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Restatement of CSR Reports: Frequency, Magnitude, and Determinants*

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Abstract

We provide the first direct analysis of the magnitude of unreliable quantitative information disclosed in corporate social responsibility (CSR) reports. CSR report reliability is of particular interest to fund managers for investment decisions as well as to policymakers for regulating and monitoring purposes. However, surprisingly little is known about CSR reporting reliability despite concerns raised in the prior literature (e.g., Laufer 2003; O'Dwyer 2002), We examine how often CSR reports for the Global Fortune 250 (G250) are restated, the magnitude of restatements, and factors associated with restatements during the period 2006 to 2013. During this sample period, the occurrence of restatements increased monotonically, with 39% of G250 CSR reports including one or more line-item restatements. The magnitude of the line-item restatements is quite high, with a median restatement of about 10%. We also find evidence of bias in the revised items toward overstatement. We find that restatements occur more frequently in firms that have reported a high level of social performance and that have environmental targets. The occurrence of restatement is also positively associated with firms residing in strong law countries and having their CSR reports audited. Our analysis of reporting bias indicates a negative association between use of Global Reporting Initiative (GRI) reporting guidelines and the likelihood of an overstatement. We also find a positive association between having the CSR report audited and the likelihood of revisions associated with overstatements. Together, our exploratory results indicate that CSR information may be unreliable and firms that face pressure to perform well have more restatements. However, our evidence is consistent with the restatements resulting from improvements in information systems over time rather than intentional bias. Our findings will help investors and fund managers better judge the reliability of CSR disclosures, and inform regulators and standard setters on ways to enhance the reliability of CSR reporting. Finally, we contribute to the audit literature examining sustainability assurance.

Keywords: sustainability, CSR report, restatements

Restatement of CSR Reports: Frequency, Magnitude and Determinants

In the absence of credible, verifiable information…it is difficult for shareholders, investors, and pension fund managers to make meaningful assessments and decisions about the CR [corporate responsibility] practices. (ISO 2002, iv).

1. Introduction

A growing number of corporations invest a substantial amount in social and environmental activities, and many of them report on their activities using voluntarily produced and unregulated corporate social responsibility (CSR) reports. KPMG (2013) reports that 71% of the 4,100 large firms they sampled worldwide prepare CSR reports, including 93% of the largest 250 firms. Reliability of the reported information is critical for its usefulness. However, concerns have been raised about the credibility of the CSR disclosures and opportunistic reporting (e.g., Laufer 2003; O'Dwyer 2002). Given these concerns and the large volume of academic literature that has examined CSR reports, surprisingly little is known about the reports' reliability. Through an examination of CSR restatements, we provide an analysis of the magnitude, nature and determinants of the unreliability of quantified information disclosed in CSR reports.

Reflecting the importance of disclosure reliability, the financial accounting literature has extensively examined the quality of reported earnings (Dechow and Skinner 2000; Healy and Whalen 1999; Dechow et al. 2010). Within this line of enquiry, a stream of papers has examined determinants and consequences of external financial report restatements.[1] However, restatements of CSR reports are likely to differ substantially from those of external financial reports. First, unlike accrual based financial statements, in most countries, CSR reports are voluntary and

[1] For example, Kinney and McDaniel (1989); Dechow et al. (1996); Hribar and Jenkins (2004); Palmrose et al. (2004); Palmrose and Scholz (2004); Srinivasan (2005), Efendi et al. (2007); Stanley and DeZoort (2007); Gleason et al. (2008); Wilson (2008); and Cao et al. (2012).

unregulated, with no generally accepted reporting principles and standards.[2] Managers thus have much discretion about how to measure and report CSR performance and can change measurement methods from year to year. Second, uncertainty associated with environmental and social performance is high and is likely to be substantially greater than that associated with estimating accruals.[3] Finally, the individual line-items in a financial statement are reported in the same dollar units and aggregate into a single key performance metric such as net profit. In contrast, CSR reports have a number of heterogenous categories, the two most significant of which are environmental and social performance metrics. Due to alternate units of measurement environmental and social metrics do not easily aggregate into a single performance metric. This heterogeneity has important implications for our study and for the literature that seeks to understand the quality of CSR reports.

We examine restatement of CSR reports at two levels: report level and line-item level. We start by investigating existence of restatements at the report level and then focus on individual line-items within the reports that have been restated.[4] We examine both the magnitude of individual line-item restatements, and the direction of restatement, i.e., whether the restatement is related to a prior overstatement or understatement of performance.

We first provide a descriptive analysis of restatements, documenting how frequently companies issue CSR reports with restatements and the magnitude of restatements of line-items within the restated CSR reports. We then conduct an exploratory investigation of determinants and

[2] Exceptions include required CSR reporting for some categories of firms in China and the required issuance of Integrated Reports for publicly listed firms in South Africa. Even in these countries, the reports do not have a required format.

[3] For example, when measuring carbon emissions, companies must determine the scope of activities to include and whether to include indirect emissions, such as emissions resulting from generating the electricity used by the company. If they decide to include the indirect emissions, they must consider the methods used to generate that electricity (natural gas, coal, hydro-electric, wind, or solar), which have tremendous variation in carbon production. On the other hand, social performance includes qualitative and subjective components, which are difficult to measure.

[4] Throughout this paper we use the terms existence and occurrence interchangeably when referring to the occurrence of a restatement of a CSR report and use frequency when referring to the frequency of the occurrence of CSR reports being restated.

economic incentives associated with the occurrence of a CSR report with restatements.[5] This includes an examination of factors associated with a bias in restatements due to intentional errors with a focus on the role of the auditor and measurement standards in guarding against intentional misrepresentation.

Our sample of firms is drawn from the Global Fortune 250 (G250) between 2006 and 2013. The incidence of CSR report restatements is substantially higher than that of financial report restatements; 37% of the sample CSR reports include restatements and the number of restated reports increases over time.[6] A significant percentage of these restated CSR reports are from the same firm repeatedly restating across time, with 49% of the sample firms restating four or more times during the sample period. This suggests that the underlying determinants of restatements are not due to yearly incentives, but rather are explained by systematic firm- or country-level factors. When a CSR report is restated, the median number of line-items in the report that are changed is four, and the median magnitude of the restatement of each line-item is 9.6%.

The restatements in our sample are approximately evenly split between changes in metric methodology ("metric changes") and revisions due to errors in the prior years' reports ("error-revisions"). There are substantially more line-items with restatements related to environmental performance measures than related to social performance, although the magnitude of revisions is

[5] Our exploratory approach is in part motivated by Glaeser and Guay (2017, 205), who discuss accounting research designs and conclude that because perfectly identified research designs are rare, causal relationships for accounting questions are likely to be inferred based on findings from multiple studies rather than a single study. More specifically they state, "We believe that the most important research questions in accounting require a general understanding of the phenomenon." Research such as ours helps provide this more general understanding of the CSR restatement phenomenon. Consistent with this, Gow et al. (2016, 499) argue that accounting research can benefit substantially from more in-depth descriptive research.

[6] This result is broadly consistent with the KPMG Internal Surveys of Corporate Responsibility (2011 and 2013) which also report a high frequency of restatements. KPMG found that one-third of G250 companies issued a restatement in 2011 and approximately one-quarter in 2013. The level of restatement that we find is higher possibly because we include all metric and error restatements, including restatements without text explanations, some of which KPMG may have excluded. Consistent with our sample, KPMG (2011) notes that the frequency of CSR report restatements far exceeds the frequency of financial statement restatements, which was 3.1% for the Fortune 1000 in 2010.

similar. For example, for the most common measures that are restated within each category, the median magnitude of the absolute revision of environmental measures ranges between 3.8% for metrics related to greenhouse gas (GHG)/volatile organic compound (VOC) releases to 9.08% for metrics related to energy intensity. The corresponding median magnitudes of social measures are 4.88% for occupational hazards and 6.04% for illness or diseases. Error magnitudes in all categories are highly skewed, with a few line-item observations representing extreme restatements.

We develop several exploratory expectations to investigate why firms restate. We find that existence of restatements is positively associated with firms that report a high level of social performance and that have environmental targets. We find a positive association between existence of a restatement and monitoring at both firm and county levels. Consistent with auditors increasing the probability of an error being detected and reported, we find a positive association between having the report assured and restatements. Further, the existence of a restated CSR report is more common for firms residing in countries with a strong rule of law. This is consistent with the threat of litigation making public disclosure of errors more desirable/necessary.

Compared to firms that restate their CSR reports infrequently, we find that repeatedly restating firms are more likely to have environmental targets and be well-governed. This is consistent with recent literature that finds a positive association between governance and CSR performance, but implies that highly performing firms may also have unreliable information.[7] The unreliability of CSR information for high-performing CSR firms potentially explains the mixed results in the CSR accounting literature that explores the informativeness of different forms of

[7] Recent research finds that well-governed firms that suffer from less agency problems engage in more CSR. Ferrell et al. (2016) find that well-governed firms engage in more CSR. Deng et al. (2013) find that mergers by high CSR acquirers take less time to complete, have larger increases in post-merger operating performance and are less likely to fail than mergers by low CSR acquirers. Khan et al. (2016) show that firms with high performance on industry-specific material CSR issues outperform firms with low performance on industry-specific material CSR issues.

CSR disclosures for predicting environmental and operating performance and firm valuation (Al-Tuwaijri et al. 2004; Hughes et al. 2001, Patten 2002; Clarkson et al. 2008; Dhaliwal et al. 2011).

The factors related to CSR report restatements appear to differ across CSR categories. Compared to key environmental disclosures (e.g., GHG emissions), we find that restated errors in the key social disclosures (e.g., occupational health and safety hazards) are more positively associated with governance, use of the Global Reporting Initiative (GRI) reporting framework and location in a stakeholder law country. This is consistent with firm-level incentives for information quality varying between social and environment categories.

In our univariate analysis of the direction of individual line-item restatements, we find evidence of a bias in error-revisions toward overstatement, but no systematic bias for metric changes. The bias for error-revisions is primarily related to social performance rather than environmental performance. Our multivariate analysis provides evidence that firms whose reports are audited are more likely to have restatements that correct previous overstatements and firms that employ GRI are less likely to do so. Due to their objective analysis, audit expertise, and litigation exposure, auditors may have a greater ability and incentive to identify overstatements and encourage auditees to correct them. Guidelines such as GRI restrict reporting choice and thus may prevent opportunistic choice of measurement methods, improve accuracy, and reduce opportunities to bias reported numbers.

The overstatements that we examine could stem from intentional opportunistic reporting to make performance appear better than it truly is or could represent an unintended systematic bias. We find a positive association between bias and well-governed, high CSR performers, and no association between bias and the size of the revision. Taken together, these results are consistent with a significant degree of inherent bias in CSR reports rather than opportunistic reporting.

We make several contributions to the academic literature and policy debates regarding the regulation of CSR reports. We conduct one of the first rigorous analyses of factors associated with existence of a restated CSR report and we are the first study to investigate the degree of unreliability for quantitative line-items within CSR reports, potential bias in the restated line-items, and determinants of both bias and magnitude.[8] We are also the first to examine if the distribution and determinants of restatements vary across categories within a CSR report.

CSR report reliability is of interest to a wide range of stakeholders, including policy makers, for whom the level of reliability determines the value of CSR reports as a mechanism for monitoring managers and firms. Our findings will thus be of interest to regulators and standard setters (both in the United States and worldwide), due to increasing interest in providing sustainability reporting guidelines and enhancing the reliability of sustainability reporting (Khan et al. 2016; Grewal et al. 2020). Report reliability is also important for stakeholders such as fund managers who are interested in considering the CSR performance of companies for investments.

Finally, we contribute to the audit literature examining sustainability assurance. This literature has largely examined the content and demand for assurance statements (O'Dwyer and Owen 2005; Simnett et al. 2009; O'Dwyer 2011; Clarkson et al. 2019). Furthermore, as noted by Cohen and Simnett (2015), relative to research on traditional financial reports, to date, there has been a paucity of research to inform assurance related to CSR reporting. We provide the first evidence that having an audit can mitigate overstatement of CSR performance.

[8] A survey by KPMG (2011) discusses the incidence of restatements and qualitatively addresses the phenomenon. Ballou et al. (2018) examine the impact of having an audit and the likelihood of a CSR report restatement. Michelon et al. (2019) examine if the likelihood of having a restatement is positively associated with having a CSR report assured by an auditor.

2. Prior research, institutional setting, and exploratory expectations

Prior research on CSR disclosures

There is a significant stream of CSR accounting literature examining the informativeness of CSR disclosure for predicting environmental performance, future operating performance, and for firm valuation (Al-Tuwaijri et al. 2004; Hughes et al. 2001; Patten 2002; Clarkson et al. 2008; Dhaliwal et al. 2011). Findings from this literature are mixed, with no clearly established link between CSR performance and financial performance. These studies can be considered as a joint test of the relevance and reliability of the reported CSR information. The absence of a relation could be either due to the information not being relevant or the information being unreliable.[9]

While there is a substantial amount of research on the existence and volume of CSR disclosure, there is only limited research on the reliability of CSR information. Cho et al. (2010) find that poor environmental performers are more likely to have optimistic and uncertain tones in their environmental disclosures. Rupley et al. (2012) find that good corporate governance and environmental media coverage have positive effects on environmental disclosure quality. Results of studies employing independently-developed CSR indices based upon GRI guidelines indicate that disclosure quality is positively related to both environmental performance (Clarkson et al. 2008) and firm value (Clarkson et al. 2013, Plumlee et al. 2015). Incorporating additional dimensions of disclosure, Michelon et al. (2015) develop a disclosure quality index based upon items reported, semantics of the disclosure, and framing of the discussion around specific disclosures. The common theme across this limited number of studies is examination of disclosure

[9] For example, if the reason for CSR investments is delegated philanthropy by the consumer to the corporation, then the information would not be relevant for predicting operating performance. Alternatively, there may be no relation between CSR investments and performance, because firms with agency problems over-invest in CSR (Masulis and Reza 2014).

quality from a qualitative perspective. The precision of the quantitative metrics that are reported has not been examined by prior research, which motivates our focus on reliability of reported quantified information.

A limited number of studies focus on restatements of CSR reports. KPMG (2011, 2013) provide a descriptive summary of the occurrence of restatements. In a concurrent study, Ballou et al. (2018) confirm the descriptive analysis in KPMG (2011), finding that globally, firms employing external assurers are more likely to include restatements in their CSR report. Focusing on US firms selected from the S&P 500 over the period from 2010 to 2014 and employing a software-based search to identify restatements, Michelon et al. (2019) also find a positive association between auditor assurance of CSR reports and the likelihood of restatements.

Unlike prior studies in this area, we examine restatement magnitudes, whether there is bias in the direction of the restatements, and if cross-country institutional factors are associated with restatement magnitude/bias.[10] Our investigation provides a fundamental first step towards identifying reasons for restatements and in turn provides input for developing an appropriate policy framework.

In contrast to the CSR literature, a large volume of financial accounting literature directly examines the quality and reliability of reported earnings numbers (e.g., Dechow and Skinner 2000; Healy and Whalen 1999; Francis et al. 2006; Dechow et al. 2010). A significant stream of this literature focuses on determinants and consequences of restatements of public company financial reports. In a review of the restatement literature, Dechow et al. (2010) conclude that the

[10] Michelon et al. (2019) simply classify restatements as material if the difference in the reported data is more than 5% of the originally reported value. They do not measure the magnitude of individual line item restatements and do not investigate determinants of variation in restatement magnitude.

generally weak and mixed evidence across restatement determinants suggests that restatements generally do not arise due to *intentional* misstatements.[11]

The magnitude and determinants of restatements in CSR reports could differ substantially from external financial reports. CSR reports are voluntary and subject to very limited regulatory guidance and oversight. Further, in contrast to accruals-based accounting, there are no well-established principles and standards for how CSR performance should be measured.[12] Finally, environmental performance and social performance are difficult to measure (Ilinitch et al. 1998; Ramanna 2013). They are multidimensional and are represented by both quantitative and qualitative measures, with no common agreement as to measurement method, and no common method for capturing and ensuring the quality of data that are reported.[13] This is in contrast to financial performance, which is presented in financial statements using a common unit of measurement (i.e., dollars) and include pre-determined measures of financial performance. As a result of the lack of standardization and the relative immaturity of CSR-related information systems, we expect more frequent and larger magnitude restatements in CSR reports relative to financial statements.

[11] Supporting this conclusion, Kinney and McDaniel (1989), find that restating firms are relatively smaller, less profitable, more indebted, and receive "going concern" or "subject to" audit qualifications more often. They interpret the evidence to suggest that accounting errors are the outcome of weak accounting systems (i.e., weak internal controls), rather than opportunistic earnings management.

[12] Two significant accounting principles that have evolved over time to address the potential unreliability of external financial reports are that i) the information must be verifiable (i.e., auditable) and ii) the information must be conservative—that is, there is a higher standard of verifiability is required for recognizing gains relative to losses (Ramanna 2013). While some CSR reporting frameworks and standards include similar language in their conceptual frameworks (e.g., GRI), CSR reporting is largely voluntary, so companies have a great deal of discretion about the extent and nature of their CSR reporting.

[13] Quantitative measures are based upon different units (e.g., tons of emissions, kilowatt-hours of electricity, employee turnover percent), and can include subjective aspects (e.g., employee or customer satisfaction). Further, the scope of activities that should be included in the performance measures is unclear. For example, should company reporting about energy usage include all of the firm's facilities? What about energy used by suppliers (i.e., indirect impacts), or transportation impacts for third party shipments of the final products to customers? As measurement systems develop, with changes in methodology and more scrutiny from both within the firm and by external stakeholders, there may be a greater number of restatements, due to both error-revisions and metric changes.

Exploring determinants of CSR restatements

The financial accounting literature discusses two conditions that must precede a restatement (Kinney and McDaniel 1989; Ashbaugh-Skaife et al. 2007; Srinivasan et al. 2014). First, the firm must issue a report containing a number that should be corrected. Second, management, the auditor, or both must detect that this has occurred and decide that public disclosure of a revised number is desirable or necessary (Dyck et al. 2010; Keune and Johnstone 2015).[14] We explore potential factors that could impact each of these conditions for restatements of CSR reports. For the first condition (risk of occurrence), we examine the role of firm complexity, incentives to misstate, and measurement standards. For the second condition (discovery and decision to disclose a revision), we examine the role of the auditor, corporate governance, and country-level laws.[15] We examine the impact of these factors on both the *existence* of restatements and *bias* of the restatements toward correction of overstatements.

Factors associated with occurrence of a misstatement: complexity, incentives to misstate, and measurement standards

We argue that restatements are more frequent in firms where reporting is more complex. Complexity can result in a larger volume of numbers being reported, greater difficulty in deriving the measures reported, or both. The complexity of CSR reporting will vary as a function of innate firm environmental and social complexity and stakeholder demand for detailed, complex information. We measure innate complexity using the value of property, plant and equipment and

[14] Unless the firm issues an Integrated Report—a report that shows the value creation through a firm's strategy, governance, performance and prospects—CSR reports are separate from firm financial reporting. Issuance of CSR reports may lag the financial reports by several months. However, our conversations with auditors indicate that for large firms, the reporting cycles for the different types of reports are becoming more aligned over time. Although a significant number of issuers employ the same audit firm for both types of engagements, firms may employ separate auditors for their CSR reports.

[15] Several of the factors that we discuss below are unlikely to be mutually exclusive to just one of the conditions necessary to observe a restatement. We present them in relation to the conditions where they have the strongest fit.

expect that firms with a greater level of plant and equipment are more likely to be complex from a CSR standpoint, increasing the difficulty of measurement and thus, occurrence of numbers needing revision.[16]

Stakeholder demand for CSR reporting can affect the complexity of a firm's CSR report and can occur at both country and industry levels. In addition to influencing firms to produce CSR reports (Dhaliwal et al. 2014), whether a country is more stakeholder- or shareholder-oriented will influence the amount of information demanded in CSR reports, with greater demand in stakeholder-oriented countries (Van der Laan Smith et al. 2005; Liang and Renneboog 2017). Companies in stakeholder-oriented countries, therefore, may have a greater frequency of restatements. However, if there is greater country-level regulation in stakeholder-oriented countries that increases the quality of reported CSR information, there may be a lower incidence of restatements.[17]

We have similar expectations at the industry level. Companies belonging to industries that are more exposed to environmental or social risks will have a greater need to manage these risks by producing more information, implying a greater probability of having numbers requiring revision and a higher likelihood of restatements. However, as Simnett et al. (2009) note, these types of industries may have incentives to invest in systems and mechanisms to increase the

[16] For example, capital-intensive firms are those involved in cement clinker production and oil and gas extraction as opposed to low asset-intensity firms, such as retailers. Capital-intensive firms not only face reporting complexity related to direct environmental impacts and regulation but are also more likely to have complex social reporting issues related to worker health and safety and other social impacts.

[17] Ramanna (2013) suggests that corporate reporting of environmental practices is likely to be more effective in reducing carbon footprints in Europe versus the United States due to stricter environmental enforcement in the European Union. For example, Germany introduced the Accounting Law Reform Act in 2004, which mandates inclusion and audit of significant CSR performance metrics in financial reports.

credibility of the information they report in their CSR reports, which may result in fewer restatements.[18]

Our discussion has been based upon *unintentional* errors in reporting (which should be unbiased). However, political-market and other socio-political theories, including political-economy, legitimacy, and "green-washing" (Hemingway and Maclagan 2004; Adams 2004; Deegan 2002; Patten 2002; Cho and Patten 2007) suggest that social and political pressures could create incentives to bias reported CSR performance. Because CSR reporting is unregulated, managers can respond to these incentives and report opportunistically (Holder-Webb et al. 2009; Hobson and Kachelmeier 2005).

A substantial body of accounting literature documents that having specific performance targets, such as beating last year's earnings, creates incentives to bias reported performance to achieve the targets (Burgstahler and Dichev 1997; Bartov et al. 2002). We expect that firms will behave similarly with CSR reporting, such that firms with CSR targets will restate more often, with a bias towards revisions that correct overstatements.[19] We also expect that due to their greater breadth of CSR initiatives, firms with better CSR performance will have more restatements, either because their performance reflects opportunistic reporting or because of unintentional errors.

Disclosures in traditional financial reports are largely driven by reporting standards. Standards can increase the quality and comparability of reported information across firms and time (Barth et al. 2008; Grewal et al. 2020). While there are no international mandatory reporting

[18] Specifically, Simnett et al. (2009) argue firms in these industries may have an incentive to have an audit of their sustainability reports in order to enhance user confidence in the credibility of the information in these reports.

[19] It is also possible that firms with targets have a greater number of unintentional errors. Firms with targets are likely to be better governed which will involve both investing in CSR and having targets. Recent research finds that well-governed firms that suffer from less agency problems engage in more CSR (Ferrell et al. 2016, Deng et al. 2013). The greater investment in CSR activities can result in a greater number of errors.

standards for sustainability disclosure, international organizations such as the Global Reporting Initiative seek to enhance the quality and comparability of CSR reporting by issuing guidelines. Firms that adopt measurement standards such as GRI may be signaling the credibility of information contained in their CSR, suggesting a lower level of restatements. While adopting standards requires firms to invest in better information systems which may reveal issues with prior reports, once established, these systems should produce fewer reporting errors. Ballou et al. (2018) find that reporting under GRI is significantly associated with restatements only for non-error restatements. Given the competing arguments, we do not have a specific expectation related to restatements and use of measurement standards, in particular, GRI. Instead, we explore the relation between GRI and different types of restatements.[20]

In our exploration of intentional misrepresentation, we expect that firms adopting GRI will be less likely to have restatements due to overstatements. Disclosure guidelines provide a benchmark against which reporting decisions can be judged. Firms following measurement standards are therefore more open to litigation for misstatement of CSR performance and will be less likely to report opportunistically.

Discovery and decision to disclose a misstatement: role of the auditor, corporate governance, and country-level laws

Detection and self-reporting of a misstatement require both a technology for detection and a decision by management to disclose the restatement. However, without enforcement to ensure prudent correction of existing misstatements, there will likely be systematic

[20] Plumlee and Yohn (2010) identify lack of clarity of an accounting standard as one of the main reasons for a financial reporting restatement. CSR reporting standards are still being developed. For example, GRI reporting standards are now in their fourth generation, with continuing development. The evolving nature of such standards underscores the notion that there may be different impacts across different types of restatements associated with the use of standards as firms align their historically reported numbers with current practice. Ballou et al. (2018) note that G4 reporting standards emphasize the importance of restating historical disclosures to maintain comparability of the data as methods change.

underreporting of restatements (Srinivasan et al. 2014). A primary enforcement mechanism for corporate reporting is the audit function. Restatement frequency should be higher when the firm engages an auditor, because the auditor is more likely to detect items that should be revised and will encourage management to report revisions.[21] This is because auditors may also face liability and reputational costs if they discover an item that should be revised and do not require a correction (Ashbaugh-Skaife et al. 2007). Further, by requiring disclosure, the auditor may enhance its reputation as an effective monitor (Michelon et al. 2019).

While we expect that audited CSR reports are more likely to be restated both because the auditor increases the probability of detection and because the auditor is more likely to pressure management to disclose any revision/method change, auditor appointment in this setting is endogenous. Firms may voluntarily choose to have an auditor in response to misstatement risk, implying a positive association between having an auditor and restatement. Consistent with this, Simnett et al. (2009) argue that companies with a greater exposure to environmental risk will have a greater need to manage these risks by purchasing assurance. However, restatements may be less frequent because firms use voluntary assurance to signal the credibility of their report (Simnett 2014; Pflugrath et al. 2011) or if they are domiciled in stakeholder-oriented countries (Zhou et al. 2016). Overall, the balance of the arguments and the empirical evidence from traditional financial reports lead us to expect that audited CSR reports are more likely to be restated.

We expect a positive association between having the CSR report audited and the likelihood of revisions reflecting overstatements. Due to litigation risk, auditors likely invest more time and

[21] In discussion with auditors from two of the Big 4 CPA firms, the authors were told that in the auditors' experience, CSR restatements were similar to financial accounting-related restatements in that potential restatements of CSR reports were typically discussed between the manager and auditor. Research into determinants of restatements of traditional financial reports also suggests that firms monitored by external auditors and other sophisticated market participants (e.g., analysts) are more likely to disclose restatements (Myers et al. 2013).

effort to identify overstatement than understatement of performance (Basu 1997; Ball and Shivakumar 2006; Watts 2003a). Watts (2003b) observes that courts generally punish overstatement more than understatement because shareholders and other stakeholders such as lenders will incur greater losses from overstatement rather than understatement of profits and assets.

Corporate governance mechanisms are also endogenous. To the extent that choice of corporate governance is a response to misstatement risk, both corporate governance and likelihood of eventual misstatement will increase. However, if stronger corporate governance is reflected in higher quality information systems, there should be fewer disclosures requiring revision and less opportunities for managers to bias reported performance, resulting in fewer restatements.

A company's home country shapes the incentives of managers and auditors and, in turn, their reporting behavior in relation to restatements (Ball et al. 2000). Ball et al. (2000) and Leuz et al. (2003) find evidence consistent with variation in accounting quality across countries being associated with the strength of domestic legal institutions. Consistent with this, Srinivasan et al. (2014) find that companies in countries with a strong rule of law are more likely to restate traditional financial reports. We therefore expect that the probability of restatements is positively associated with the level of home country rule of law.

In summary, we expect that issuance of restatements is associated with factors related to complexity and demand for CSR, CSR performance, measurement standards, and monitoring (see Appendix 1 for a summary of the expectations). We expect a positive association between the frequency of restatements and fundamental environmental and social complexity, the setting of targets, the level of environmental and social performance; and stronger monitoring measured by auditor engagement, and firm location in strong rule of law countries. We expect an association

(but no expected direction) between frequency of restatements and external stakeholder demand for CSR information, use of standards, and governance. We expect a bias in the direction of restatements toward correction of overstatements, which is positively associated with setting specific targets and having a CSR audit. We expect a negative association between bias and use of measurement standards.

3. Data description and analysis of restatement frequency

Sample construction

Our sample comprises CSR reports voluntarily issued by the firms in the G250 over the period 2006 to 2013. Primarily due to scale effects, firm size has been regularly established as a determinant of voluntary disclosure in the literature (Hahn and Kühnen 2013). We use a constant sample of G250 firms based on the total revenues in 2011 (the most recent ranking available at the beginning of data collection) as our starting population to help address self-selection in the decision to produce a CSR report and control for firm size.

We begin our sample in 2006 because of the tremendous growth in CSR reporting since then. KPMG (2005) reports that, between 2002 and 2005, the percentage of G250 companies providing standalone CSR reports grew from 40% to 52%. KPMG (2008) finds that 79% of G250 companies provided these reports, and in 2011, 95% did so (KPMG 2011).[22] Our sample period thus represents a time when CSR reporting became pervasive but was still evolving and was thus more likely to exhibit variation in quality. We collected standalone CSR reports from GRI's disclosure database (http://database.globalreporting.org/search), company websites, and, if not publicly available, via email request to the company. Our initial sample consists of 1,480 firm-

[22] KPMG (2011) does not separate out different forms of reporting, so this figure includes companies that provide integrated reports, provide information within their financial statements, or provide disclosures through various online resources.

year observations from 221 firms. We match hand-collected standalone CSR report data to the Thomson Reuters Asset4 database and Compustat Global, resulting in a sample of 779 firm-years representing 142 firms.[23]

We lose a number of firm observations due to non-availability of data, which could potentially bias our results. We conduct a number of tests to provide some insight regarding the extent to which this is a concern. First, we compared our results to the other two studies that have examined CSR restatements (Ballou et al. 2018 and Michelon et al. 2019), both of which had different samples. Our results for the key variable common across these studies, i.e., having the CSR report audited, are qualitatively the same. Second, we estimated our models using a reduced form which allowed for more firm-year observations and found qualitatively similar results.[24]

Classification of CSR restatements

We hand-code restatements by reading each sustainability report to identify environmental and social data that were changed from the prior year's report.[25] Such changes are disclosed through footnotes to tables or in notes appended to reported data. The footnotes and notes typically state a reason for the restatement. We separate individual restatements into three types: i) changes that reflect correction of errors/estimates in reported data from past reports ("error-revision"); ii) changes that reflect a change in calculation method/metric ("metric change"); and iii) other unspecified changes. We code the firm-year in which the restatement was reported as having a

[23] Asset4 is a database that provides environmental, social, and governance performance rankings of large corporate entities across the world.

[24] Specifically, we remove control variables with no significant relationship in the full models. This increases the number of observations to 943 for restatement frequency (from 779 originally), and 504 for restatements associated with overstatement (from 398 originally). Using these increased samples, we examined if our sample construction lead to a bias in the results. Both the coefficient sign and the statistical significance of all of our main results remained the same, suggesting that sample-construction is not creating a bias.

[25] To address any coding bias, all reports were hand coded by two independent coders. Any differences in the coding were resolved by one of the authors.

restatement. This is because the information systems producing the restated information were in existence for that report year, and a prior year's item can be restated in multiple future years. For example, if a year 3 report includes numbers restated for year 1, the year 1 report will not be coded as including a restatement, but year 3 will. Each CSR report-year can have more than one line-item that has been restated. For example, in a single report, both the line-items for GHG emissions and for fatalities at managed operations could be restated, in which case that report would be recorded as having two line-items restated.

Figure 1 provides examples of the first two types of restatements. In both panels, the highlighted fields indicate the original and restated data. Panel A provides an example of restatement due to an error-revision from Rio Tinto. Rio Tinto's social performance for 2013 includes a footnote indicating that prior-year numbers for new cases of occupational illness and for employee exposure to noise have been restated due to data verification. The number of new cases of occupational illness originally reported for 2012 changed from 13 to 15, a 15% increase. For employee exposure to noise, the restatements ranged from an increase of 0.7% to a decrease of 7.3%. It is interesting to note that, in the original data panel, some of the numbers that were subsequently restated had already been restated from prior years.

Panel B of Figure 1 provides an example of a metric change. In the footnote to the table on accidents worldwide, Exxon-Mobil notes a change in its metric to compute GHG emissions from the direct equity method to the net equity method, which includes direct and imported GHG emissions and excludes emissions from exports. In this case, the GHG measures from the prior 2010 year decrease by 5% when restated. Another type of metric change is a change in the scope of the measure. For example, Toyota Motor Corporation (2009, 46) indicates that measurement of air and quality data started including non-operational hours in calculation of discharge volume.

<<Insert Figure 1 about here>>

Frequency and magnitude of restatements

We first explore basic distributional characteristics of restated CSR reports. Table 1, panel A, reports the frequency of restatements across time. Across the sample period 37% (291) of the sample CSR reports, representing 92 firms include restatements of prior years' data. There has been a general increase in the frequency of restatements across time from 29% in 2006 to 52% in 2013. This level of restatements is substantial and is considerably greater than restatement frequency of financial reports.

Table 1, panel B, aggregates the items restated by report and categorizes the reports based on the overall nature of restatements: error-revisions alone, metric changes alone, a mix of both types, or unspecified. Across the sample, 32% (94) of restated CSR reports are restated solely due to error-revisions; 34% (99) are solely due to metric changes; and 29% (85) include both error-revisions and metric changes. Four percent (13) could not be classified.

<<Insert Table 1 about here>>

Firms can restate their reports in multiple years. Table 1, panel C, reports the frequency with which firm restate their CSR reports across time. Of the 142 firms in our sample 92 (65%) restated at least once. We find that a significant percentage of these restated CSR reports are from firms that restate year after year; 49% of restating firms restated in four or more sample years. Table 1, panel D, reports the number of restated reports in each sample year by restatement frequency. For example, 122 of the restated reports in our sample (from panel D) are issued by the 21 firms (from panel C) that have reports restated in six or more years in our sample period. This suggests that underlying determinants of restatements are not related to yearly incentives but reflect firm-level characteristics.

Table 2 reports the sample distribution by industry (panel A) and country (panel B). Focusing on industries with more than 20 CSR reports indicates that the most frequently restating firms are in the Electric Utilities (70.0%), Pharmaceuticals (60.5%), Oil, Gas and Consumable Fuels (62%), and Technology Hardware, Storage and Peripherals (53.1%) industries. The high incidence of restatements for the Electric Utilities, Pharmaceuticals and Oil and Gas industries is consistent with these industries having greater demand for CSR information and being more fundamentally complex with respect to measurement of environmental and social performance. These characteristics result in a greater possibility of required error-revisions and development of new measurement systems. Panel B reports the percentage of restatements by country. Among countries with more than 20 CSR reports, the countries with the highest incidence of restatements are the Netherlands (75%) and Spain (70%). The country with the lowest incidence of restatements is Switzerland (9.7%).

<<Insert Table 2 about here>>

The 291 restated reports include 1,019 individual line-item restatements. For each line-item we compute the absolute percentage magnitude of the restatement. For example, in the case of Rio Tinto in Figure 1, the 2013 report of *New Cases of Occupational Illness* reports a figure of 15 for 2012, which was originally reported to be 13. For this restatement, the absolute magnitude is 15.38% [(15-13)/13].

Table 3, panel A, reports descriptive statistics for individual line-item restatements. The mean (median) number of line-items restated in each CSR report is 7.5 (4). The mean (median) value of the absolute magnitude of the restatement is 76.3% (9.6%). The difference between mean and median magnitude indicates existence of some extreme observations. While difficult to convert to monetary equivalents, the restatements appear to be of economic significance for a large

portion of the distribution (although arguably observations below the 25th percentile are immaterial).[26] Within reports, metric changes are more common than error-revisions both at the mean (7.6 versus 4.2, respectively) and median (3 versus 2.5 line-items, respectively). The magnitude of metric changes is significantly higher than error-revisions, both at the mean (176.2% versus 17.1%, respectively) and the median (11.0% versus 8.1%, respectively).[27] This is consistent with rapidly evolving CSR reporting standards as companies refine their systems, and the relative immaturity of social and environmental performance information systems.

<<Insert Table 3 about here>>

Restatement of different CSR categories

To explore the heterogenous nature of information in CSR reports, we categorize the 1,019 line-items into environmental and social categories and then into further subcategories based upon GRI Sustainability Reporting Guidelines (GRI 2013). Appendix 3 provides the definition and description of each category.

The first two quantitative columns of Table 3, panel B, identify the number and percent of the total 1,019 line-items represented in each restatement category. There are substantially more environmental restatements (65.2%) than social restatements (12.7%). The most frequent environmental line-item restatements concern GHG/VOC emissions, primarily related to Scope 2 and 3 GHG emissions (19.9%). This is unsurprising, since uncertainty associated with estimating indirect emissions is substantial. The most frequent social restatements relate to Occupational

[26] Restatement of different items may have variation in economic impact and the materiality of a restatement can depend on the stakeholder's viewpoint. For example, large revisions to reported numbers of employee fatalities or injuries may be very material to employee readers of the reports. Large revisions of emission numbers may be material to regulators and activist shareholders.

[27] Both the number and magnitude are statistically different between errors and metrics at the 5% level.

Hazards (10.4%). When we separate the frequencies by metric changes versus error-revisions (untabulated) we find broadly similar distributions.

The remainder of Table 3, panel B, reports descriptive statistics for the magnitude of restatement of the individual line-items in each category. The median value of the absolute magnitude of the restatement across all categories is 5.22%. Focusing on categories with more than 10 CSR reports, there is relatively low variation between categories in the median value of restatement ranging from a high of 9.08% for energy intensity to a low of 3.83% for GHG/VO released. Except for the illness or diseases category, all categories exhibit severe skewness. The homogeneity of the distributions across different categories could suggest consistency in the maturity of firm information systems used to measure CSR performance and as such, that the underlying determinants of restatements is driven by factors at the firm or country level which apply to all types of restatements.

4. Factors associated with restated CSR reports

In this section we examine factors associated with restatements measured at the report level. Based upon our discussion in section 2, the baseline logistic regression is:

$$RESTATE_{it} = \beta_1 - \beta_3\ (Complexity\ and\ Demand\ for\ CSR) + \beta_4 - \beta_6\ (CSR\ Performance) + \beta_7(Measurement\ Standards) + \beta_8 - \beta_{10}\ (Monitoring) + \varepsilon_{i,t}, \quad (1)$$

where *RESTATE* takes the value of one if a CSR report for firm *i* in year *t* has been restated and zero otherwise. Appendix 2 provides formal definitions of all explanatory variables. *Complexity and Demand for CSR* variables include logged value of property, plant and equipment (*LN_PPE)*; a dummy variable for sensitive industries (*SENSITIVE_IND*) and a rank-score of the country's stakeholder law orientation (*STAKE_LAW)*. *CSR Performance* variables include a dummy variable if a firm sets a target (*TARGET*); environmental performance score (*ENV_PERF*) and social performance score (*SOCIAL_PERF*). *Measurement Standard* variables include a dummy variable

if a firm reports following GRI (*GRI*). *Monitoring* variables include: a dummy variable is the CSR report is audited (*AUDIT*); corporate governance performance score (*GOVERNANCE*), and a dummy variable if a country has strong rule of law (*STRONG_LAW*).

Univariate analysis

Table 4 provides sample descriptive statistics for the variables included in our analysis. Consistent with our sample comprising the world's largest and most visible companies, social responsibility appears to be a general focus. The average company scores relatively high on ASSET4's CSR indexes (averages of 90.53%, 87.84%, and 63.97% for *ENV_PERF*, *SOCIAL_PERF* and *GOVERNANCE*, respectively). Of these scores, *GOVERNANCE* appears to be somewhat positively skewed. The vast majority of firms have specified CSR targets (*TARGET* =1 for 95% of the sample). Almost all of the companies follow *GRI* (96%), and the majority have their CSR reports assured (*AUDIT* =1 for 82% of the sample).[28] This does not appear to be driven by industry factors, since only 18% of the firm-years represent firms that are in industries that have higher social and environmental risks (*SENSITIVE_IND* =1).

<<Insert Table 4 about here>>

Table 5, panel A, compares the mean and median level for the variables of interest between report years with and without restatements. These samples significantly differ along a number of dimensions, with restated reports associated with firms that are less capital intensive (*LN_PPE*), more likely to be in sensitive industries, more likely to have environmental targets, have higher

[28] We code all forms of assurance such as assurance by an independent "team of experts" as an *AUDIT*. However, if we tighten the definition to only include formally defined Direct or Attestation Engagements (as defined by International Standard on Assurance Engagements 3000), we find a CSR audit in 60% of the total sample, which is comparable to the 59% reported by KPMG (2011). Key inferences of the study are unchanged using this tighter measure of *AUDIT*. Because our study looks at the influence of a third-party assurance for CSR, which is not a mandatory requirement as per the standard, we keep the broader definition of *AUDIT* in the main results.

CSR performance (*SOCIAL_PERF* and *GOVERNANCE*), and are more likely to be in countries with strong rule of law (*STRONG_LAW* = 1).

<<Insert Table 5 about here>>

We separate the type of restatements into those due to error-revisions and those due to metric changes and report the univariate results in Table 5, panels B and C. For most variables, there is no significant difference between the error-revisions and metric changes. In untabulated results, there are only two significant differences in the characteristics of firms reporting the two types of restatements. Error-revisions are significantly more likely to be from companies in sensitive industries (*SENSITIVE_IND* = 1) than are metric changes (a mean percent of 0.27 versus 0.15, respectively; *p*-value <0.03).[29] Finally, metric changes are significantly more likely to be reported for companies located in stakeholder-oriented countries (*STAKE_LAW* = 1) than are error-revisions (a mean of 15.14% versus 17.13%, respectively; *p*-value <0.01).

Multivariate analyses

Base logistic regression model

Table 6 reports the results from the estimation of the logistic regression model (1). Because the residuals can be correlated across firms, over time, or both, for all multivariate analyses we report test statistics and significance levels based on standard errors clustered by industry and with year fixed effects. The first result column reports the results from our baseline regression model. The remaining columns report results from estimation of the models for subsamples based on restatements due to error-revisions and metric changes.

<<Insert Table 6 about here>>

[29] All reported *p*-values are for two-tailed tests, unless specified otherwise.

Results in all models fail to provide evidence that restatements are associated with complexity as proxied for by investments in plant and equipment (*LN_PPE)*. A possible explanation for this is insufficient variation in complexity as all our sampled firms are very large.

Focusing on the results reported in the first column, for the variables we use to proxy for our performance construct, we find a statistically significant positive association between restatements and social performance (*SOCIAL_PERF* = 0.030, p <0.01, odds ratio 1.03) and having a target (*TARGET* =0.899, p <0.01, odds ratio 2.46*)* but not *ENV_PERF*. Thus, we find reasonably strong evidence that restatements are significantly associated with the level of CSR performance. From an economic standpoint, the largest odds ratio is for *TARGET*. Results for our monitoring and measurement construct indicate a positive statistical and economic association with monitoring, i.e., positive associations between restatements and rule of law strength (*STRONG_LAW* = 0.605, p < 0.05, odds ratio 1.83) and CSR audits (*AUDIT* = 0.657, p < 0.10, odds ratio 1.93).[30]

There is no evidence that the use of GRI standards affects occurrence of restatements.[31] However, there are many other certifications and standards issued by private and nonprivate sector organizations, so one explanation for the null results with respect to *GRI* is that other standards are more important. In untabulated tests, we investigate use of four other prominent standards, namely, ISO 14000, ISO Environmental Management Systems, and whether the company signed onto the

[30] Assurance providers can be either accounting firms or non-accounting firms. As recognized by Michelon et al. (2019), Ballou et al. (2018), Hummel et al. (2019), Boiral et al. (2019) and Channuntapipat (2019), assurance scope, nature, and quality can vary from year to year within a focal company and by type of assurance provider. To consider if the heterogeneity in assurance is biasing our inference we conduct a number of further tests. We collect the name of the assurance providers and classify the assurance provider as being either a Big-4 assurance provider or not. We test whether there is any incremental difference between the two types of firms. In untabulated results, we find no statistical difference between the two type of providers for existence of restatements.

[31] Most of the firms in our sample using GRI did so for the entire sample period. In untabulated analysis, we examine whether restatements are associated with first-time adoption of GRI and other standards. First-time adoption is not incrementally significant in explaining the occurrence of restatements.

UN Global Compact. None of these was found to be significant either independently or incrementally. Another explanation is that we have low statistical power for this test because the vast majority of our sample employs GRI. We are, however, able to test the impact of GRI on the nature of restatements in tests presented below.[32]

In the second and third results columns of Table 6, we examine error-revisions and metric changes separately. This is motivated by the possibility the explanatory factors could differ between the two types of restatements. Restatements could be due to either intentional opportunistic reporting or unintentional mistakes. The financial reporting literature argues that, given a choice between using discretionary accruals versus accounting policy changes, firms will always use discretionary accruals. This is because choice of measurement methods must be disclosed, and thus the earnings management becomes visible and will not be successful. Assuming that metric changes are similar to accounting policy choices, this suggests that the explanatory factors for metric changes could differ from error-revisions.

A restated report could have either error-revisions or metric changes alone, or a combination of restatement types. To isolate the factors associated with error-revisions, we include a dummy variable, *OTHER_REVISION_EXISTS_1*, that takes the value of one if the report had a restatement type other than error-revision (e.g., a metric change or unclassified restatement). We adopt a similar approach for the metric changes regression by including a dummy variable *OTHER_REVISION_EXISTS_2*, that takes the value of one if the report had a restatement type other than a metric change. Results reported in the second and third columns of Table 6 indicate

[32] Using a sample of S&P500 firms, 52% of which follow GRI, Michelon et al. (2019) find that GRI is significantly associated with restatements. Ballou et al. (2018) find mixed results for GRI influencing restatements in their international sample of firms (45% of which follow GRI), with a significant coefficient of GRI only for non-error restatements. Our sample has a much more homogenous GRI adoption than that of Ballou et al. (2018), as 96% of our sample follows GRI.

that, with exception of *GRI*, the signs of the coefficients of all variables are the same between error-revisions and metric changes. With the exception of *SENSTIVE_IND* and *STAKE_LAW*, we find no statistical difference between the coefficient magnitudes (untabulated). Firms in sensitive industries are more likely to have error-revisions and firms in stakeholder law countries are less likely to have error-revisions. The positive and statistically significant coefficients on the variables *OTHER_REVISION_EXISTS_1* and *OTHER_REVISION_EXISTS_2* indicate that restated reports are significantly likely to have multiple types of restatements (e.g., a report with an error-revision is also likely to have metric or unclassified changes).

Models investigating cross-sectional variation in restatements[33]

Firms that repeatedly restate their CSR reports. The most significant finding in the prior section is that restatement of CSR reports is positively associated with variables that proxy for our monitoring and CSR performance constructs. Our univariate analysis indicates that a significant percentage of firms repeatedly restate across time. Consistent with this, estimation of the following simple autoregressive model of $RESTATE_{it+1} = \alpha_1 + \beta RESTATE_{it}$ provides strong statistical evidence (untabulated) that a restatement in the current period predicts a restatement in the following period ($\beta = 2.327$, $p < 0.01$).

[33] While this section presents a number of cross-sectional partitions to provide greater insight into the explanations for restatements, it also serves the purpose of increasing the power of our tests, which could be one explanation for the insignificant results for some variables. Our binary restatement dependent variable likely contains a mixture of different accounting decisions, possibly lowering the power of our tests. First, an error could either be intentional or non-intentional. Second, observing a restatement is a joint outcome of occurrence of an accounting error occurring and detection/reporting of the misstatement. Although including test variables as explanatory variables for some of these possibilities somewhat addresses this, the power of our tests could remain low. There is no straightforward procedure for distinguishing this mixture of accounting decisions as we cannot observe managerial intent. Consistent with this, the large volume of literature that has examined restatements of financial reports usually does not distinguish between these accounting decisions (Hennes et al. 2008). In this section we attempt to address this issue by limiting restatement samples to certain types of restatements where the reporting decisions are more likely to be homogenous.

These two findings motivate us to examine whether firms that repeatedly restate across time are different from firms that restate occasionally. Plumlee and Yohn (2010) find that the majority of US financial report restatements arise due to unintentional errors. In our setting, given the relative immaturity of CSR-related measurement systems, the incidence of repeat restatements of CSR reports across time by the same firm could be due to growing investment in CSR, but with a lag in information system development and sophistication in system use.

The definition of a firm that frequently restates is arbitrary. Because of the large number of firms that have restated in multiple sample years, we compare those firms above and below the median number of restatements across the sample periods as our proxy for firms who either frequently or occasionally restate. We estimate separate logit regressions of model (1) for frequent versus occasional restatement firms, and then test for differences in coefficients between the two regressions. For both regressions, we use the benchmark of firms that did not restate at any time during the sample period.

Results reported in Table 7, panel A, are significant only for the firms that frequently restate and are significantly different from occasional restatement firms. As we report in the second column, there is a statistically and economically significant positive association for frequent restatement firms between restatements and having a target (*TARGET* =2.754, $p < 0.05$, odds ratio 15.7*)* which differs significantly from results for occasional restatement firms ($p < 0.01$). Results also indicate a positive association between frequent restatement firms' restatements and monitoring (*GOVERNANCE = 0.025, p* < 0.05, odds ratio 1.03*),* although its economic significance is low. This result is also significantly different from the result for occasional restatement firms ($p < 0.05$).

<<Insert Table 7 about here>>

This evidence is consistent with recent research that well-governed firms have greater investment in CSR (see footnote 7). As better governed firms invest in CSR, they are likely to have higher CSR performance, a consequence of which will be an increase of errors in measurement of CSR performance. The strong governance mechanisms in these firms can result in identification, correction, and reporting of the errors. This potentially implies that high performing CSR firms will have low reliability CSR performance metrics, although given that the errors stem from improvements in systems, reliability should improve over time.

Category of restatements. We next investigate whether factors associated with demand and quality of CSR reports vary as a function of the nature of environmental versus social information provided. We employ a multinomial model version of model (1) based upon categories of restatements: *CAT* = 0 for reports with no restatements; *CAT* = 1 for reports with restatements only related to GHG; *CAT* = 2 for reports with restatements only related to Occupational Health and Safety Hazards (OH); and *CAT* = 3 for reports with restatements related to both GHG and OH in the same report. We compare coefficients for the estimates from *CAT = 1* (GHG restatements alone) and *CAT = 2* (OH restatements alone) to test if the factors that determine the type of restatement are different.

Results are reported in Table 7, panel B. The columns provide results from the estimation for the three categories respectively. Overall, results indicate that there are more factors that are systematically associated with OH restatements than GHG restatements. Statistical tests of the difference between GHG and OH restatements provide evidence that compared to GHG restatements, OH restatements, are more strongly associated with reporting via GRI (*GRI*= 15.337 v 0.475, $p < 0.01$) and the quality of internal governance (*GOVERNANCE* = 0.030 v -0.003, $p < 0.05$). OH restatements also have a greater positive association with stakeholder law countries than

GHG restatements (*STAKE_LAW*= 0.045 v -0.018, $p < 0.10$), although neither group differs significantly from reports without restatements. Although *AUDIT* is economically and statistically significantly different from zero in the models for *OH* and *BOTH* (AUDIT = 1.381 vs. 1.894, $p < 0.05$ vs. $p < 0.10$, odds ratio 3.98 vs. 6.65) the coefficients between GHG and OH do not significantly differ from each other. We conclude that *AUDIT* is an important factor for restatements, but we cannot completely distinguish between OH and GHG restatements. Having a target (*TARGET)* is significantly related to both GHG and OH restatements ($p < 0.01$ for both), although the propensity of firms to have both types of restatements in the same report is not related to having targets.

These results suggest that some sources of demand for CSR information may vary across subcategories of information reported within a CSR report and in turn, the quality of information within a CSR report, may not be homogenous. Specifically, the result that OH restatements have a greater positive association with stakeholder law countries than GHG restatements, is consistent with the view in the literature that *STAKE_LAW* captures a country's legal environment in protecting labor rights, welfare of employees and minorities (see for example Dhaliwal et al. 2012). These countries demand a relative higher level of performance of social relative to environment, which can give rise to greater errors. Under the condition that OH information is of lower quality than GHG information, and *GOVERNANCE* is proxying for the detection and reporting of errors, our results also are suggestive of variation in quality between subsets of information within a CSR report.

Further sensitivity analyses. Auditor incentives are strongly associated with avoiding litigation. Dhaliwal et al. (2012) document that some countries have laws requiring commercial firms and/or pension funds to report on their social or environmental policies and activities. Dhaliwal

et al. (2012) argue that these laws will be associated with stakeholder expectations of stronger corporate social performance. As this suggests that auditors in countries with CSR laws will have a greater incentive to avoid litigation, we estimate model (1) separately for samples of countries with and without CSR laws.[34] In untabulated results, we find that the coefficient of *AUDIT* is larger for countries with CSR laws compared to those without CSR laws (respectively, *AUDIT* =2.053 vs. 0.002, $p < 0.01$).

Regression model (1) includes a proxy for governance at both the firm-level (*GOVERANCE)* and country-level (*STAKE_LAW).* Our lack of results in Table 6 for *GOVERNANCE* could be because *GOVERANCE* and *STAKE_LAW* act as substitutes. Consistent with prior research (e.g. Simnett et al. 2009; Liang and Renneboog 2017), our proxy for stakeholder countries is based upon the existence of a civil law system. Arguably, a civil law system protects the rights of stakeholders at the country level and thus, obviates the need for firm-level governance regarding environment and social issues. To examine this, we estimate separate logistic regressions of model (1) for stakeholder and non-stakeholder countries. In untabulated results, we find a statistically significant coefficient on *GOVERANCE* for the sample of non-stakeholder countries (*GOVERANCE* = 0.041, $p < 0.05$*)* but not for stakeholder countries (*GOVERANCE* = 0.003, $p > 0.10$) and the two coefficients are statistically different ($p < 0.10$).

5. Bias in the direction of CSR restatements

In this section, we investigate the existence of a directional bias in line-item error-revisions. Following the financial accounting literature, we classify error-revisions as either over- or understatement of the underlying environmental and social performance. We define overstatements as changes to numbers previously reported such that the reported performance in

[34] See Appendix A of Dhaliwal et al. (2012) for the distribution of CSR Disclosure regulations across countries.

the restated disclosure is worse than originally reported. For example, assume that carbon dioxide emissions for 2010 was reported as 7.34 in the 2010 CSR report, but restated to 7.56 in the 2011 CSR report. We classify this as an overstatement, since the originally reported environmental performance is better than the restated environmental performance. Coding of changes to reported numbers must be considered in context; increases to reported numbers can reflect worse performance, such as in the carbon dioxide example, or better performance, such as for hours that employees contribute to charities. Decreases in reported numbers should similarly be viewed in context.

Univariate analyses

Table 8 reports exploratory univariate comparisons across different partitions of line-items containing restatements. Panel A reports analysis of restatements reflecting prior overstatements versus understatements. Overall, 53% of the line-items restated represent overstatements, which is significantly greater than the incidence of understatements ($p < 0.05$). Bias is most evident in error-revisions of line-items related to social performance ($p < 0.01$).[35] These results potentially represent intentional bias; measurement of social performance is less uniform across firms, which may provide greater latitude for managers to manipulate reported numbers.

<<Insert Table 8 about here>>

Examination of whether the overstatements vary by error-revisions versus metric changes (Table 8, panel A), provides evidence of a statistically significantly greater level of overstatements than understatements for error-revisions (56% versus 44%, $p < 0.05$) but no significant difference for metric changes (52% versus 48%, $p > 0.10$).

[35] To confirm this result, we compare homogenous subcategories and compare GHG restatements to Occupational Hazards restatements. The results again show a bias towards overstatement of social performance information but no positive bias for environmental metrics.

The remaining panels of Table 8 focus on error-revisions, since they provide evidence of potential bias. To the extent the bias is driven by opportunism, bias may be more prevalent for large than small errors. Results in panel B indicate that the social error-revisions are more biased when they are of larger magnitude ($p < 0.01$), although bias for smaller magnitude social item error-revisions approaches significance ($p < 0.11$). As a result, bias is not significantly different across the magnitude partition. Taken together, these results do not provide evidence of intentional opportunistic reporting based upon overstatement magnitude.

Results in panel C indicate a significant bias in social item error-revisions, but only for high social performance firms ($p < 0.01$). Based on Kim et al. (2012), who find that higher CSR firms are less likely to manage earnings we interpret our results as indicating that high social performance firms do not report opportunistically, but instead, continuously implement improvements in information systems, which helps identify previously omitted negative events.

To provide insight into mechanisms that can mitigate bias, we consider the role of auditors and reporting via GRI. Results in panel D provide evidence that audited reports are more likely to have error-revisions that correct previous overstatements than understatements. This is consistent with increased monitoring by auditors, who focus on correcting overstatements, possibly related to litigation concerns, as discussed earlier. Because of the greater latitude for managers to manipulate numbers associated with social measures and the relative immaturity of associated reporting systems, auditors may provide additional scrutiny for these measures. Panel E, partitions error-revisions based upon GRI reporting. Results indicate that reports that do not follow GRI guidelines are significantly more likely to have error-revisions that reflect overstatements. This is true for all categories of restatements, although reports that follow GRI are significantly less likely to exhibit biased social line-item disclosures ($p < 0.05$). Overall, results from panels D and E

suggest that having an auditor and GRI measurement standards may be associated with mitigating bias in CSR reporting.

Multivariate analysis

The univariate evidence indicates a significant bias for overstatement of social information. This could be due to opportunistic reporting or instead, may reflect unintentional bias. We extend our examination of bias via an exploratory multivariate analysis, employing model (1), but replacing the dependent variable with *OVERSTATE,* which takes the value of one if the correction makes prior-year performance of the individual line-item worse than was originally reported and zero otherwise. We also include *MAGNITUDE* (absolute % change in the reported number due to restatement) as an independent variable because we find evidence at the univariate level of differences in bias across some partitions. Only firm-years with an error-revision restatement are included in the sample.

Results from logistic regression estimation for line-items are reported in Table 9, panel A. The results for all error-revisions indicate a negative association between use of GRI reporting guidelines and the likelihood of an overstatement (*GRI* = -0.924, $p < 0.01$). Based upon the corresponding odds ratio, firms following GRI are only 37% as likely to have overstatements as those that do not follow GRI. This is consistent with measurement guidelines restricting choice and thus guarding against managers making errors that overstate performance. This result only holds for error-revisions of environmental information, which is consistent with the more mature status of environmental metric development in GRI guidelines. We also find a positive association between overstatements and high social performance and governance, although economic significance is relatively low (*SOCIAL_PERF* = 0.021, $p < 0.10$, odds ratio 1.02; *GOVERNANCE* = 0.013, $p < 0.05$, odds ratio 1.10).

<<Insert Table 9 about here>>

The remaining models reported in Table 9, panel A, split the line-items into environmental and social error-revision overstatements. Consistent with the univariate results, we find different factors associated with overstatements of the two types of error-revisions: environmental error-revision overstatements are primarily associated with GRI. Social error-revision overstatements are negatively associated with environmental performance, but strongly positively associated with audited reports (*AUDIT* = 2.494, $p < 0.01$, odds ratio 12.11). None of the models indicates a significant association between overstatement and error-revision magnitude. This is inconsistent with overstatements being intentional (i.e., to make the performance appear better than it actually is), which would imply an incentive to manage the magnitude.

As a sensitivity analysis, we aggregate the overstatements to the report level (see Table 9, panel B). For the dependent variable we use the binary variable *OVERSTATE_REPORT*, which takes a value of one if there are more items that are overstated than understated in a given report, and zero otherwise. We note that this model has low statistical power due to the low number of reports in the sample. Consistent with earlier models, reports adopting GRI are less likely to have error-revisions related to overstatements. *GOVERNANCE* is positively associated with aggregate error-revisions related to overstatements, although the economic significance is low, with a maximum odds ratio of 1.04 in the model for social error-revisions.

6. Conclusion

Firm stakeholders increasingly demand disclosure of sustainability information. Given the voluntary nature of disclosure and a lack of mandatory reporting rules, understanding the reliability of this information is important. This paper examines the frequency, magnitude, and determinants of restatements of CSR reports for the G250 from 2006 to 2013. We provide the first in-depth

analysis of the unreliability of CSR reports as reflected in restatements. We find that that a significant proportion of CSR reports are restated and this increases across time. We find a bias in the direction of the revisions toward overstatement, implying that the social and environmental performance were worse than originally reported. Together, the frequency and magnitude of restatements imply that CSR information can be unreliable.

Our exploratory investigation of determinants and economic incentives associated with CSR restatements produces several insights. We find some evidence that the frequency of restatements higher in firms that have higher levels of social performance, have their CSR report audited, and reside in strong law countries. Our examination of the factors associated with the bias indicates a negative association between the use of GRI reporting guidelines and the likelihood of an overstatement of environmental information. Finally, we find a positive association between having the CSR reported audited and the likelihood of social error-revision overstatements. Taken together, our results are inconsistent with firms intentionally misrepresenting CSR performance. Instead, we conclude that firms in stronger institutional environments, both external to the firm and internally driven through corporate CSR initiatives, are continually improving their CSR-related reporting systems and as a result, uncovering and correcting prior reporting deficiencies. Firms that invest in reporting quality by employing CSR report auditors, who appear to invest more time and effort in identifying overstatements than understatements, are also more likely to discover and report prior misstatements.

Results from the study are descriptive and are only indicative. Future research should develop theoretically based hypotheses to further explain reasons underlying the frequent restatements of these voluntary reports. Further, the current findings are limited to firms that provide standalone CSR reports, which are also associated with higher CSR commitment

(Clarkson et al. 2019). Future research can explore whether these findings extend to firms that publish some CSR information without a standalone CSR report. Finally, our research does not address consequences of CSR restatements or possible differences in consequences across types of restatements. For example, restating the number of fatalities may be much more significant to report users than restating the number of indirect carbon emissions. We leave this to future research.

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Figure 1 Restatement examples

Panel A: Example of a restatement from Rio Tinto Summary of Social Performance 2013 and 2012 that is due to revision of a reported number

Rio Tinto Sustainability Report 2012, p. 83 (original numbers)

Social

	2012	2011	2010	2009	2008
Employees (average)	71,000	68,000	77,000	102,000	106,000
Fatalities at managed operations	3***	6**	3	4	18
All injury frequency rate (AIFR) (per 200,000 hours worked)	0.67	0.67	0.69	0.81	0.94*
Lost time injury frequency rate (LTIFR) (per 200,000 hours worked)	0.37	0.37	0.38*	0.42*	0.49*
Fines and prosecutions – safety (US$ '000)	536.1	18.3*	92.3*	190.6	207.4
New cases of occupational illness (per 10,000 employees)	13	12*	20*	39*	48*
Employees potentially exposed to an average eight hour noise dose of more than 85db(A) (per 10,000 employees)	3,410	3,602*	3,605*	3,626*	3,582*
Fines and prosecutions – health (US$ '000)	23.2	0.0	0.46	0.0	0.0

* Numbers corrected from those published in previous year following data verification
** Six fatalities at Rio Tinto managed operations or operations held for divestment in 2011. Includes one fatality at Zululand Anthracite Colliery (identified for divestment)
*** Two fatalities due to safety incidents and one fatality due to an occupational illness

Rio Tinto Sustainability Report 2013, p. 104 (restated numbers)

Social

	2013	2012	2011	2010	2009
Employees (average)	66,000	71,000	68,000	77,000	102,000
Fatalities at managed operations from safety incidents	3	2	6	3	4
Fatalities at managed operations from health incidents	–	1	–	–	–
All injury frequency rate (AIFR) (per 200,000 hours worked)	0.65	0.67	0.67	0.69	0.81
Lost time injury frequency rate (LTIFR) (per 200,000 hours worked)	0.42	0.37	0.37	0.38	0.42
Fines and prosecutions – safety (US$ '000)	145.5	536.1	18.3	92.3	190.6
New cases of occupational illness (per 10,000 employees)	16	15*	13*	20	39
Employees exposed to an 8-hour noise dose of more than 85db(A) (per 10,000 employees)	3,276	3,398*	3,587*	3,629*	3,360*
Fines and prosecutions – health (US$ '000)	0.0	23.2	0.0	0.46	0.0

* Numbers corrected from those published in previous year following data verification
** Six fatalities at Rio Tinto managed operations or operations held for divestment in 2011. Includes one fatality at Zululand Anthracite Colliery (identified for divestment)

Figure 1 Restatement examples

Panel B: Example of a restatement from Exxon-Mobil GHG emissions 2010 and 2011 that is due to a metric change

Exxon-Mobil Corporate Citizenship Report 2010, p. 11 (original numbers)

	2007	2008	2009	2010	Interpretation	Page #
Managing Climate Change Risks*						
[2]Greenhouse gas emissions, absolute (direct equity, CO_2-equivalent emissions), millions of metric tons	139	130	128	**132**	■	34
[2]Greenhouse gas emissions, normalized (direct equity, CO_2-equivalent emissions, excluding cogeneration and Hong Kong Power), metric tons per 100 metric tons of throughput or production						
Upstream	19.8	18.7	18.1	**18.5**	■	34
Downstream	17.4	17.0	16.7	**16.6**	■	34
Chemical	42.0	39.8	40.2	**38.2**	■	34
Energy intensity, normalized versus *Global Energy Management System* (GEMS) base year (2000) – refining	93.2	93.4	92.6	**91.4**	■	34
Energy intensity, normalized versus GEMS base year (2001) – chemical steam cracking	90.6	91.3	90.3	**89.3**	■	34
Cogeneration capacity in which we have interest, gigawatts	4.5	4.6	4.9	**4.9**	■	35
[2]Hydrocarbon flaring (worldwide activities), millions of metric tons	8.0	5.7	4.4	**3.6**	■	34

Exxon-Mobil Corporate Citizenship Report 2011, p. 8 (restated numbers)

CITIZENSHIP DATA

	2008	2009	2010	2011	Interpretation	Page #
Managing Climate Change Risks*						
[1,2]Greenhouse gas emissions, absolute (net equity, CO_2-equivalent emissions), millions of metric tons	126	124	125	**129**	■	23
[1,2]Greenhouse gas emissions, normalized (net equity, CO_2-equivalent emissions), metric tons per 100 metric tons of throughput or production						
Upstream	21.0	20.2	20.3	**20.7**	■	24
Downstream	21.0	21.0	20.8	**20.4**	■	24
Chemical	59.8	60.7	57.9	**57.1**	■	24
Energy intensity, normalized versus *Global Energy Management System* (GEMS) base year (2000) – refining	93.4	92.6	91.4	**90.2**	■	23
Energy intensity, normalized versus GEMS base year (2001) – chemical steam cracking	91.3	90.3	89.3	**87.8**	■	23
Cogeneration capacity in which we have interest, gigawatts	4.6	4.9	4.9	**5.0**	■	24
Hydrocarbon flaring (worldwide activities), millions of metric tons	5.7	4.4	3.6	**4.1**	■	23

Notes on performance table:

[1] The above net equity greenhouse gas (GHG) emissions metric was introduced in 2011 as a replacement for the direct equity GHG metric. Information has been restated back to 2008 according to this new metric. The net equity GHG metric includes direct and imported GHG emissions and excludes emissions from exports, including Hong Kong Power.

[2] ExxonMobil reports GHG emissions on a net equity basis for all our business operations, reflecting our percent ownership in an asset. Environmental, health, and safety data are reported for our affiliates and those operations under direct ExxonMobil management and operational control.

Appendix 1

Expectations for determinants of CSR restatement frequency and bias

Construct	**Variables**	**Expected association with the existence of CSR restatements**	**Expected association with CSR restatement correcting an overstatement**
CSR complexity	*LN_PPE*	Positive association	
	SENSITIVE_IND	Positive/negative association	
CSR targets	*TARGET*	Positive association	Positive association
CSR performance	*ENV_PERF* *SOCIAL_PERF*	Positive association	
Stakeholder demand`	*STAKE_LAW*	Positive/negative association	
Measurement standards	*GRI*	Positive/negative association	Negative association
Monitoring	*AUDIT*	Positive association	Positive association
	STRONG_LAW	Positive association	
	GOVERNANCE	Positive/negative association	

Appendix 2

Variable definitions

Variable	Definition
Dependent variables	
RESTATE	Dummy variable that equals one if the CSR report for firm *i* in year *t* was restated (Source: Hand coded from hand-collected CSR reports for the G250)
ERROR-REVISION	Dummy variable that equals one if the CSR report for firm *i* in year *t* was restated due to correction of estimates and zero otherwise
METRIC_RESTAT	Dummy variable that equals one if the CSR report for firm *i* in year *t* was restated due to changes in measurement method and zero otherwise
Complexity and demand for CSR	
LN_PPE	Logged value for the level of the net property, plant and equipment as reported in the year-end balance sheet (Source: Thomson Reuters ASSET 4 database)
SENSITIVE_IND	Dummy variable for companies belonging to industries identified by Simnett et al. (2009) as being exposed to greater environmental or social risks (oil, gas, and consumable fuels; chemicals; metals and mining)
STAKE_LAW	Average rank score of three indices from Botero et al. (2004) and one from La Porta et al. (2006), assessing the legal environment of a country in protecting labor rights
CSR performance	
TARGET	Dummy variable that takes the value of one if a firm sets a target for its environment performance, with an expected positive coefficient (Source: Thomson Reuters Asset 4 ESG database)
ENV_PERF	ASSET4 percentage score, based on the relative environmental performance of firm *i* in year *t*, compared to the universe of firms covered by ASSET4 in the same industry. The environmental performance attributes measured are Emission Reduction, Product Innovation, and Resource Reduction (Source: Thomson Reuters Asset 4 ESG database). Thomson Reuters constructs an Environmental score based on company-reported information for a range of metrics across the themes of resources use, emissions, innovation. For example, one of the metrics is Total recycled and reused waste produced in tons divided by total waste produced in tons. Values are extracted for all the metrics based on company-reported information. Based on the nature of metric, relevant numeric values are assigned and calculated. An overall percentile score is then computed based on the relative environmental performance of firm *i* in year *t*, compared to the universe of firms covered by ASSET4 in the same

Variable	Definition
	industry across the world. Further details are at https://financial.thomsonreuters.com/content/dam/.../pdf/.../esg-scores-methodology.pdf. Measurement errors associated with the ASSET 4 scores are discussed in Bouten et al. (2017)
SOCIAL_PERF	ASSET4 percentage score, based on the relative social performance of firm *i* in year *t* compared to the universe of firms covered by ASSET4. The social performance attributes measured are: Product Responsibility, Community, Human Rights and Opportunity, Employment Quality, Health and Safety, Training and Development (Source: Thomson Reuters Asset 4 ESG database). ASSET4's social performance metric is computed following the same principles as for *ENV_PERF*
Measurement standards	
GRI	Dummy variable that takes the value of one if a firm adopts the Global Reporting Initiative's (GRI) measurement standard in its reporting of CSR information and zero otherwise. There are several measurement standards, as certifications and standards have been issued by various bodies. We use the GRI Sustainability Reporting Guidelines as they are among the most high-profile standards worldwide (Ramanna 2013) and the most widely used CSR reporting framework (KPMG 2013)
Monitoring	
AUDIT	Dummy variable that takes the value of one if the CSR reported is audited and zero otherwise, with an expected positive coefficient
GOVERNANCE	ASSET4 percentage score, based on the relative corporate governance performance of firm *i* in year *t*, compared to the universe of firms covered by ASSET4. The corporate governance performance attributes measured are: Board Functions, Board Structure, Compensation Policy, Vision and Strategy, Shareholder Rights. ASSET4's corporate governance metric is intended to measure a company's systems and processes, which ensure that its board members and executives act in the best interests of its long-term shareholders. It reflects a company's capacity, through its use of best management practices, to direct and control its rights and responsibilities through the creation of incentives and checks and balances to generate long-term shareholder value (Source: Thomson Reuters Asset 4 ESG database)
STRONG_LAW	Dummy variable that takes the value of one for countries with strong rule of law and zero otherwise. A positive coefficient is expected. We follow Srinivasan et al. (2014) and use the rule of law index from the World Bank's Worldwide Governance Indicators (Kaufmann et al. 2004), with countries above the median being classified as strong

Variable	Definition
MAGNITUDE	Absolute % change in the reported number due to restatement
OTHER_REVISION_EXISTS_1	Dummy variable that equals one if the CSR report for firm *i* in year *t* included restatements of prior CSR reports related to any reason other than correction of estimates and zero otherwise. (i.e., metric change or unclassified restatement)
OTHER_REVISION_EXISTS_2	Dummy variable that equals one if the CSR report for firm *i* in year *t* included restatements of prior CSR reports related to any reason other than changes in measurement method and zero otherwise (i.e., error-revision or unclassified restatement)

Appendix 3

Environment and social disclosure subcategories

We classify the environmental and social restatements into subcategories using the categories in the GRI G4 Sustainability Reporting Guidelines (GRI 2013).

Category	Definition, description, and GRI reference
Environment	
CO_2 Emissions	Measurement of gross direct (Scope 1) GHG emissions in metric tonnes CO_2
GHG/VOC released	Scope 2 and 3 GHG emissions in metric tonnes CO_2. For example, in 2012 Dell reported 98,407 metric tonnes of Scope 3 GHG emissions for global employee commercial air travel (tonnes CO_2e) and 13 metric tonnes of VOC emissions (Dell 2012, 5)
Energy Used (including water)	Measurement of total fuel consumption from non-renewable sources in joules or for million kilowatt-hours (kwh). For example, Dell in 2012 reported total electricity consumed of 672.5 million kilowatt-hours (kwh) (Dell 2012, 5)
Energy Intensity	Measurement of the energy intensity ratio, usually in gigajoule per tonne production. For example, Royal Dutch Shell in 2009 reported energy intensity of 0.79 gigajoule per tonne production (Royal Dutch Shell 2009, 34)
Energy Saved	Measurement of the amount of reductions in energy consumption achieved as a direct result of conservation and efficiency initiatives in joules or multiples
Waste	Measurement of the total weight in tonnes of hazardous and non-hazardous waste that has been generated. For example, in Hyundai in 2012 reported waste generated in tonnes of 586,750 (Hyundai 2012, 3)
Spill	Total number and volume of significant spills usually reported as either tonnes or number
Recycled	Waste to landfills usually reported as a percentage of waste that is recycled
Social	
Occupational Hazards	Total recordable incident rate of fatalities, work accidents, or incidents. Reported either as an absolute number or a ratio as *N* employees or per *N* work hours. For example, Siemens reported an absolute number of 2 work accidents in 2010 (Siemens 2010, 81)
Illness or Diseases	New cases of occupational illness or diseases (per 10,000 employees). For example, in 2013 Woolworths reported an occupational disease rate of 1.48 per 200,000 hours worked (Woolworths 2013, 49)

TABLE 1

Frequency of CSR reports being restated

Panel A: Frequency of reports containing restatements

Year	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**Total**
% restated	*29*	*30*	*28*	*32*	*39*	*40*	*39*	*52*	***37***
Restated reports	10	21	28	35	47	49	47	54	**291**
N	34	71	100	108	119	123	120	104	**779**

Panel B: Distribution of restatements overtime

Reason	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**Total**
Error-revisions only	4	11	11	13	15	11	15	14	**94**
Metric changes only	2	5	9	12	12	20	16	23	**99**
Multiple[a]	4	5	7	10	19	14	13	13	**85**
Unspecified[b]	0	0	1	0	1	4	3	4	**13**
Total	**10**	**21**	**28**	**35**	**47**	**49**	**47**	**54**	**291**

Panel C: Frequency of firms issuing reports with restatements

Single versus multiple restatements (Firm level)	**First year appearing in the sample period**								
	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**Total**
Firms with a single restatement in sample period	4	5	4	1	2	0	1	0	**17**
Firms with 2-3 restatements in sample period	4	10	6	3	5	1	1	0	**30**
Firms with 4-5 restatements in sample period	6	8	8	2	0	0	0	0	**24**
Firms with 6 or more restatements in sample period	7	10	3	0	1	0	0	0	**21**
Total	**21**	**33**	**21**	**6**	**8**	**1**	**2**	**0**	**92**

Panel D: Number of reports containing restatements by sample year produced by firms that issue multiple reports with restatements over the sample period

Single versus multiple restatements (Report level)	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**Total**
Reports of firms with a single restatement in sample period	0	1	2	1	0	2	3	8	**17**
Reports of firms with 2-3 restatements in sample period	1	2	5	4	12	12	13	16	**65**
Reports of firms with 4-5 restatements in sample period	3	5	9	13	15	15	13	14	**87**
Reports of firms with 6 or more restatements in sample period	6	13	12	17	20	20	18	16	**122**
Total	**10**	**21**	**28**	**35**	**47**	**49**	**47**	**54**	**291**

Notes: [a]These reports include a mix of revision, metric change, and/or unspecified restatements. [b]The reason for restatement is not provided in the CSR report.

TABLE 2

Frequency of restatements by industry and country

Panel A: Restatements by industry

Global Industry Classification	**Total reports** ***N***	**Restated reports** ***N***	**% Reports restated**	**Error-revisions[a]** **N**	**Metric restated[b]** **N**
Air Freight & Logistics	14	12	85.7	7	9
Building Products	4	3	75	0	3
Communications Equipment	14	10	71.4	8	7
Electric Utilities	20	14	70	7	12
Marine	6	4	66.7	1	4
Wireless Telecommunication Services	19	12	63.2	5	10
Oil, Gas, & Consumable Fuels	79	49	62	35	28
Pharmaceuticals	43	26	60.5	21	19
Technology Hardware, Storage, & Peripherals	32	17	53.1	8	14
Airlines	2	1	50	1	0
Multiline Retail	2	1	50	1	0
Capital Markets	28	12	42.9	3	8
Internet Software & Services	7	3	42.9	1	0
Banks	81	34	42	18	18
Insurance	29	12	41.4	8	7
Automobiles	63	24	38.1	15	12
Multi-Utilities	24	8	33.3	2	7
Auto Components	6	2	33.3	2	0
Metals & Mining	42	11	26.2	9	4
IT Services	16	4	25	4	0
Industrial Conglomerates	21	5	23.8	3	1
Diversified Telecommunication Services	35	8	22.9	5	5
Food & Staples Retailing	49	10	20.4	6	5
Software	6	1	16.7	0	1
Chemicals	19	3	15.8	2	1
Beverages	8	1	12.5	0	1
Construction & Engineering	10	1	10	0	1
Trading Companies & Distributors	24	2	8.3	1	1
Food Products	16	1	6.3	0	1
Household Durables	16	0	0	0	0
Aerospace & Defense	10	0	0	0	0
Electronic Equipment, Instruments, & Components	8	0	0	0	0
Machinery	8	0	0	0	0
Media	7	0	0	0	0
Semiconductors & Semiconductor Equipment	7	0	0	0	0
Electrical Equipment	4	0	0	0	0
Total	**779**	**291**	**37.4**	**173**	**179**

TABLE 2
Frequency of restatements by industry and country (continued)

Panel B: Restatements by country

Country	Total reports *N*	Restated reports *N*	% Reports restated	Error restated[a] *N*	Metric restated[b] *N*
Australia	26	9	34.6	8	1
Belgium	2	0	0.0	0	0
Brazil	20	12	60.0	9	6
Denmark	6	4	66.7	1	4
Finland	7	4	57.1	2	2
France	89	22	24.7	10	14
Germany	91	44	48.4	22	28
Hong Kong	7	5	71.4	0	5
India	6	3	50.0	1	2
Italy	28	11	39.3	7	9
Japan	146	17	11.6	13	8
Republic of Korea	28	12	42.9	7	6
Netherlands	24	18	75.0	13	15
Norway	6	3	50.0	3	1
Spain	30	21	70.0	7	17
Sweden	6	0	0.0	0	0
Switzerland	31	3	9.7	0	1
Taiwan	2	0	0.0	0	0
Thailand	2	2	100.0	2	2
United Kingdom	61	34	55.7	22	20
United States	161	67	41.6	46	38
Total	**779**	**291**	**37.4**	**173**	**179**

Notes: [a]Reports with error-revision only restatements or multiple types of restatements that include error-revision(s). [b]Reports with metric-only restatements or multiple types of restatements that include metric restatement(s).

TABLE 3

Incidence and magnitude of restatement of line-items in CSR reports that have been restated

Panel A: Incidence and magnitude (average absolute % change) of line-item restatements per report for reports with restatements

Reason		No. of reports	Mean	SD	Min	P25	Median	P75	Max
Error-revisions only	No. of items restated	94	4.2	4.9	1.0	1.0	2.5	4.0	26.0
	Restatement magnitude (absolute % change)	94	17.1	27.2	0.2	2.5	8.1	20.7	198.5
Metric changes only	No. of items restated	99	7.6	12.9	1.0	2.0	3.0	6.0	81.0
	Restatement magnitude (absolute % change)	99	176.2	714.5	0.2	3.6	11.0	32.5	3,949.2
Multiple	No. of items restated	85	11.3	10.8	2.0	5.0	7.0	15.0	67.0
	Restatement magnitude (absolute % change)	85	35.8	120.6	0.3	5.0	9.9	18.8	966.1
Unspecified	No. of items restated	13	6.1	6.8	1.0	3.0	4.0	6.0	24.0
	Restatement magnitude (absolute % change)	13	8.3	8.7	0.4	1.9	6.6	9.8	30.8
Total	**No. of items restated**	**291**	**7.5**	**10.4**	**1.0**	**2.0**	**4.0**	**8.0**	**81.0**
	Restatement magnitude (absolute % change)	**291**	**76.3**	**426.9**	**0.2**	**3.3**	**9.6**	**22.6**	**3,949.2**

Panel B: Descriptive statistics for restatements of environmental and social items (absolute % change)

Subcategory	N	% of Total	Mean	SD	Min	Q1	Median	Q3	Max
Environmental									
CO_2 emissions	104	*10.2*	65.56	550.00	0.10	1.57	5.41	14.34	5,615.45
GHG/VOC released	203	*19.9*	63.55	689.75	0.00	1.23	3.83	13.30	9,821.76
Energy used (includes water)	170	*16.7*	69.37	626.31	0.02	0.93	3.94	13.48	7,890.00
Energy intensity	13	*1.3*	760.16	2,712.46	0.01	3.16	9.08	13.55	9,787.76
Energy saved	2	*0.2*	10.71	13.13	1.43	1.43	10.71	20.00	20.00
Waste	125	*12.3*	22.70	51.19	0.01	1.58	6.39	16.17	338.49
Spill	18	*1.8*	38.38	72.81	0.41	0.92	6.83	44.06	300.00
Recycled	29	*2.8*	17.07	25.50	0.00	3.80	8.35	16.38	98.90
Subtotal Environmental	**664**	***65.2***							
Social									
Occupational hazards	106	*10.4*	12.97	23.41	0.04	2.08	4.88	14.76	175.00
Illness or diseases	24	*2.4*	8.72	7.81	0.49	3.20	6.04	12.94	27.90
Subtotal Social	***130***	***12.7***							
Other	225	*22.1*	522.68	7,473.36	0.00	1.93	8.01	24.44	112,122.22
Total	1019	*100.0*	161.56	3,551.14	0.00	1.50	5.22	16.00	112,122.22

Notes: Panel A reports descriptive statistics for individual line-items that were restated in each report**.** The magnitude of restatements is computed for each report as the average of restatement magnitudes of all the line-items that were restated in that report. The restatement magnitude for each line-item is calculated as the average absolute percentage change for all the years restated for that line-item. The category *Multiple* includes some mix of error-revision, metric, and/or unspecified restatements and the category *Unspecified* includes those line-items for which the reasons for restatements are not indicated in the CSR reports. Panel B tabulates the distribution statistics of restatement magnitude at the line-item level. See Appendix 2 for the basis for environmental and social subclassifications.

TABLE 4

Descriptive statistics for CSR reports and firms

Variable	*N*	Mean	Std. dev.	Q1	Median	Q3	Min	Max
RESTATE	779	0.37						
ERROR-REVISION	779	0.22						
METRIC_RESTAT	779	0.23						
LN_PPE	779	17.76	2.41	16.03	17.09	19.54	13.51	24.26
SENSITIVE_IND	779	0.18	0.38					
STAKE_LAW	779	16.08	6.07	10.5	13	22.75	7	26.88
TARGET	779	0.95						
ENV_PERF	779	90.53	5.65	89.87	92.29	93.79	60.98	96.6
SOCIAL_PERF	779	87.84	9.69	84.82	90.87	94.63	50.46	97.83
GOVERNANCE	779	63.97	27.37	40.67	73.69	87.42	8.16	96.13
GRI	779	0.96						
AUDIT	779	0.82						
STRONG_LAW	779	0.55						

Notes: This table reports the descriptive statistics for all the firm-year variables used in the study for the sample 779 firm-year CSR reports across the period from 2006 to 2013. See Appendix 2 for variable definitions.

TABLE 5

Univariate differences in characteristics between firms with and without restatements of CSR reports

Panel A: CSR reports with no restatement versus restatement

	No restatement in report			Restated report			Difference
	N	Mean	Median	*N*	Mean	Median	*t*-stat
LN_PPE	488	18.025	17.283	291	17.306	16.721	**4.04*****
SENSITIVE_IN	488	0.158	0.000	291	0.216	0.000	**-2.06****
STAKE_LAW	488	16.144	13.000	291	15.961	13.250	0.40
TARGET	488	0.936	1.000	291	0.979	1.000	**-2.73*****
ENV_PERF	488	90.320	92.240	291	90.892	92.370	-1.36
SOCIAL_PERF	488	86.988	90.380	291	89.259	92.260	**-3.18*****
GOVERNANCE	488	60.450	68.650	291	69.862	81.330	**-4.70*****
GRI	488	0.949	1.000	291	0.966	1.000	-1.09
AUDIT	488	0.785	1.000	291	0.866	1.000	**-2.83*****
STRONG_LAW	488	0.482	0.000	291	0.653	1.000	**-4.70*****

Panel B: CSR reports with no restatement versus error-revisions

	No restatement in report			Error-revision			Difference
	N	Mean	Median	*N*	Mean	Median	*t*-stat
LN_PPE	488	18.025	17.283	173	17.350	16.721	**3.15*****
SENSITIVE_IN	488	0.158	0.000	173	0.266	0.000	**-3.15*****
STAKE_LAW	488	16.144	13.000	173	15.137	13.000	**1.88***
TARGET	488	0.936	1.000	173	0.983	1.000	**-2.36****
ENV_PERF	488	90.320	92.240	173	90.726	92.570	-0.78
SOCIAL_PERF	488	86.988	90.380	173	89.241	92.770	**-2.54****
GOVERNANCE	488	60.450	68.650	173	70.203	83.180	**-3.97*****
GRI	488	0.949	1.000	173	0.948	1.000	0.04
AUDIT	488	0.785	1.000	173	0.844	1.000	**-1.67***
STRONG_LAW	488	0.482	0.000	173	0.676	1.000	**-4.47*****

Panel C: CSR reports with no restatement versus metric changes

	No restatement in report			Metric change			Difference
	N	Mean	Median	*N*	Mean	Median	*t*-stat
LN_PPE	488	18.025	17.283	179	17.232	16.671	**3.74*****
SENSITIVE_IN	488	0.158	0.000	179	0.184	0.000	-0.819
STAKE_LAW	488	16.144	13.000	179	16.472	19.750	-0.617
TARGET	488	0.936	1.000	179	0.978	1.000	**-2.11****
ENV_PERF	488	90.320	92.240	179	90.827	92.100	-0.99
SOCIAL_PERF	488	86.988	90.380	179	90.200	92.260	**-3.89*****
GOVERNANCE	488	60.450	68.650	179	69.374	76.650	**-3.78*****
GRI	488	0.949	1.000	179	0.966	1.000	-0.962
AUDIT	488	0.785	1.000	179	0.883	1.000	**-2.87*****
STRONG_LAW	488	0.482	0.000	179	0.637	1.000	**-3.58*****

Notes: The table reports the mean, median, and tests of difference of firm-year variables between the sample of CSR reports with a restatement and the sample of CSR reports without a restatement. The *z*-statistic is from Wilcoxon rank-sum test. See Appendix 2 for variable definitions. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01, respectively.

TABLE 6
Logistic regression analysis of determinants of a CSR report restatement

	Logit regressions		
Dependent variable:	*RESTATE* (1= Restated)	*ERROR-REVISION* (1= Restated)	*METRIC_RESTAT* (1= Restated)
LN_PPE	-0.031	-0.052	-0.026
	(0.086)	(0.067)	(0.119)
SENSITIVE_IND[a]	0.499	0.862***	0.012
	(0.565)	(0.293)	(0.550)
OTHER_REVISION_EXISTS_1		1.167***	
		(0.216)	
OTHER_REVISION_EXISTS_2			1.093***
			(0.194)
STAKE_LAW[a]	-0.016	-0.047***	0.003
	(0.020)	(0.017)	(0.018)
TARGET	0.899***	0.941*	0.394
	(0.341)	(0.559)	(0.359)
ENV_PERF	0.008	0.006	-0.008
	(0.025)	(0.025)	(0.023)
SOCIAL_PERF	0.030***	0.022	0.041***
	(0.010)	(0.015)	(0.010)
GOVERNANCE	0.006	0.001	0.002
	(0.006)	(0.006)	(0.007)
GRI	0.054	-0.368	0.047
	(0.470)	(0.489)	(0.650)
AUDIT	0.657***	0.355	0.545**
	(0.221)	(0.345)	(0.252)
STRONG_LAW	0.605**	0.387	0.390
	(0.308)	(0.352)	(0.340)
Constant	-5.918***	-3.842*	-5.759**
	(2.222)	(2.074)	(2.760)
Year FE	Yes	Yes	Yes
Observations	779	779	779
Pseudo R^2	0.0809	0.1077	0.1061
Number of clusters	36	36	36

Notes: The table reports the results of a logistic regression examining the determinants of restatements. The dependent variable *RESTATE* takes the value of one if a firm-year CSR report was restated and zero otherwise. *ERROR-REVISION (METRIC_RESTAT)* takes the value of one if the restatement related to correction of estimates (changes in measurement method). See Appendix 2 for definitions of the explanatory variables. Standard errors clustered by industry are in parentheses. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01, respectively. [a]Coefficients for the error-revisions and metric changes significantly differ between models at $p < 0.06$ or better.

TABLE 7

Cross-sectional variation in restatements

Panel A: Logistic regression analysis of determinants of CSR report restatements split between firms which frequently restate versus firms which occasionally restate

Variables	*Occasional Restatement Firms* *RESTAT* (1= Restated)	*Frequent Restatement Firms* *RESTAT* (1= Restated)
LN_PPE	-0.082	0.096
	(0.191)	(0.227)
SENSITIVE_IND	0.130	0.212
	(0.684)	(1.056)
STAKE_LAW	0.014	0.033
	(0.045)	(0.056)
TARGET[a]	0.773	2.754**
	(0.692)	(1.123)
ENV_PERF	0.027	0.024
	(0.031)	(0.051)
SOCIAL_PERF	0.023	0.047**
	(0.014)	(0.021)
GOVERNANCE[a]	-0.007	0.025**
	(0.009)	(0.013)
GRI	-0.436	0.061
	(0.638)	(0.819)
AUDIT	-0.021	0.623
	(0.640)	(0.477)
STRONG_LAW	0.671	1.230
	(0.669)	(0.791)
Constant	-6.066	-14.794**
	(4.893)	(6.521)
Year FE	Yes	Yes
Observations	344	359
Pseudo R^2	0.0837	0.1798
Number of clusters	33	26

TABLE 7
Cross-sectional variation in restatements (continued)

Panel B: Multinomial logistic regression analysis of determinants of CSR report restatement by category of restatement: GHG, OH, and both GHG and OH

Variables	*RESTATE_CAT=1* (GHG only)	*RESTATE_CAT=2* (OH only)	*RESTATE_CAT=3* (both GHG and OH)
LN_PPE	-0.088	0.149	0.128
	(0.126)	(0.143)	(0.173)
SENSITIVE_IND	0.537	0.530	1.230
	(0.631)	(0.524)	(0.774)
STAKE_LAW[b]	-0.018	0.045	0.016
	(0.026)	(0.032)	(0.043)
TARGET	15.952***	15.602***	0.660
	(0.667)	(0.804)	(0.723)
ENV_PERF	0.011	-0.029	0.029
	(0.033)	(0.042)	(0.044)
SOCIAL_PERF	0.013	0.057	0.041
	(0.012)	(0.035)	(0.045)
GOVERNANCE[c]	-0.003	0.030**	0.029**
	(0.008)	(0.013)	(0.013)
GRI[d]	0.475	15.337***	-2.069*
	(0.613)	(0.840)	(1.234)
AUDIT	0.396	1.381**	1.894*
	(0.301)	(0.596)	(1.083)
STRONG_LAW	0.592	0.686	1.337**
	(0.375)	(0.707)	(0.567)
Constant	-19.022***	-43.418***	-15.685***
	(3.452)	(4.202)	(3.917)
Year FE		Yes	
Observations		693	
Pseudo R^2		0.116	
Number of clusters		36	

Notes:
Panel A reports the results of a logistic regression examining the determinants of restatements. The dependent variable *RESTATE* takes the value of one if a firm-year CSR report was restated and zero otherwise. See Appendix 2 for definitions of the explanatory variables. *Frequent (Occasional*) restatement firms are defined as those firms that are above and below the median number of restatements by individual firms across the sample period. Only those firms that have no restatement in the entire sample period are included as the non-restatement base group. This leads to 206 non-restatement firm-years, 138 firm-years for occasional restatement firms, and 153 firm-years for frequent restatement firms. Standard errors, clustered by industry, are in parentheses. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01, respectively. [a]Coefficients significantly differ between models at $p < 0.04$ or better. Panel B reports the results of a multinomial logistic regression examining the determinants of restatements by category of restatement. The base category of the dependent variable *RESTATE_CAT* takes the value of zero if a firm-year CSR report has no restatement, a value of one if there is at least one restatement relating to GHG and none relating to Occupational Health and Safety Hazards (OH), a value of two if there is at least one restatement relating to OH and none relating to GHG and a value of three if there is at least one restatement relating to GHG and OH each. Reports with restatements that do not fall into either GHG or OH categories (e.g., other environmental or social restatements only) are omitted in this analysis. See Appendix 2 for definitions of the explanatory variables and Appendix 3 for the environmental and social

subclassifications. Reports with restatements that do not fall into either GHG or OH categories (e.g., other environmental or social restatements only) are omitted in this analysis. Standard errors, clustered by industry, are in parentheses. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01, respectively. [b]Coefficients across the first two models significantly differ between models at $p < 0.06$. [c]Coefficients across the first two models significantly differ between models at $p < 0.03$. [d]Coefficients across the first two models significantly differ between models at $p < 0.01$.

TABLE 8

Univariate analysis of the direction of restatement by category: Restatement of prior year (*t*-1) line-terms are classified as overstatements (understatements) if the restated number makes performance worse (better) than was originally reported

Panel A: By the type of restatement

			Diff. from understated	
			z-stat[a]	*p*-value
	N	**%**		
Error-revisions and metric changes:				
All line-items	**1019**			
Overstated in *t*-1	542	0.532	**2.0362**	**0.0417**
Understated in *t*-1	477	0.468		
Environmental line-items	**763**			
Overstated in *t*-1	389	0.510	0.5430	0.5871
Understated in *t*-1	374	0.490		
Social line-items	**256**			
Overstated in *t*-1	153	0.598	**3.1250**	**0.0018**
Understated in *t*-1	103	0.402		
Error-revisions:				
All line-items	**398**			
Overstated in *t*-1	221	0.555	**2.2055**	**0.0274**
Understated in *t*-1	177	0.445		
Environmental line-items	**269**			
Overstated in *t*-1	139	0.517	0.5487	0.5832
Understated in *t*-1	130	0.483		
Social line-items	**129**			
Overstated in *t*-1	82	0.636	**3.0816**	**0.0021**
Understated in *t*-1	47	0.364		
Metric changes:				
All line-items	**585**			
Overstated in *t*-1	303	0.518	0.8682	0.3854
Understated in *t*-1	282	0.482		
Environmental line-items	**470**			
Overstated in *t*-1	240	0.511	0.4613	0.6446
Understated in *t*-1	230	0.489		
Social items line-items	**115**			
Overstated in *t*-1	63	0.548	1.0258	0.305
Understated in *t*-1	52	0.452		

TABLE 8

Univariate analysis of the direction of restatement by category: Restatement of prior year (*t*-1) line-terms are classified as overstatements (understatements) if the restated number makes performance worse (better) than was originally reported (*continued*)

Panel B: Partition by restatement size (small magnitude vs. large magnitude error-revisions)

			Diff. from understated		***Diff. from Large***	
			z-stat	*p*-value	*t*-stat	*p* -value
	N	**%**				
Small restatements:						
All line-items	**202**					
Overstated in *t*-1	110	0.545	1.2665	0.2053	-0.4360	0.6631
Understated in *t*-1	92	0.455				
Environmental line-items	**146**					
Overstated in *t*-1	76	0.521	0.4966	0.6195	0.1361	0.8919
Understated in *t*-1	70	0.479				
Social line-items	**56**					
Overstated in *t*-1	34	0.607	1.6036	0.1088	-0.5857	0.5591
Understated in *t*-1	22	0.393				
Large restatements:						
All line-items	**196**					
Overstated in *t*-1	111	0.566	**1.8571**	**0.0633**		
Understated in *t*-1	85	0.434				
Environmental line-items	**123**					
Overstated in *t*-1	63	0.512	0.2705	0.7868		
Understated in *t*-1	60	0.488				
Social line-items	**73**					
Overstated in *t*-1	48	0.658	**2. 6919**	**0.0071**		
Understated in *t*-1	25	0.342				

TABLE 8

Univariate analysis of the direction of restatement by category: Restatement of prior year (*t*-1) line-terms are classified as overstatements (understatements) if the restated number makes performance worse (better) than was originally reported (*continued*)

Panel C: Partition by level of social performance (error-revisions for low vs. high social performance firms)

			Diff. from understated		***Diff. from High***	
			z-stat	*p*-value	*z*-stat	*p*-value
	N	**%**				
Low social performance firms:						
All line-items	**171**					
Overstated in *t*-1	87	0.509	0.2294	0.8185	-1.6217	0.1057
Understated in *t*-1	84	0.491				
Environmental line-items	**130**					
Overstated in *t*-1	67	0.515	0.3508	0.7257	-0.0425	0.9661
Understated in *t*-1	63	0.485				
Social line-items	**41**					
Overstated in *t*-1	20	0.488	-0.1562	0.8759	**-2.4170**	**0.0171**
Understated in *t*-1	21	0.512				
High social performance firms:						
All line-items	**227**					
Overstated in *t*-1	134	0.590	**2.7213**	**0.0065**		
Understated in *t*-1	93	0.410				
Environmental line-items	**139**					
Overstated in *t*-1	72	0.518	0.4241	0.6715		
Understated in *t*-1	67	0.482				
Social line-items	**88**					
Overstated in *t*-1	62	0.705	**3.8376**	**0.0001**		
Understated in *t*-1	26	0.295				

TABLE 8

Univariate analysis of the direction of restatement by category: Restatement of prior year (*t*-1) line-terms are classified as overstatements (understatements) if the restated number makes performance worse (better) than was originally reported (*continued*)

Panel D: Partition by existence of an audit (error-revisions in reports with and without audits)

			Diff. from understated		***Diff. from Non-Audit***	
			z-stat	*p*-value	*t*-stat	*p*-value
	N	**%**				
Reports with audits:						
All line-items	**341**					
Overstated in *t*-1	192	0.563	**2.3286**	**0.0199**	-0.7619	0.4465
Understated in *t*-1	149	0.437				
Environmental line-items	**224**					
Overstated in *t*-1	114	0.509	0.2673	0.7893	0.5694	0.5696
Understated in *t*-1	110	0.491				
Social line-items	**117**					
Overstated in *t*-1	78	0.667	**3.6056**	**0.0003**	**-2.3146**	**0.0222**
Understated in *t*-1	39	0.333				
Reports without audits:						
All line-items	**57**					
Overstated in *t*-1	29	0.509	0.1325	0.8946		
Understated in *t*-1	28	0.491				
Environmental line-items	**45**					
Overstated in *t*-1	25	0.556	0.7454	0.4561		
Understated in *t*-1	20	0.444				
Social line-items	**12**					
Overstated in *t*-1	4	0.333	-1.1547	0.2482		
Understated in *t*-1	8	0.667				

TABLE 8

Univariate analysis of the direction of restatement by category: Restatement of prior year (*t*-1) line-terms are classified as overstatements (understatements) if the restated number makes performance worse (better) than was originally reported (*continued*)

Panel E: Partition by use of GRI (error-revisions in GRI vs. non-GRI reports)

			Diff. from understated		***Diff. from Non-GRI***	
			z-stat	*p*-value	*t*-stat	*p*-value
	N	**%**				
Reports based upon GRI:						
All line-items	354					
Overstated in *t*-1	187	0.528	1.0630	0.2878	**3.1072**	**0.0020**
Understated in *t*-1	167	0.472				
Environmental line-items	247					
Overstated in *t*-1	123	0.498	-0.0636	0.9493	**2.0711**	**0.0393**
Understated in *t*-1	124	0.502				
Social line-items	107					
Overstated in *t*-1	64	0.598	**2.0301**	**0.0423**	**1.9674**	**0.0513**
Understated in *t*-1	43	0.402				
Reports that are not based upon GRI:						
All line-items	44					
Overstated in *t*-1	34	0.773	**3.6181**	**0.0003**		
Understated in *t*-1	10	0.227				
Environmental line-items	22					
Overstated in *t*-1	16	0.727	**2.1320**	**0.0330**		
Understated in *t*-1	6	0.273				
Social line-items	22					
Overstated in *t*-1	18	0.818	**2.9848**	**0.0028**		
Understated in *t*-1	4	0.182				

Notes: This table reports a univariate analysis of the direction of the restatement of individual line-items by category. Panel A reports by type (error versus metric) and category of restatement (environment versus social). Panel B reports by size (large versus small, based on a median split of magnitude) and category of restatement (environment versus social). Panel C reports by level of social performance (high versus low, based on a median split of social performance) and category of restatement (environment versus social). Panel D reports by audit and category of restatement (environment versus social). Panel E reports by GRI and category of restatement (environment versus social). Restatement line-terms are classified as overstatements if the restated number makes performance worse than was originally reported. They are classified as understatements if the restated number makes performance better than was originally reported. See Appendix 3 for the basis for environmental and social subclassifications. [a]The *z*-stat is from a test on the equality of proportions of overstatements and understatements in the sample. In the absence of a bias in restating, overstatements and understatements are expected to be equally distributed.

TABLE 9

Logistic regression investigating factors associated with overstatements

Panel A: Error-revisions at the line-item level

Dependent variable:	*OVERSTATE* (1= Overstatement in *t*-1)		
Variables	All revisions	Environmental revisions	Social revisions
LN_PPE	0.122	0.018	0.321
	(0.107)	(0.138)	(0.214)
SENSITIVE_IND	-0.008	0.311	-0.605
	(0.337)	(0.428)	(0.835)
STAKE_LAW	-0.033	-0.028	-0.049
	(0.023)	(0.028)	(0.052)
TARGET	-0.349	-0.664	.
	(1.621)	(1.705)	
ENV_PERF	-0.012	0.033	-0.121**
	(0.026)	(0.032)	(0.061)
SOCIAL_PERF	0.021*	0.011	0.029
	(0.012)	(0.013)	(0.041)
GOVERNANCE	0.013**	0.010	0.018
	(0.007)	(0.009)	(0.015)
GRI	-0.924***	-1.020***	-0.579
	(0.225)	(0.371)	(0.549)
AUDIT	0.510	-0.042	2.494***
	(0.323)	(0.375)	(0.817)
STRONG_LAW	0.331	0.050	0.802
	(0.296)	(0.387)	(0.593)
MAGNITUDE	0.180	0.242	0.572
	(0.254)	(0.255)	(1.045)
Constant	-3.589	-3.838	-0.237
	(4.159)	(4.579)	(8.885)
Year FE	Yes	Yes	Yes
Observations	398	269	129
Pseudo R^2	0.0865	0.0678	0.2094
Number of clusters	71	59	38

TABLE 9

Logistic regression investigating factors associated with overstatements (*continued*)

Panel B: Error-revisions at the report level

Dependent variable:	*OVERSTATE_REPORT* (1= Net Overstatement in *t*-1) Logit regressions		
	All revisions	Environmental revisions	Social revisions
LN_PPE	0.189	0.225*	0.328
	(0.115)	(0.134)	(0.216)
SENSITIVE_IND	0.328	0.330	0.438
	(0.386)	(0.416)	(0.927)
STAKE_LAW	-0.013	-0.014	-0.038
	(0.033)	(0.037)	(0.051)
TARGET	1.758	1.723	.
	(1.768)	(1.848)	
ENV_PERF	0.042	0.062	-0.035
	(0.047)	(0.056)	(0.041)
SOCIAL_PERF	0.005	0.005	-0.021
	(0.021)	(0.021)	(0.037)
GOVERNANCE	0.017*	0.018*	0.036**
	(0.009)	(0.011)	(0.016)
GRI	-1.434**	-1.513**	-2.177***
	(0.684)	(0.720)	(0.631)
AUDIT	-0.549	-0.551	0.351
	(0.637)	(0.671)	(0.802)
STRONG_LAW	-0.045	0.021	-0.587
	(0.386)	(0.502)	(0.749)
Constant	-10.129*	-12.632*	-2.673
	(5.473)	(7.129)	(5.975)
Year FE	Yes	Yes	Yes
Observations	164	137	85
Pseudo R^2	0.126	0.1316	0.2397
Number of clusters	68	63	43

Notes:

Panel A reports the results of a logistic regression examining the factors associated with a restatement of an individual line-item that represents an overstatement of performance. The dependent variable *OVERSTATE* takes the value of one if the correction makes prior-year performance worse than was originally reported and zero otherwise. Only firm-years with an error-correction restatement are included in the sample. See Appendix 2 for variable definitions and Appendix 3 for the environmental and social subclassifications. Standard errors, clustered by industry, are in parentheses. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01, respectively.

Panel B reports the results of a logistic regression examining the factors associated with a restatement of a report that represents a net overstatement of performance. The dependent variable *OVERSTATE_REPORT* takes the value of one if the net correction in the report makes prior-year performance worse than was originally reported. *Net correction* in a report is calculated by adding all percentage overstatements and deducting all percentage understatements. If the net value is an overstatement (i.e. > 0), *OVERSTATE_REPORT* = 1, and zero otherwise. *MAGNITUDE* is excluded in these models because the analysis is at the firm-year level. See Appendix 2 for variable definitions and Appendix 3 for the environmental and social subclassifications. Standard errors are in parentheses. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01, respectively.