm return	M3 (KLD) Firm return	M4 (ESG) Analyst recom	M5 (ESG) Firm return	M6 (ESG) Firm return
Δ CSP	1.273***	1.322**	0.815*	1.292***	1.639**	0.836*
Mediation effects						
Δ Analyst recommendations (recom)			0.239***			0.242***
Controls						
Δ Self-disclosure	2.608**	1.521**	1.145*	2.361**	0.816	0.782
Δ Other-disclosure	2.339**	0.705	0.675	2.229**	0.722	0.681
Δ ROA	2.107***	2.697**	2.752**	2.193***	2.695**	2.763**
Δ ROA variability	−0.128	−1.331*	−1.411*	−0.118	−1.328*	−1.406*
Δ Firm size	0.178**	0.479**	0.487**	0.176**	0.481**	0.432**
Δ R&D intensity	1.297*	0.151*	0.161*	1.291*	0.156*	0.161*
Δ Financial leverage	−0.049	0.030	0.038	−0.045	0.041	0.046
Δ Dividend	1.312*	0.044	0.055	1.317*	0.055	0.059
Δ Liquidity	0.008	0.125	0.128	0.009	0.129	0.118
Δ Analyst coverage	1.772**	0.321**	0.332**	1.774**	0.321**	0.331**
Δ Analyst forecast errors	0.880*	−0.071	−0.079	0.881*	−0.072	−0.078
Δ Analyst expertise	0.635*	0.138*	0.146**	0.638*	0.138*	0.141**
Δ Institutional ownership	3.128**	0.071	0.076	3.123**	0.071	0.062
Δ Environmental volatility	−0.669**	−0.439**	−0.519**	−0.654**	−0.438**	−0.506**
Δ Industry competition	−0.025	−0.041	−0.042	−0.029	−0.051	−0.047
R-squared	0.31	0.21	0.34	0.33	0.22	0.36
F-statistic	16.818	8.625	13.539	17.085	8.872	15.017
N	3,490	3,490	3,490	6,856	6,856	6,856

Note: $*p < 0.10$; $**p < 0.05$; $***p < 0.01$.

This equation gauges the effects of CSP on firm stock performance.

$$\Delta Recom = \beta_{20} + \beta_{21}\Delta CSP + \Delta Controls + \varepsilon_2. \quad (5)$$

Equation 5 assesses the effect of CSP on the mediator of analyst recommendations.

$$\Delta Perf = \beta_{30} + \beta_{31}\Delta CSP + \beta_{32}\Delta Recom + \Delta Controls + \varepsilon_3. \quad (6)$$

Following Shaver (2005: 338), we estimated this system of (5) and (6) with the two-stage least squares (2SLS). Specifically, according to Shaver (2005), if the errors terms (ε_2 and ε_3) in (5) and (6) are correlated, the traditional approach with Baron and Kenny (1986) would lead to wrong conclusions. Thus, 2SLS is recommended to correct the possible bias due to the correlated error terms. That is, the predicted value of analyst recommendations in (5) is treated as an endogeneous variable and entered in (6). In this way, the predicted value of analyst recommendations (the instrument variable) will not correlate with ε_3 even if ε_2 and ε_3 are correlated (Shaver, 2005: 338). The 2SLS results are reported in Table 2.

As reported in Table 2, firm CSP is positively associated with analyst recommendations. CSP information by both KLD and ESG is indeed positively related to analyst recommendations (both $p < 0.01$). In order to establish mediation from CSP → recommendations → firm return chain, CSP must affect recommendations, and recommendations must affect firm return. Table 2 results indicate that, for both the KLD and ESG datasets, CSP affects recommendations ($p < 0.01$). Entering the mediator of recommendations reduces the strength of the effects of CSP on firm stock returns (from $p < 0.05$ to $p < 0.10$), thus supporting the partial mediation role of analyst recommendations in the effects of CSP on firm stock returns.

To gauge whether the indirect mediation effects are statistically significant (Sobel, 1982), we also conducted the extended Sobel test with the bootstrapping meditation approach (Zhao, Lynch, and Chen, 2010). The extended Sobel test model

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DOI: 10.1002/smj

is $z_{value} = ab/\sqrt{a^2 s_b^2 + b^2 s_a^2 + s_a^2 s_b^2}$, where a and s_a are coefficients and standard errors (from the bootstrapping) for the impact of independent variables on mediators, while b and s_b are coefficients and standard errors for the impact of mediators on the dependent variable. We find that the Sobel test results are significant ($z_{value} = 4.307$ with KLD and 4.678 with ESG, $p < 0.01$), thus supporting the indirect mediation role of analyst recommendations in the effects of CSP on firm stock returns.

To test the robustness of our mediational results, we not only used the strength and weakness of firm CSP (Waldman *et al.*, 2006), but also employed the primary and secondary types of CSP (Godfrey *et al.*, 2009; Hillman and Keim, 2001; Mattingly and Berman, 2006; Yoon *et al.*, 2006). The results (not reported but available upon request) consistently support the mediational role of analyst recommendations across the strength, weakness, primary, and secondary types of CSP, although this mediation role is more salient in the case of the weakness and primary types of CSP.

DISCUSSION

With both qualitative and quantitative evidences, this study confirms that analysts act as mediators in the CSP–CFP link. As industry experts and the "information bridge," analysts reduce the information asymmetry associated with CSP, by incorporating firm CSP information into their recommendations for general investors.

Furthermore, we extend the literature on the role of analysts by revealing CSP as another critical intangible asset, to which analysts pay increasing attention. Given the growing importance of social investing and fund managers' quest for "investment with a conscience," more frequently firm CSP is addressed as an intangible and promising asset by analysts. While previous studies have examined the role of analysts in reducing information asymmetry associated with other firm intangibles such as research and development and customer satisfaction (e.g., Kimbrough, 2007; Luo *et al.*, 2010), few empirical analyses link firm CSP to security analysts (Dhaliwal *et al.*, 2011, 2012; Ioannou and Serafeim, 2010). Our work thus examines the under-researched issue of the relevance of firm CSP for stock analysts.

In practice, analysts may respond to firm CSP and adapt their buy-and-sell recommendations accordingly, while investors rely heavily on analyst recommendations (e.g., Barber *et al.*, 2001; Womack, 1996). Thus, firm managers should be cognizant of such analyst-based mechanisms, which may account for the ultimate financial returns to CSP. In this sense, analysts can be considered a strategically important component of firms' multistakeholder management. By taking into account the effect of CSP on analysts, managers can acquire a more complete picture of the eventual financial impact of their investment in firm CSP.

In conclusion, our study hopefully helps researchers and practitioners understand the analyst-based mechanism underlying the impact of firm CSP on shareholder wealth. We encourage further research to uncover more insights into this important area.

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APPENDIX: DATA FOR COVARIATES

We have a comprehensive set of firm- and industry-level covariates, closely following the widely used models of financial analyst metrics (Jegadeesh *et al.*, 2004) and firm financial value in finance and accounting (Lui *et al.*, 2007). This allows us to calibrate the extent to which CSP contributes new information in explaining analyst recommendations and firm value. Firm profitability (ROA) is measured as the ratio of a firm's operating income (from COMPUSTAT) to its book value of total assets. ROA variability is measured as the standard deviation of the reported prior five years of ROA. R&D intensity is measured as research and development expenses divided by sales. *Firm financial leverage* is the ratio of long-term book debt to total assets (Thomas, 2002). *Firm dividend* is the ratio of cash dividends to firm market capitalization. *Firm liquidity* is the current ratio of a firm. Analysts' *earnings forecast errors* are gauged as the differences (in absolute values) between the latest analysts' median consensus forecasts (MEDEST) before the earnings announcements and the firms' actual earnings per share scaled by stock prices (Barth

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et al., 2001). We assess the *public disclosure of firm social activities* with two measures: self-disclosure and other-disclosure. Directly following Tetlock (2007) and Dhaliwal *et al.* (2011), we collect information on public disclosure from several sources: (1) corporate social responsibility newswire, (2) Corporateregister.com, (3) Internet searches, (4) company websites, and (5) media Lexis/Nexis database. If the disclosure is conducted by the firm itself, we classified it as *self-disclosure* (self); otherwise, we classified the disclosure as *other-disclosure* (media) of firm CSP information. Results also confirmed that favorable public disclosure leads to positive returns, and unfavorable disclosure leads to negative returns (all $p < 0.01$). We also tested the hypotheses with total information disclosure (= self + media) and the results were consistently supportive of our conclusion on the mediational role of analyst recommendations and the moderating role of information disclosure as hypothesized. *Analyst coverage* is measured as the number (in natural log) of financial analysts following or covering the stock of the firm (Barron, Byard, and Kim, 2002). Following prior accounting studies (Ertimur, Sunder, and Sunder, 2007: 583), we measure *analyst expertise* as the firm-specific experience of the financial analysts working at the brokerage firm (Chen and Matsumoto, 2006).[3] The data for *institutional ownership* are obtained from the Thompson Financial CDA/Spectrum database of Securities and Exchange Commission (SEC) 13F filings. This variable assesses how many percentages of the firm's shares are owned by institutions relative to the total shares outstanding of the firm (Yan and Zhang, 2009). *Industry competition* is measured as the Herfindahl concentration index, which is the sum of squared market shares of the firms in the industry derived from the sales revenue (from COMPUSTAT), on the basis of the Standard Industrial Classification (SIC) codes (Hou and Robinson, 2006: 1933). *Environmental volatility* is the degree of uncertainty of the broad stock market returns (AMEX/NYSE/NASDAQ indexes). We measure it with the conditional volatility in the Fama-French-Carhart model at the *market* level as follows:

$$R_{mt+1} - R_{ft+1} = \beta_0 + \beta_1 \left(R_{mt} - R_{ft}\right) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 MOM_t + \phi_{it+1}, \omega_{t+1} = \alpha_0 + \alpha_1 \phi_t^2 + \gamma_1 \omega_t, \quad \Phi_{t+1} | \left(\Phi_t, \Phi_{t-1,} \cdots\right) \sim N\left(0, \omega_{t+1}\right), \tag{A1}$$

where ω_{t+1} = the latent conditional variance of residual terms, or the measure of financial market volatility. We obtain the daily stock market return from CRSP and French's website.

[3] Per one anonymous reviewer, we conducted additional analyses by aggregating the firm-specific analyst experience to industry-specific analyst experience, and the results are qualitatively the same.

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DOI: 10.1002/smj