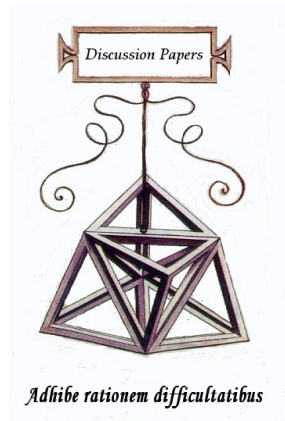


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## *Discussion Papers*

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*Davide Fiaschi - Elisa Giuliani – Nicola Salvati*

*The Challenge of Measuring Corporate Social Irresponsibility*

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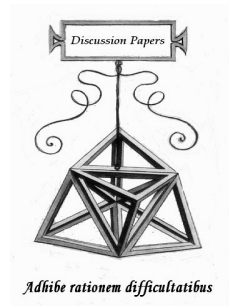
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Davide Fiaschi - Elisa Giuliani - Nicola Salvati

# The Challenge of Measuring Corporate Social Irresponsibility

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## Abstract

In this paper, we develop a family of indexes to measure the social irresponsibility of firms. We define corporate social irresponsibility (CSIR) on the basis of firms' alleged involvement in human rights abuses. After a critical appraisal of the existing CSIR raw data and measures/indexes, we take a M-quantile regression approach to develop a family of CSIR indexes that overcome the limitations of existing measures. We apply our methodology to a sample of 380 large publicly-listed firms, observed over the period 2004-2012. Our analysis develops a family of CSIR indexes robust to firms' media exposure, size and industry specificities, and provides a measure of their accuracy.

**Classificazione JEL:** C14; C21; O40; O50

**Keywords:** Corporate Social Irresponsibility (CSIR); M-quantile regression; CSIR index

*Contents*

<b>I. Introduction</b>	<b>3</b>
<b>II. A critical appraisal of existing CSIR raw data and measures</b>	<b>7</b>
II.A. CSIR raw data . . . . .	7
II.B. Concerns about CSIR raw data . . . . .	11
II.C. From CSIR raw data to CSIR indexes . . . . .	14
<b>III.A new family of CSIR indexes</b>	<b>15</b>
III.A.Desirable properties of CSIR raw data . . . . .	15
III.B.Desirable properties of CSIR indexes . . . . .	17
III.C.Using M-quantile models to measure CSIR . . . . .	20
<b>IV.Application</b>	<b>22</b>
IV.A.Data . . . . .	22
IV.B.Empirical results . . . . .	26
IV.B.i. The estimation of M-quantile regressions . . . . .	26
IV.B.ii.A Comparison Between the Different Types of CSIR Indexes . . . . .	27
IV.B.iiiIllustrative examples of firms' CSIR indexes . . . . .	28
IV.B.ivAssessing the statistical significance of the CSIR indexes . . . . .	30
IV.B.v.The persistence of irresponsibility . . . . .	30
<b>V. Conclusions</b>	<b>34</b>
<b>A M-quantile regression</b>	<b>42</b>
<b>B M-quantile regressions for <i>derogable, non-derogable, direct</i> and <i>indirect</i> abuses of human rights</b>	<b>43</b>

## ***I. Introduction***

In 2015, Volkswagen, such an extremely reputable and solid firm, was found to have been deceiving American regulators by manipulating data on emissions from diesel-engine cars, which were revealed to be much more polluting than the regulation allowed, and were shown to be abusing people's right to health. In the aftermath of the scandal, Volkswagen's reputation was considered to be "in tatters" (Economist, 2015), and the company's stock value fell abruptly, somewhat impacting negatively on the whole industry reputation. Like Volkswagen there are numerous other global companies whose legitimacy has put under pressure due to their corporate social irresponsibility (CSIR) - another case in point is the Apple-Foxconn scandal in 2011, among many others (The New York Times, 2012). Yet, while the value-destroying potential of CSIR is an important strategic concern for managers and analysts, very little advancement has so far been done in the measurement of CSIR.

In this paper, we provide a critical appraisal of some of the most widely used data and measures of CSIR and draw on some of their limitations to develop a new family of CSIR indexes. What motivates this research is, first, as anticipated above, the growing evidence of CSIR thanks to the heightened attention of the media, as well as NGOs and other organizations' tighter monitoring of corporate misconduct. Thus, cases like the Volkswagen and Apple-Foxconn scandals are just the tip of an iceberg. Second, therefore, we need to know more about the antecedents CSIR. Extant research has investigated CSIR in the past, but mostly with a view to understanding its consequences in terms of firms' reputational backlash, financial impacts, and consumer reactions (Groening and Kanuri, 2016; Carvalho et al., 2015; Antonetti and Maklan, 2014; Flammer, 2013; Janney and Gove, 2011; Minor, 2011). Research trying to understand the antecedents of CSIR is far less common (for notable exceptions, see: Fiaschi et al., 2016; Kang et al., 2016; Keig et al., 2015; Mishina et al., 2010; McKendall and Wagner, 1997; Strike et al., 2006; Baucus and Near, 1991) and therefore we need to know more about the factors that make CSIR most likely to manifest – not least because this may help preventing it. The third

motivation for this paper is that measurement of CSIR will allow to analyse the harmful impacts of firms on society at a large scale.

The measurement of CSIR is not an untapped issue (see, on a related subject, De Felice, 2015), but it is a very controversial one. To start with, it requires that we accept CSIR as a self-standing conceptual construct, which captures the extent to which a firm enacts a socially irresponsible business conduct. Yet the definition of irresponsible business conduct is not unambiguous (for a review, see Giuliani et al., 2013), as there is no unique frame of reference to discern what is irresponsible from what is not. Some scholars provide some definitions of irresponsibility, as e.g. “corporate actions that result in (potential) disadvantages and/or harm to other actors” (Lin-Hi and Müller, 2013, p. 1930) or as “the set of corporate actions that negatively affects an identifiable social stakeholder’s legitimate claims (in the long run)” (Strike et al., 2006, p. 852). Other scholars stretch their conception of irresponsibility to the notion of corporate misconduct (“the organizational pursuit of any action considered illegitimate from an ethical, regulatory, or legal standpoint”, Harris and Bromiley (2007, p. 351), or deviant organizational practices - i.e. deviation from normative standards, societal norms and expectations Sherman (1987); Vaughan (1999). Sometimes the notion of irresponsibility is declined in terms of corporate illegality or crime, defined, essentially, as violation to the rule of law (Daboub et al., 1995; McKendall and Wagner, 1997; Mishina et al., 2010). In other cases, scholars focus on very narrow CSIR issues, such as corruption, environmental crimes, or white-collar crimes.

In line with Giuliani et al. (2013), we conceptualize CSIR as human rights abuses in which a firm is involved, and we use the 1948 Universal Declaration of Human Rights (UNDHR) definition of human rights as inalienable fundamental rights to which a person is inherently entitled simply because she or he is a human being (Ruggie, 2008). We use universal human rights as the frame of reference for assessing CSIR because we consider it to have two key properties which are lacking in earlier CSIR conceptualizations: first, it is attached to a global institutional framework – the UNDHR, its subsequent covenants

and treaties, and the International Bill of Human Rights, which very tightly define what types of rights are worth protection and promotion, thus leaving very little leeway for ad hoc interpretations of irresponsibility (Giuliani et al., 2016); second, it is all-encompassing and does therefore not focus on only one set of very narrow issues. It covers issues such as labour rights (e.g. child labour, labour discrimination, union busting, among others); violations of local indigenous communities' rights to land and to life; violation of right to health among others. Hence, our definition of CSIR covers a very wide array of harmful impacts on human beings, spanning civil and political rights, socio-economic rights. Accordingly, a firm is more socially irresponsible, the more it is involved in violations of human rights, either through its own operations or, indirectly, through the complicity with third-party actors (e.g. suppliers, clients, government agencies, etc.) Note that this definition includes all instances where abuses of human rights have been allegedly perpetrated, irrespective of whether a lawsuit has been filed against the breaching firm. This is important, and marks a difference with respect to research on e.g. corporate illegality, because most business operations are nowadays in countries where the rule of law is weak and access to justice is all but to be taken for granted, which in turn means that hard law evidence is often unavailable (Scherer and Palazzo, 2011). To be on the safe side, we need also to clarify here that our notion of CSIR is that of a self-standing construct (in line with e.g. Chiu and Sharfman, 2016; Kang et al., 2016; Keig et al., 2015; Lin-Hi and Müller, 2013; Muller and Kraussl, 2011; Mattingly and Berman, 2006), as we reject the idea that a firm's failure to respect a negative duty (i.e. do no harm) can be compensated by a positive duty or action in favour of the affected (or other) constituencies – i.e. by being more socially responsible thorough the explicit adoption of corporate social responsibility (CSR) policies. This in turn means that we do not consider CSIR and CSR as “opposite ends of a continuum” (Jones et al., 2009, p. 305), and believe these should therefore be measured as two separate constructs.

Having clarified this, we now turn to the measurement of CSIR, which poses a number of further challenges. A problem, and one that was among the motivations for the

analysis reported in this article, is that the different conceptualizations of CSIR do also reflect in quite different measures of CSIR, whose validity has been poorly discussed so far (see e.g. Chatterji et al., 2015, for a critical discussion on CSR measures' convergent validity). For instance, many CSIR measures used in prior research are 'issue-specific', that is, they very narrowly focus on only one dimension or operation of the firm, neglecting others all-together. These include measures such as number of product defects, or recalled products (Zavyalova et al., 2012); measures of environmental damages (such as emissions, toxic releases, etc.; Chatterji and Toffel, 2010); or about lack of occupational safety and corruption or bribery (see Martin et al., 2007). We consider these indicators to inaccurately measure the socially irresponsible business conduct of a firm as a whole, because they lie on the assumption that irresponsibility in one dimension/operation is a good proxy of the overall irresponsible conduct of the firm. While assessing the external validity of these measures is beyond the scope of this article, we propose that measures of CSIR should not be too issue-specific, on the grounds that failure to consider all facets of the construct will lead to the exclusion of relevant information (Diamantopoulos and Winklhofer, 2001). We do therefore focus our discussion solely on measures of CSIR that are not issue-specific (hereinafter CSIR measures). By the same token, we consider that CSIR measured using exclusively evidence from lawsuits and legal procedures may have little value, if the focus of analysis involves countries with weak rule of law and poorly-functioning judicial systems. Hence, we consider allegations of human rights abuses as key raw data in the development of CSIR measures.

The remainder of this paper is organized as follows. In Section II., we provide a critical appraisal of existing CSIR measures. To do so, we discuss two dimensions: first, the characteristics and quality of the 'raw data' used to develop CSIR measures/indexes. By raw data we mean the basic information and material used to inform the construction of a CSIR measure or index – e.g. what type of information is used, whether and how it is subject to codification, how many issues are covered etc. Second, we discuss how the raw data have been used to construct CSIR measures/indexes. With this aim we compare



some of the key and widely used CSIR data sources: the first three - MSCI KLD (formerly Kinder, Lydenberg, Domini Research and Analytics); Asset4 (Thomson Reuters); Sustainalytics - are provided by private companies that elaborate and sell Environmental, Social and Governance (ESG) firm-level indicators, while the fourth source is the Corporate Human Rights Benchmark (CHRB), developed through the CHRB Steering Committee, composed of Aviva Investors, Business and Human Rights Resource Centre (BHRRC), Calvert Investments, Institute for Human Rights and Business (IHRB), VBDO and Vigeo Eiris. We conclude this section by identifying the key challenges about CSIR measurement and the desirable properties of a CSIR measure/index. In Section III. we describe how a family of CSIR indexes can be derived from M-quantile regression (Breckling and Chambers, 1988; Kokic et al., 1997), while in Section IV. we apply this methodological approach to a sample of large publicly-listed firms from both advanced and emerging countries, and develop a family of CSIR indexes for our sample of firms. Section V. concludes.

## *II. A critical appraisal of existing CSIR raw data and measures*

### **II.A. CSIR raw data**

Table 1 provides an overview of the characteristics of the CSIR raw data sources that we have scrutinized. We focus first on MSCI KLD, because it represents the CSIR data source with more longevity and that is mostly used in academic research. First launched in 1990 for a set of U.S. firms, it has now reached a global coverage of more than 8800 publicly-listed firms. For each of these firms, the MSCI KLD database provides a total of 82 different items – called “concerns” – that cover seven different thematic areas (community, corporate governance, diversity, employee relations, environment, human rights, product) and that signal the presence of negative impacts the company has generated on different constituencies, through its activities. Each of the 82 items is coded as 0 or 1 depending on whether that particular concern is present in a particular year. Each year MSCI KLD releases a new version of the dataset so the data are available over time

for each year since at least 1990 (times series vary according to the sample). Note also that in 2009 KLD started to provide detailed firm-level reports in a different platform (KLD Global Socrates) which offered details on the controversies in which the firms in the sample was been involved, although it is currently unclear whether this platform has been discontinued after KLD has been acquired by MSCI in 2011.

Asset4 covers a large sample of publicly listed firms across different countries (approximately 5000), and for each firm it provides yearly a score for 266 Key Performance Indicators (KPI) on ESG issues. Twenty KPIs focus on “controversies” (i.e. controversy-related KPI) the firm is allegedly involved in with reference to ten areas (client loyalty, community, compensation policy, diversity and opportunity, employment quality, health and safety, human rights, product responsibility, resource reduction, shareholder loyalty). Each controversy-related KPI is either given a raw score of 0 (absent) - 1 (present) or, a rating that adjusts the normalized raw scores to skewness, differential between the mean and the median calculated among industry, regional or universal peers (depending of the KPI considered), and constraints the distribution to a normal curve,<sup>1</sup> delivering a rating that ranges from 0 (less irresponsible) to 100 (more irresponsible). Each controversy-related KPI is based on a question, which is mostly phrased as follows “*Is the company under the spotlight of the media because of a controversy linked to . . .*.” No further information is offered on the actual controversies in terms of when and where they took place, or on how many such controversies are there under each controversy-related KPI.

Sustainalytics also develops a dataset that contains raw data about CSIR. For a sample of approximately 3500 publicly listed firms, it provides a “controversy” indicator for ten thematic topics (business ethics, governance, public policy, employee, contractors and supply chain, customer, society and community, operations, product and services). Each indicator is measured on a 0 to 100 scale, depending on the impact that the controversy is deemed to generate on both the impacted constituencies and the company’s own operations, given by Sustainalytics’ analysts. Hence, for instance, a score of 100 is given

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<sup>1</sup>See <http://financial.thomsonreuters.com/content/dam/openweb/documents/pdf/tr-com-financial/methodology/corporate-responsibility-ratings.pdf>, last accessed 7 June 2016.

when there are “minor controversies”. A score of 50 is given to “serious controversies with significant impact on stakeholders but not a structural issue of the company”. A score of 0 is given when the company has committed “complicit violations of human rights, most serious forms of corruption, most serious environmental crimes”. Sustainalytics also provides subscribers of their dataset with “controversy reports” that describe in depth the nature of the controversies – e.g. when and where they took place, whether there were lawsuits and what were their results, which were the damages caused etc.

Finally, the CHRB is a very recent but very relevant project, with a specific interest in measuring the human rights conduct of firms. The project has recently released its methodology (CHRB Pilot Methodology 2016)<sup>2</sup> and it aims at measuring the human rights performance of a sample of the 500 largest global publicly-listed firms covering three industries (agricultural products, extractive and apparel). The CHRB covers six themes (governance and policy commitments; embedding respect and human rights due diligence; remedies and grievance mechanisms; companies human rights practices; companies responses to serious allegations; transparency). The theme “company response to serious allegations” is the one that focuses on companies’ serious allegations of human rights, which include child labour; forced labour; discrimination; freedom of association and collective bargaining; working hours; health and safety; right to security of persons including, freedom from torture, cruel inhumane or degrading treatment; land rights including forced displacement; indigenous peoples rights; environmental damage leading to water, land or air harmful to human health or negative impacts on livelihoods. For each serious allegation the CHRB assigns a value on a 0 to 8 scale to each company considered in their dataset depending on the seriousness of the abuses but also on how well the firm has responded to the abuses (e.g. by providing immediate remedy etc.) Each serious allegation is considered if it has taken place up to three year prior to the rating.

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<sup>2</sup>See [https://business-humanrights.org/sites/default/files/CHRB\\_report\\_06\\_singles.pdf](https://business-humanrights.org/sites/default/files/CHRB_report_06_singles.pdf).

Source	Starting year	Geographical coverage	Number of firms	Sectoral coverage	Raw data	Type of controversies covered	CSIR Index
MSCI KLD	1990	Global	8800+	Alcohol, Nuclear Power, Civilian Firearms, Adult Entertainment, Genetically Modified Organisms excluded since 2002	82 "Concerns", measured as dummy variable (0; 1)	Community; Corporate Governance; Diversity; Employee relations; Environment; Human Rights; Product	Sum of number of "Concerns" reported each year (e.g. Keig et al., 2015; Chiu and Sharfman, 2016; Kang et al., 2016)
Asset4 (Thomson Reuters)	2002	Global	5000+	No exclusion based on industries	20 "Controversy" KPI measured as dummy variable (0; 1) and as scores (0-100)	Client Loyalty; Community Compensation Policy; Diversity and Opportunity; Employment Quality; Health & Safety; Human Rights (child labour, human rights in general, freedom of association) Product Responsibility; Resource Reduction; Shareholder Loyalty	Not available as CSIR index.
Sustainalytics	2009	Global	3500	No exclusion based on industries, controversial industries are rated	10 topics, 1 "Controversy" indicator each (measured on a scale 0-100). Controversy Reports for each firm available	Business Ethics; Governance; Public Policy; Employee Contractors & Supply Chain; Customer; Society & Community; Operations; Contractors & Supply Chain; Products & Services	1-5 controversy index.
CHRB	2016	Global	500	Three sectors included: agricultural products, apparel, extractive industries	"Company response to serious allegations" Measured on a 0-8 or 0-100 scale	Child Labour; Forced Labour; Discrimination; Freedom of Association and Collective Bargaining; Working Hours; Health and Safety; Right to security of persons including freedom from torture, cruel inhumane or degrading treatment; Land rights including forced displacement; Indigenous peoples rights; Environmental damage leading to water, land or air harmful to human health or negative impacts on livelihoods.	Not available as stand-alone negative human rights impact indicator.

Table 1: List of existing CSIR raw data and measures

## II.B. Concerns about CSIR raw data

The raw data discussed in the earlier section are of great value as analysts scan through numerous public sources at local and international scales to filter reliable evidence of firms' alleged involvement in irresponsible business conducts – defined in terms of concerns (MSCI KLD), controversies (Asset4 and Sustainalytics) and serious human rights abuses (CHRB). Nevertheless, each of these raw data present some critical issues that deserve careful consideration. In particular, we notice four key shortcomings that characterize either one or more of these raw data, namely: (a) temporal inconsistency; (b) lack of details about controversies; (c) recent global coverage; (d) ad hoc and/or poorly transparent scoring systems.

- a *Temporal inconsistency between the year of actual irresponsible business conduct and the year of rating.*

All sources provide the CSIR raw data on an yearly basis – except for CHRB which has not yet released the data. Yet, concerns or controversies' scores do not always allow to identify when the irresponsible business conduct has taken place (i.e. in which year(s)). One of the problems is that some of these scores are given on the basis of the year in which the alleged irresponsible conduct has been sanctioned (i.e. via a fine, or a judicial process, etc.), which may differ the year in which the irresponsible conduct did actually take place. For instance, in the case of MSCI KLD, the controversy concerning “Health and Safety concerns” is phrased as: “the company recently has either *paid substantial fines or civil penalties* for wilful violations of employee health and safety standards, or *has been otherwise involved* in major health and safety controversies”, which does not allow to disambiguate the year of occurrence of the irresponsible event, from the year in which it was actually fined or sanctioned. This problem arises with reference to numerous other items. Similarly, Asset4 codifies controversies as occurring in a year, if the firm is considered “*to be under the spotlight of the media*” for a particular year, which tells very little on when the controversy started and for how long it lasted. Asset4 does not

provide further evidence that allow to better qualify the temporal dimension of the controversies. A similar problem is observed in CHRB where human rights abuses are planned to be accounted for in a given year if they have occurred in within the previous three years from the start date of the annual CHRB research period – with the temporal window being potentially extended to more years in the case of if renewed allegations arise in connection with the original allegation. In contrast, Sustainalytics’ controversy reports provide more in-depth qualitative information on the controversies, which means that they can be used as raw data for CSIR, provided that their content is analyzed and validated further, while relying on the scores may pose the same challenges of other CSIR raw data sources.

b *Lack of details about the controversies.*

Not all sources provide detailed information about the controversies, in terms of where they have occurred, which were exactly the constituencies affected by the irresponsible business conduct and when this occurred. As said, “controversy reports” are available with Sustainalytics, and evidence of human rights abuses can be possibly be retrieved by the Business and Human Rights Resource Centre, which is the primer source for CHRB, while neither Asset4, nor MSCI KLD appear to provide detailed information on the controversies.

c *Relatively recent ‘global coverage’.*

While KLD exists since 1990 for a sample of 400 U.S. companies, global coverage of the CSIR scores is more recent. For instance, firms from emerging markets have become monitored only in recent years by both Sustainalytics and MSCI KLD.

d *Ad hoc and poorly transparent scoring of irresponsibility.*

Each concern, controversy or serious human rights abuse’s item receives a score, which each data provider measures following a different (often proprietary) methodological approach. For instance, in Sustainalytics, each of the ten controversy items receives a score that ranges from 0 to 100, which is attributed by analysts consid-

ering a number of issues such as the impact on stakeholders, the level of recurrence of the controversy, the magnitude of the controversy relative to industry peers, and the risks generated by the controversy to firms' reputation and financial, legal and operational issues, among others. Hence, in this case, the raw scores include also the potential negative impacts on the firm's own interests, which means that the same kind of controversy can result in a different score depending on how much resilient is the firm to the reputational or other damages. Also, the way in which the analysts melt together all these criteria and come up with a number is not entirely transparent. Similarly, CHRB follows a very complex procedure to assign scores for irresponsible conduct such that firms without any serious allegations will receive the full score (8 points). If a firm has at least a serious allegation, its response to it is assessed and scored on a 0-8 basis and each score is weighted differently depending on the number of allegations classified as "1", "2", "3 or more". The final score results in the weighted sum of the assessed scores, and it is measured on a 0-100 per cent scale, where 100 per cent is intended as the least irresponsible business conduct. Note, that also in this case what is evaluated is not the irresponsible conduct per se, but also how the firm has responded to it in terms of providing remedy. Hence, if a firm promptly provides support to the victims of its misconduct, it will result in a higher score. Asset4, in contrast, has a very transparent mathematical procedure to transform the raw score into a 0-100 rating, and it also provides percentile ranks. However, the rationale for the mathematical transformation is less clear cut. MSCI KLD provides dichotomous data (0;1) for the concerns and does not produce any transformation of the raw data into scores. While this avoids cumbersome and poorly transparent transformation of raw data into scores, it has the limit of treating all concerns as being equally 'serious'.

### II.C. From CSIR raw data to CSIR indexes

The scores attributed to each of the concerns, controversy, or human right abuses' items can be used as an input to develop firm-level CSIR measures. For instance, according to each firms' raw data scores, Sustainalytics classifies their level of involvement in controversies on a early basis, using a 1-5 scale where 5 corresponds to the firms' involvement in an event that has severe impact on the environment and society, posing serious risks to the company; while 1 is given to firms whose involvement in a controversial event has low impact on on the environment and society, posing negligible risks to the company. The other CSIR raw data providers analysed here do generally not develop self-standing CSIR indexes, but, rather, construct corporate social performance (CSP) indexes, where both positive and negative environmental, social and governance (ESG) scores of firms are accounted for.<sup>3</sup>

Some academic work has used the raw data available at (MSCI) KLD to build their own CSIR indexes. The most common approach has been that of summing up the scores for the concerns items and then use a standardized measure of the sum of scores. This kind of CSIR measure has been described by prior work, as being a formative index (see e.g. Strike et al., 2006). Formative measurement is relevant for dealing with organizational constructs, and formative indexes are conceived as "explanatory combinations of indicators that are determined by a combination of variables" (Diamantopoulos and Win-klhofer, 2001). Such constructs are measured by a latent variable that is a function of multiple variables, which reflect dimensions that are expected to contribute to the formation of the latent variable (construct). In the case of CSIR, these dimensions are captured by the different areas where firms may enact an irresponsible business conduct, spanning different operational areas or functions; involving different types of stakeholders (employees, indigenous communities, communities in general, clients, etc.) and, consequently, generating different types of impacts on the affected constituencies (violation of workers' rights, right to life, right to health, right to land, etc.). These dimensions need not to

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<sup>3</sup>We do not enter here into the discussion of the overall notion of CSP and its measurement. The interested reader can refer to Wood (2010).



be internally consistent - because some firms may infringe on certain rights but not on others - but all these dimensions need to be accounted for as omitting one of them, means omitting part of the construct.

Earlier studies have used firm-level CSIR measures as formative indexes, though not always they have called them as such (see, e.g., Chiu and Sharfman, 2016; Kang et al., 2016; Keig et al., 2015). While widely employed in academic research, these indexes have been rarely subject to external validation. Recently, scholars have tried to assess the convergent validity with reference to CSP indexes (see Chatterji et al., 2015), finding poor convergence. While a convergent validity for CSIR indexes is beyond the scope of this paper, we note that the convergence and external validity of these measures requires that (i) they use comparable or homogeneous CSIR raw data and (ii) they use similar methodologies to derive scores and CSIR indexes. As we have seen in this section for a set of CSIR data and measures, none of the two requirements are met, which casts doubts on the meaningfulness of such validations. Rather, it seems that one more fruitful avenue of research is that of developing a new CSIR index that attempts to overcome the limitations of existing CSIR raw data and indexes.

### ***III. A new family of CSIR indexes***

#### **III.A. Desirable properties of CSIR raw data**

In Section II.B., we have expressed some reservations about the existing CSIR raw data. We now discuss some of the desirable properties of CSIR raw data.

One first important dimension to consider is the accuracy with which the irresponsible event associated to a given firm has been coded in time. It is crucial - especially for those who aim at conducting longitudinal analyses - that instances of irresponsible business conduct are codified according to the year(s) in which they allegedly *occurred*, rather than in the year(s) in which they were sanctioned or reported - unless these years coincide. Having an accurate codification of the year(s) in which an irresponsible business conduct has occurred is necessary for analyses that attempt to predict CSIR or to observe its

trends over time. If an irresponsible business conduct spans several years, it should be coded accordingly. We acknowledge that finding accurate evidence of when an abusing event is considered to have started and/or ended is sometimes hard, but it is fundamental that all available and reliable information is scrutinized to that purpose.

Consequently, our second consideration concerns the need to rely on sufficient information about each controversy or irresponsible event. News, as well as NGO reports and information from other sources should be validated, stored and codified. In-depth qualitative information on the irresponsible conduct allows the codification of irresponsible event(s) according to their qualities - not just in terms of the stakeholders affected, but, especially, in terms of how *seriously* they have negatively impacted the affected stakeholders; or in terms of the degree of involvement of the focal firm, especially whether the firm is directly involved in the allegations via its own operations, or indirectly by the operations of third-party actors (suppliers, clients, government agencies, etc.). Distinguishing abuses based on how severe their negative impacts are on the affected constituencies is important because some abuses are far more devastating and long-lasting than others. To this end, Giuliani et al. (2013) use an international law framework to distinguish between *non-derogable* and *derogable* human rights abuses. The former refer to abuses which represent the breaching of international norms to which the international community affords a particular degree of protection and include cases such as arbitrary deprivation of life, torture, slavery, the worst forms of child labour and forced labour. The latter include less grave human rights abuses, such as e.g. discrimination at work; violations of the right to health, union busting, among many others. A further qualitative distinction concerns the degree of involvement of the firm in the abuses. As Whiteman and Cooper (2016) rightly argue, abuses of human rights are not always *directly* attributable to a firm, that is, to the operations conducted directly by its divisions, branches or subsidiaries. Abuses are sometimes the result of multi-party activities, hence a firm may be found complicit in abuses perpetrated by third-party actors such as clients, suppliers or even governments. Hence, firms may be involved in abuses of human rights only *indirectly*.<sup>4</sup> Accounting for

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<sup>4</sup>Note that indirect involvement in abuse of human rights does not make firms less irresponsible. Under

these differences - i.e. *derogable* vs. *non-derogable*, *direct* vs *indirect* abuses - allows to have an accurate codification of the CSIR raw data according to its quality.

Third, it is desirable that the codification of CSIR raw data is undertaken year by year, and it covers firms from all continents, especially the largest multinational enterprises (MNEs), that are more easily monitored and scrutinized by the press and NGOs for any misconduct. Finally, we believe that the CSIR raw data should not be subject to alterations - i.e. scoring of individual items via ad hoc manipulations. We understand that ESG data providers like MSCI, Sustainalytics or Thomson Reuters elaborate scores that are appealing to investors, who use them to orient their responsible investment strategies. However, such alterations may run the risk of artificially modifying the quality of the variables used to develop the CSIR latent construct. Hence, it is desirable that the CSIR raw data consist in simple yearly count of the irresponsible events in which the focal firms is allegedly involved in, and that such raw data are codified separately also according to their qualities (e.g. seriousness of the event, direct vs. indirect abuses of human rights etc).

### III.B. Desirable properties of CSIR indexes

In Section II.C., we mentioned that the existing firm-level CSIR measures are often classified as formative indexes, and we largely concur with this view. Ideally, such an index would assume values in a limited range, say  $[0, 1]$ , as to allow the comparison across firms in meaningful way. In particular, a CSIR index with this quality is adequate to measure the a firm's *intensity* to be involved in CSIR events relative to the other firms in its universe or sample. The use of an index defined in the range  $[0, 1]$  also allows for comparison across time under the assumption of no time trend.

Next, we posit that the development of a CSIR index should take into due account that: (a) firms are not equally monitored by the press, NGOs and watchdog organizations (also over time); (b) firms' scale is likely to affect the probability that a firm is involved

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the United Nations Guiding Principles, firms are also responsible for their indirect abuses, see Principle 13.

in individual irresponsible events, not the degree to which it is irresponsible *per se*, and (c) firms belonging to different industries are differently exposed to irresponsibility.

a *Accounting for the heterogeneous chances of being in the spotlight of the media and NGOs' scrutiny.*

All sources of CSIR raw data, inclusive those of ESG data providers, rely on publicly available information, and therefore on the material made public by local and international NGOs, watchdog organizations, press releases and news available about the focal firm in each of the observed years. These sources are subject to scrutiny to assess their reliability, and therefore select out blind attacks to firms, inconsistent information and false allegations. When using these CSIR raw data to develop a CSIR index, earlier research has, by and large, assumed that the information about allegations was available homogeneously for all firms in their samples. However, firms are not equally in the spotlight of the press or NGOs, and therefore an index of CSIR should at minimum control for the different propensities that any irresponsible conduct connected to a focal firm is monitored and reported. Conceptually, this argument relies on the notion that countries differ one another in their capacity to ensure speech and press freedom, as well as to allow for the independent work of NGOs within their territories (Kaufmann et al., 2009). This in turn means that companies that originate, and/or have most of their investments and operations in countries characterized by low speech and press freedom and that severely constrain the activities of NGOs, are less likely to be monitored, and their irresponsible conduct less likely to be reported, as compared to firms whose origins or operations are mainly in countries that protect the right to free speech and free press. Also, even within the same country or institutional context, firms are differently monitored, as their monitoring depends on firm-specific events. This is also another aspect that influences the quality of the raw CSIR data, which should be taken into account in the development of a CSIR index.

b. *Accounting for the scale of the firm's operations.*

A second important aspect that may be important to take into account when developing a CSIR index is that firms are heterogeneous in terms of the scale of their operations: some firms are bigger than others – i.e. have more subsidiaries, suppliers, employees, etc. When a firm is big, or it is a MNE having operations in different countries, its chances of being involved in an irresponsible event are higher because, as Strike et al. (2006) put it: "MNEs may act irresponsibly, not out of malice or ill will, but because they have to stretch their resources and capabilities in order to coordinate and monitor subsidiaries." (p. 853) In line with this, our argument is that the chances of a firm being involved in an irresponsible event are bound to increase with the scale of the firms' operations, not because the firm is more evil or irresponsible, but because the higher number of operations may come with a higher number of opportunities for controversies. Hence, a scale-neutral CSIR index may be helpful to scholars who are interested in knowing how much a firm is irresponsible, irrespective of its size.

*c Accounting for the industry of the firm.*

Finally, a CSIR index may take into account also industry specificity. Based on the notion of materiality put forward by environmental sociologists (for a discussion, see Dougherty and Olsen, 2014), we consider that firms in some industries are more exposed to abuses of human rights or violations because of the inherent characteristics of the industry itself. For instance, the extractive and oil industry are seen as being particularly problematic for the almost unavoidable harmful impacts that these activities generate on the local context where they take place. Hence, industry specificity should be controlled for when developing a CSIR index.

We note that while most of the existing CSIR measures do neither account for the media exposure of firms, nor for their size, they do often adjust the raw data scores to industry averages. By conditioning the evidence of firm's involvement in CSIR events to one or more of these three dimensions (firm's media exposure, scale and industry), we thus expect to increase the fit between the CSIR index that we observe, and the latent construct we

are interested at measuring (i.e. firm-level CSIR).

Hence, to sum up, we would recommend a CSIR index to have the following properties:

- use as CSIR raw data the simple count of abuses firm  $j$  is allegedly involved in at time  $t$ ;
- assume values in a limited range (e.g.  $[0, 1]$ ), as to allow comparability across time and space for a given universe or sample of firms;
- to be robust to possible adverse/favourable firm-level characteristics that may influence a firm's odds of being *reported* as behaving irresponsibly, or/and to be scale and industry neutral.

### III.C. Using M-quantile models to measure CSIR

We use a M-quantile regression approach to derive the proposed CSIR indexes. M-quantile regression provides a ‘quantile-like’ generalization of regression (Breckling and Chambers, 1988). While the standard M-quantile regression requires continuous dependent variables, it becomes a challenge when we count on discrete dependent variables – as in our case. In fact, the basic information for the calculation of the CSIR indexes is  $y_{it}$ , measured as the number of alleged CSIR events firm  $j$  is involved in at period  $t$ . To account for this, we follow the most popular approach, by assuming that the response variable follows a Poisson distribution, and using the logarithm as link function. In particular, Tzavidis et al. (2016) propose the log-linear specification for count data, i.e.

$$MQ_y(\tau|\mathbf{x}_j; \psi) = t_j \exp(\mathbf{x}_j^T \mathbf{beta}_\tau), \quad (1)$$

where  $t_j$  is an offset term,  $\mathbf{x}_j$  is the vector of covariates for firm  $j$ ,  $j = 1, \dots, n$ ,  $\mathbf{beta}_\tau$  is the vector  $p \times 1$  of regression coefficients and  $\psi$  function is introduced to control deviation in  $y$ -space. For estimating  $\mathbf{beta}_\tau$ , Tzavidis et al. (2016) consider extensions of the robust version of the estimating equations for GLMs by Cantoni and Ronchetti (2001) to the M-quantile case. For more details we refer to Tzavidis et al. (2016) and to Appendix

A. The fitted value for each firm of a M-quantile regression consists in a parameter  $\tau$ , taking values between 0 and 1;  $\tau$  indicates the quantile of the distribution of  $y_{it}$  each firm is estimated to belong to, conditioned to the firm-level variables included in the M-quantile regression – in our case, variables that account for firms’ media exposure, scale and industry (see Section III.A.).

In the limiting case where only the intercept is included in the regression,  $\tau$  indicates the quantile of the *observed* distribution of reported abuses a firm belongs to; for example, a value of  $\tau=0.9$  for a firm indicates that the firm belongs to top 10 per cent of the distribution of reported abuses. We estimate a  $\tau$  for each firm and in each year included in the sample, and consider both the whole time series of the CSIR index, and its time average for each firm, the latter taken as a average behaviour of the firm in the period.

In a bid to clarify our approach, we provide an illustrative simplified example (Figure 1). We denote by  $x$  the firms’ characteristics which are considered to be significant for the explanation of CSIR (i.e. variables that measure the media exposure, scale and industry of the firm). A standard linear regression model can provide an estimate of the *expected* CSIR conduct of the firm conditioned to its characteristics, i.e.  $\hat{y} = E[y|x]$ . In other words  $\hat{y}$  summarises the *average CSIR conduct* of  $y$  given  $x$ .

The figure reports the simplest case where only one firm characteristics  $x$  is considered, which positively affects the firms’ CSIR in a linear fashion. The bold line in the figure corresponds to the linear regression of  $y$  on  $x$ , i.e. in term of quantile regression to the  $\tau = 0.5$ -th quantile. We also report some of the estimated quantiles for each level of  $x$  (in particular  $\tau \in \{0.1, 0.25, 0.5, 0.75, 0.9\}$ ). In each quantile we observe the same relationship between  $y$  and  $x$  (the slope of dashed lines are the same) but a different intercept. Firm  $A$  in the figure is involved in a lower number of CSIR events than firm  $B$ , but given  $x_A$  and  $x_B$ , the estimated quantile regression indicates that firm  $A$  belongs to  $\tau = 0.9$ -th quantile (i.e. to the 90% percentile of distribution of CSIR behaviour), while firm  $B$  belongs to  $\tau = 0.25$ -th quantile. Therefore, the value of the CSIR index for firm  $A$  will be 0.9 and equal to 0.25 for firm  $B$ . Hence, although firm  $B$  has a higher number of reported human

rights abuses than firm  $A$ , *conditioned* to firms' characteristics  $x$ , firm  $B$  turns out to have a lower value of the CSIR index – i.e. being less irresponsible than firm  $A$ .

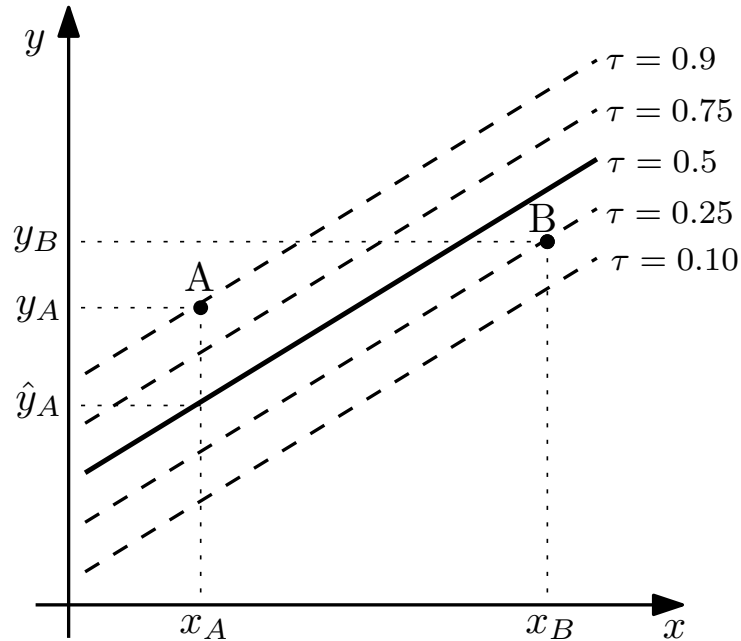


Figure 1: The estimate of an index of CSIR by a quantile regression

The proposed M-quantile regression approach provides us with a CSIR index that satisfies the desirable properties discussed in Section III.B., with 0 and 1 indicating lower and upper boundaries of the CSIR conduct.

#### IV. Application

##### IV.A. Data

Our sample comprises a total of 380 firms, ranked by Forbes Global 2000 (2012 Edition) as the largest public companies in their respective countries. The dataset has global coverage including firms 245 firms from emerging economies (i.e. Brazil, China, India, Indonesia, Malaysia, Mexico, Russia and South Africa) and 135 firms from advanced economies (i.e. U.S., Europe, Japan and South Korea).<sup>5</sup>

<sup>5</sup>Both samples are selected using a stratified sampling with equal allocation. The allocation is done by industry in the case of advanced country firms and by country of origin in the case of emerging country firms. Descriptive statistics on the sample are available upon request.



We have retrieved the CSIR raw data through the Business and Human Rights Resource Centre (BHRRC), considered the world’s leading independent information hub on the positive and negative impacts exerted by corporations on human rights, which is the key data source for CHRB.<sup>6</sup> The BHRRC has offices in London and New York and relies on the efforts of regional researchers based in Africa, Asia, Eastern Europe, and Latin America, who interact with local NGOs and gather information in the field. The BHRRC database covers the social and environmental impacts of over 5,000 companies, operating in over 180 countries. Taking international human rights standards as its starting point, the topics covered include discrimination, environment, poverty and development, labour, access to medicines, health and safety, security, and trade. BHRRC researchers collect news and reports relating to business and human rights from the web and other sources, on a day-to-day basis, paying attention to sources across the world including local newspapers and reports produced by large and small NGOs. News, reports, and events focusing on the relations between the activities of companies and human rights are examined, and subject to a minimum criterion of credibility (therefore excluding blind attacks on companies) are published on the BHRRC website. They highlight the impact of business on human beings (news on the protection of an endangered species but with no clear connection to an impact on human rights is not published).

We used this information source to search for alleged human rights abuses connected to the firms in our sample. It resulted in over 3500 documents including news and reports providing evidence of “events” of negative human rights impacts. We identify events involving the firms in our sample, related to different types of abuses of human rights (or CSIR events). We codified the information on individual CSIR events into a dataset which includes the following items:

- a. a unique code for each separate CSIR event reported by our data sources (event);
- b. a firm level code associated with each event code;

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<sup>6</sup>For a parallel project using this source, see the Corporations and Human Rights Database <http://chrdproject.com/index.html>.

- c. a brief description of the event – e.g. “company resettled 717 households in order to develop a mine in Mozambique’s Cateje, Moatize district”;
- d. year(s) in which the event took place, including for each event, the year in which the event is known to have started and the year in which it is considered to have ceased;
- e. a codification of the characteristics of the abusing event, by distinguishing between derogable and non-derogable abuses, and between direct and indirect abuses;
- f. the year in which the event was first denounced or reported;
- g. a unique code for the document(s) reporting evidence of the abuse(s). These document(s) contain full news or reports of the abuse(s), are stored separately, and are available for consultation. Two different coders read the BHRRC and Sustainability material and checked it for its inclusion, accuracy and completeness in the dataset. Once the information was codified in the dataset, a business and human rights expert checked the events to ensure there were no errors or ambiguities in the events reported, and to check accurate coding of abuses. Data on CSIR events were collected for 1990 to 2014.

CSIR  $i$  at period  $t$  is denoted by  $y_{it}$ , and it is measured by the number of reported human rights abuses, referred to firm  $j$  at period  $t$ . Each CSIR event captures a different type of human right violation in which the firm is involved in each year (e.g. if at time  $t$ , the firm is found abusing labour rights in one of its plants, and in the same year, there is evidence of it violating indigenous communities right to land, the CSIR value for this particular firm at time  $t$  would be 2). Each single event is counted yearly as 1, whether it occurs in one particular year only, or extends across more than a year (e.g. a firm poisoning the environment and violating the right to health of local residents over several years). In this case, we count this multi-year event as 1 for each year in which it occurs.

As a baseline, we condition the number of CSIR events to a constant and time dummies. This allows to calculate an *unconditioned index of CSIR* (hereinafter *UNCOND-*

*CSIR*), which will be used as benchmark for the other types of CSIR indexes.

Given this benchmark, we propose three sets of conditioning variables:

- *MEC-CSIR index*: ‘Media exposure’ variables should take into account that firms are not equally monitored by press organizations and NGOs (referred to as ‘media exposure-conditioned’ CSIR in Section III.B.). This index is suitable for scholars who are interested in an index of CSIR that is robust to the different firm-level exposure to the media and other means of communication. In particular, to measure media exposure we use: (i) information retrieved in Lexis Nexis (News section) and computed as the log of the ratio between the number of news items/articles mentioning firm  $j$  at time  $t$ , and the total number of articles mentioning any of our sample firms at time  $t$ ; (ii) the level of ‘voice and accountability’ of the firm’s home country (based on the World Bank Global Governance “Voice and Accountability” indicator) and (iii) the ‘voice and accountability’ of the host countries where the firm has foreign direct investments (FDI). FDI data have been retrieved by FDI Markets, Zephyr and SDC Platinum data.
- *MESC-CSIR index*: ‘Scale effect’ variables should take into account that a firm appears as socially irresponsible also for its scale of activity, as the bigger the operations and global reach of the firm, the more it is likely to be involved in CSIR events (referred to as ‘media exposure and scale-conditioned’ CSIR). This index is also robust to the size of the firm. In particular, to measure scale effect we use: (i) firm’s size, proxied by the log of the number of workers in each year and (ii) firms’ internationalization, a quantitative indicator to measure the number of different countries in which the firm invested in each year.
- *MESIC-CSIR index*: ‘Industry’ variables should take into account that certain industries possess characteristics that make their operations more likely involved in corporate misconduct. This index (referred to as ‘media exposure, scale and industry-conditioned’) is interesting for scholars who have an interest in comparing

the CSIR conduct of firms across industries. In particular, to measure industry effect we draw on Giuliani and Macchi (2014) and Wright (2008) to identify groups of industries that are relatively homogeneous in terms of their firms' risk of being involved in human rights abuses. The reference group (Industry I dummy) include firms in the extractive industries (Oil, Mining and Steel), the second group (Industry II dummy) includes Retail, Banking, Chemicals and Pharmaceuticals, and the third group (Industry III dummy) includes Cosmetics, Pulp and Paper, Aerospace, Heavy Industry, Telecommunications (TLC), Food and Beverages, Electricity and other Utilities, Real Estate.

The current analysis covers the period 2004-2012.

#### IV.B. Empirical results

In this section we first show the results of the M-quantile regressions, and the contribution of each conditioning variable to CSIR at the different quantiles (Section IV.B.i.). Second, based on the results of the M-quantile regression we provide a comparative analysis of the three indexes (MEC-CSIR, MESC-CSIR and MESIC-CSIR), and some illustrative examples (Section IV.B.ii. and IV.B.iii.). In Section IV.B.iv., we undertake an analysis of the statistical reliability of our CSIR indexes by means of a bootstrap analysis. Finally, we briefly analyse the CSIR indexes' dynamics over time (Section IV.B.v.).

##### *IV.B.i. The estimation of M-quantile regressions*

Table 2 presents the results of the M-quantile regressions. With the exception of *Internationalization*, which at the  $\tau = 0.1$ -th quantile is significant only at 10% confidence level, the remaining variables are all significant at 1% confidence level and, based on extant research, they display the expected signs. We find a concave effect of the conditioning variable *Media Exposure* on CSIR, which suggests us to include in the regression also a square term for this variable.

We do find a difference to exist between advanced and emerging country firms, but

	$\tau = 0.10$		$\tau = 0.25$		$\tau = 0.50$		$\tau = 0.75$		$\tau = 0.90$	
	<i>Estimate</i>	<i>p-value</i>	<i>Estimate</i>	<i>p-value</i>	<i>Estimate</i>	<i>p-value</i>	<i>Estimate</i>	<i>p-value</i>	<i>Estimate</i>	<i>p-value</i>
Intercept	-7.34	0.00	-5.80	0.00	-4.75	0.00	-3.86	0.00	-3.31	0.00
Media Exposure	8.73	0.00	7.02	0.00	5.35	0.00	4.00	0.00	3.16	0.00
Media Exposure <sup>2</sup>	-5.67	0.00	-4.91	0.00	-3.98	0.00	-3.02	0.00	-2.38	0.00
VA home country	0.65	0.01	0.44	0.00	0.40	0.00	0.31	0.00	0.23	0.00
VA host	0.29	0.01	0.25	0.00	0.16	0.00	0.08	0.00	0.04	0.03
Firm Size	0.20	0.00	0.23	0.00	0.29	0.00	0.32	0.00	0.34	0.00
Internationalization	0.86	0.10	0.88	0.01	0.69	0.00	0.74	0.00	0.86	0.00
Sector group 1	-0.40	0.06	-0.70	0.00	-0.78	0.00	-0.67	0.00	-0.47	0.00
Sector group 2	-1.00	0.00	-1.16	0.00	-1.14	0.00	-0.98	0.00	-0.83	0.00
Dummy adv. country	0.83	0.04	0.76	0.00	0.49	0.00	0.28	0.00	0.15	0.04
Time dummy	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 2: The estimated M-quantile regression model

its magnitude is in general very small. Therefore, the pooling of firms from advanced and emerging countries seems to be not problematic.

We note that we have used evidence of all kind of abuses independent on how serious or grave they are, or on whether the firm is directly or indirectly involved in the abuse. In principle, it is possible to run separate regressions (and consequently develop different CSIR indexes) on the basis of the quality of the abuses (i.e. *derogable*; *non-derogable*; *direct*; *indirect*), see Appendix B.

#### IV.B.ii. A Comparison Between the Different Types of CSIR Indexes

By the estimated M-quantile regression we obtain an index of CSIR for each firm in each of the observed years, i.e. we build a panel of CSIR indexes for the 380 firms in our sample covering the period 2004-2012. Taking the average firm-level value of the CSIR index for the observed period, in Figures 2-4 we compare the *UNCOND-CSIR* index with the three conditioned CSIR indexes, namely *MEC-CSIR*, *MESC-CSIR*, and *MESIC-CSIR*.

Observations below the diagonal correspond to firms whose conditioned CSIR index is higher than their UNCOND-CSIR index, while the reverse holds for observations above the diagonal. The more we increase the number of conditioning variables (i.e. shifting from MEC-CSIR to MESC-CSIR and, finally, to MESIC-CSIR), the higher the difference. Since all the conditioning variables have a significant impact on the CSIR indexes (see Table 2), this result was expected.

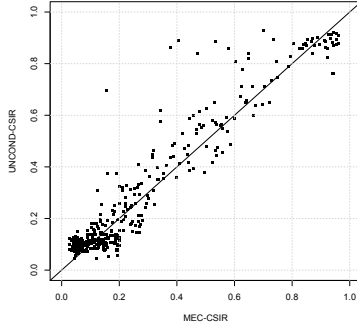


Figure 2: *UNCOND-CSIR* versus *MEC-CSIR*

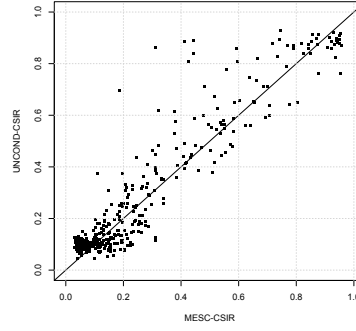


Figure 3: *UNCOND-CSIR* versus *MESC-CSIR*

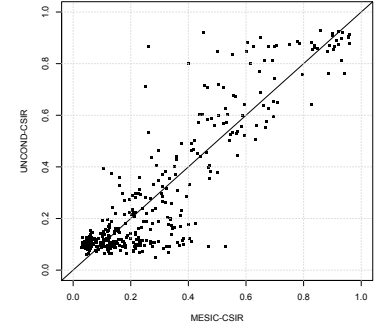


Figure 4: *UNCOND-CSIR* versus *MESIC-CSIR*

#### IV.B.iii. Illustrative examples of firms' CSIR indexes

For illustrative purposes, in Table 3 and 4 we name the least (bottom 10) and most irresponsible firms (top 10) in our sample. We list them in alphabetical order, and for each CSIR index. The first column lists the least/top irresponsible 10 firms in the case of the unconditional CSIR index (*UNCOND-CSIR*). Columns 2-4 list the least/top 10 firms as they appear under the different specifications of the index (*MEC-CSIR*; *MESC-CSIR*; *MESIC-CSIR* respectively). It is possible to appreciate that the name of the firms changes as we move from one index to another, which indicates that different models affect the measurement of CSIR. For instance, in the case of the most irresponsible firms, 6 out of 10 firms listed under the *MESIC-CSIR* index do not appear in the *UNCOND-CSIR* index, reflecting the fact that when conditioning for some firm-specificities, the most irresponsible firms are different from those that appear so from the simple count of abusing events they are involved in.

UNCOND-CSIR	MEC-CSIR	MESC-CSIR	MESIC-CSIR
Bharti Airtel Ltd.	Aramark Corp	Bank of Baroda	Allied Domecq plc.
Ind. and Comm. Bank of China Limited	Cadbury plc	Brasil Foods S.A. (BRF)	Aramark Corp
Industrias Penoles S.A.B. DE CV	Centex Corp.	Dover Corp	BangkokBank
Itau Unibanco Holding S.A.	CSC Computer Sciences Corp.	Genting (group)	Bank of India (BOI)
Oriental Bank of Commerce	Essilor International SA	Maytag Corp.	Brasil Foods S.A. (BRF)
Public Bank	GFNorte	PowerGrid Corp. of India Ltd.	Cadbury plc
Reliance Communications Ltd.	Ineos	RMB Holdings	Electrolux
Sistema JSFC	OGX Petroleo e Gas Part. SA	Steinhoff International Holding	Genting (group)
United States Steel	Reliance Communications Ltd.	Union Bank of India	Itau Unib. Holding S.A.
Yangzijiang Shipbuilding Holdings Ltd.	SCA (Svenska Cellulosa AB)	UnitedHealth Group	RMB Holdings

Table 3: Least irresponsible firms (bottom 10, alphabetical order).

UNCOND-CSIR	MEC-CSIR	MESC-CSIR	MESIC-CSIR
Adidas	Arcelor SA	African Rainbow Minerals	Adidas
AngloGold Ashanti (AngloGold)	Bayer AG	Altria ex-Phillip Morris Co.	Bayer AG
Arcelor SA	Coal India Ltd. (CIL)	AngloGold Ashanti (AngloGold)	Dongfeng Motor Group Co. Ltd.
Coal India Ltd. (CIL)	Exxon Mobil Corp.	Bayer AG	Jindal Steel and Power Ltd.
Coca Cola	Oil and Nat. Gas Corp. Ltd.	Dongfeng Motor G. Co. Ltd.	Nike
Gold Fields	PetroChina Co. Ltd.	Jindal Steel and Power Ltd.	Oil and Nat. Gas Corp. Ltd.
McDonald's	Ping An Ins. Co. of Ch. Ltd.	Nike	PetroChina Co. Ltd.
Oil and Nat. Gas Corp. Ltd.	Vale S.A.	Oil and Nat. Gas Corp. Ltd.	Vale S.A.
PetroChina Co. Ltd.	Wal-Mart Stores	Vale S.A.	Wal-Mart Stores
Wal-Mart Stores	Weichai Power Co. Ltd	Wal-Mart Stores	Weichai Power Co. Ltd

Table 4: Most irresponsible firms (top 10, alphabetical order).

*IV.B.iv. Assessing the statistical significance of the CSIR indexes*

We apply a block bootstrap procedure (Tzavidis et al., 2016) to assess the reliability of our CSIR indexes. We focus here only on one of the three indexes (MESIC-CSIR) which conditions CSIR to the three variables of media exposure, size and industry. In Figure 5 we report the estimated MESIC-CSIR index for all firms in our sample ranked in increasing order according to the value of their CSIR index for the period 2004-2012. We report the 95% confidence band for all the estimated indexes, which represents a measure of reliability of reported indexes.<sup>7</sup>

Our analysis shows that when the index's value is below 0.2, it is not statistically different from zero at the 5% significance level. This implies that all firms with a MESIC-CSIR index less than 0.2 should be equally considered among the group of the least irresponsible firms in the sample considered. On the contrary, a value of the index above 0.8 is not statistically different from 1 at the 5% significance level. This implies that all firms with a MESIC-CSIR index higher than 0.8 should be equally considered among the most irresponsible firms in the sample. In the middle range  $[0.2, 0.8]$ , firms have an average CSIR index, signalling a relatively moderate irresponsible business conduct.

*IV.B.v. The persistence of irresponsibility*

As final issue we analyse the persistence of firms' irresponsible conduct by studying the dynamics of the three types of CSIR indexes. To this purpose, based on the analysis in Section IV.B.iv., observations for each CSIR index have been split into three ranges: one corresponding to the group of least irresponsible firms, whose CSIR index is in the range  $[0, 0.2)$ ; a second range corresponding to the group of most irresponsible firms, whose CSIR index is in the range  $[0.8, 1]$ ; and a third group of "average irresponsible firms", whose CSIR index is in the range  $[0.2, 0.8)$ .

Table 5 presents the Markov transition matrices with one-year lag for the three types of CSIR indexes, i.e. the probabilities of moving from one of the three groups among those

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<sup>7</sup>Details about the bootstrap procedure are available upon request.



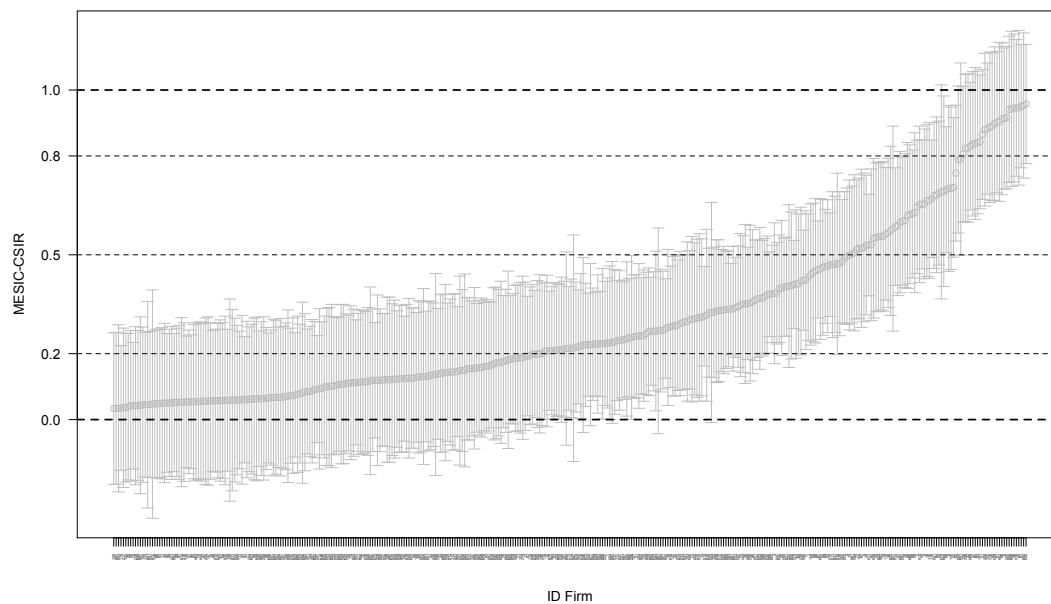


Figure 5: The estimated MESIC-CSIR index and its 95% confidence band.

defined above (reported in the first column (Least, Average and Most, corresponding to the least irresponsible, average irresponsible and most irresponsible firms in the sample based on the CSIR index definition) to one of the three groups in the next year (reported in the first row).

All three Markov matrices display a very high persistence in the first group of least irresponsible, whose probability of remaining in the group is above 0.90, and high persistence in the third group of the most irresponsible firms, with a probability of above 0.70. This suggests that firms tend to display a rather stable CSIR conduct at the extremes. Accordingly, the probabilities of transition from the most irresponsible to the least irresponsible group and viceversa are relatively low (i.e. ranging from 0.03 to 0.12 depending on the index). In contrast, firms that are classified as “average irresponsible firms” display higher inter-group mobility (ranging approximately from 0.1 to 0.30). A full interpretation of these findings is beyond the scope of the current exercise, which serves the purpose of showing how analysing the proposed CSIR index using Markov transition matrices can be useful to detect serial CSIR (corresponding to high persistence over time among the group of the most irresponsible firms); disambiguate serial CSIR from occa-

sional CSIR (corresponding to firms that swap groups frequently), and from the group of the least irresponsible firms. This in turn may be instrumental to developing data-driven taxonomies of firm's CSIR conduct and assign characteristics to the firms belonging to the different groups of the taxonomy.

MEC-CSIR			MESIC-CSIR			MESIC-CSIR			
Least [0-0.20)	Average [0.20-0.80)	Most [0.80-1]	Least [0-0.20)	Average [0.20-0.80)	Most [0.80-1]	Least [0-0.20)	Average [0.20-0.80)	Most [0.80-1]	
Least [0-0.20)	0.919	0.042	0.039	0.917	0.045	0.038	0.907	0.052	0.041
Average [0.20-0.80)	0.270	0.577	0.153	0.258	0.604	0.138	0.186	0.713	0.101
Most [0.80-1]	0.127	0.119	0.754	0.123	0.125	0.752	0.111	0.168	0.721

Table 5: Markov transition matrix with one-year lag.

## V. *Conclusions*

Growing evidence about corporate irresponsibility is calling for more research to delve into the drivers and outcomes of CSIR. Prior quantitative research has relied on CSIR raw data and measures, which we critically analyse in this paper with the aim of developing a new family of CSIR indexes that overcome the limitations of earlier measures.

We posit that CSIR raw data and indexes should possess a set of desirable properties. CSIR raw data should come with detailed accounts of the irresponsible events, as to allow the codification of the year(s) in which the irresponsible event has been allegedly occurred; how seriously the abuse is reported to have impacted on the relevant constituencies; what is the degree of involvement of the firm. Also we suggest CSIR raw data to be subject to the least manipulation as possible, and to consist in sample counts of the different types of abuses a firm is allegedly involved in yearly, which we propose to classify according to how serious they are (i.e. non-derogable vs derogable abuses) and to whether the firm is directly or indirectly (i.e. via complicity with third-party actors) in the abuses. CSIR raw data with these properties are adequate to contribute to the formation of a CSIR index, where we suggest that the simple count of firms' alleged involvement in CSIR events should be conditioned on at least three firm-specific characteristics, namely, their media exposure, the scale of their operations and the specificities of their industries (i.e. conditioning variables).

Based on these considerations, we adopt a M-quantile regression approach where we develop a family of CSIR indexes that condition the firm-level raw count of CSIR events to one or more of the conditioning variables. We next apply our proposed methodology using an original dataset including firm-level information about 380 publicly-listed firms from advanced and emerging countries, and derive CSIR indexes that allow the identification of the least and most irresponsible firms in our sample. We further use Markov transition matrices to analyse longitudinally our family of CSIR indexes.

Our work is original in at least two ways. First, it brings the attention to CSIR measurement, while earlier research has mostly focused on measures of CSR or CSP (see

Chatterji et al., 2015); De Felice (2015); Wood (2010). Second, it critically analyses the drawbacks of some of the most prominent sources of CSIR raw data and measures in order to develop a new family of CSIR indexes that can be used in quantitative analyses of CSIR. In this paper, we reported the names of the least and most irresponsible firms in our sample, but CSIR indexes for the full sample are available upon request by the authors. Also, while our analysis rests on a relatively large sample of firms, our methodological approach is replicable on other samples, so our approach can be useful to scholars who have an interest in measuring CSIR in a bigger or different sample of firms.

Finally, let us also discuss briefly the limitations of our approach. In the measurement of CSIR we used information on alleged human rights violations, which may not finally be judged as such by an international or domestic court. While this is apparently a key drawback in the data - using lawsuits data would have certainly been a safer strategy in terms of data reliability - it is in fact highly problematic if we have an interest in analysing CSIR beyond countries like the U.S. or Europe where the judiciary system is expected to function well. In most of the other countries, where the vast majority of production activities are currently undertaken (e.g. most of Asia, Latin America and parts of Africa), only a tiny minority of human rights violations result in lawsuits and receive a final judicial decision. This is due to many constituencies lacking access to justice, and “friendly settlements” (Kobrin, 2009). Another reason for not using final judicial decision as a measure of CSIR is that there is wide cross-country variety in how human rights’ treaties are incorporated into national legal systems, which means that some countries may be more tolerant than others in applying the rule of law, or in incorporating human rights treaties into their national laws. Hence, in some countries certain universal human rights may not receive the same degree of protections as in others. Thus using lawsuit data would lead to overlook many abuses of human rights (i.e. a problem of false negatives in the process of creation of CSIR raw data). Hence, we believe that a careful scrutiny of the allegations, which filters out unsubstantiated allegations, constitutes a better alternative. Furthermore, in this application we measure CSIR on the basis of firms’ involvement in

allegations of abuses of universal human rights. However, other scholars may want to broaden the focus to consider unethical business conduct which does not result in human rights abuses - including e.g. damages to animals, or to the natural environment that do not per se produce any evident harm to human beings. Similarly, tax evasion and bribery are certainly activities that deserve careful consideration and coding as they not always result in traceable violations of human rights.

More conceptual as well as methodological work is needed to improve the measurement of the CSIR construct, yet we hope that our work will spark more research in this very important domain.

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## Appendix

### A *M-quantile regression*

M-quantile regression provides a ‘quantile-like’ generalization of regression based on influence functions (Breckling and Chambers, 1988). The use of M-quantile regression with discrete outcomes is challenging, since in this case there is no agreed definition of an M-quantile regression function (Tzavidis et al., 2016). A popular approach for modelling the mean of a discrete outcome as a function of predictors is through the use of generalised linear models, by assuming that the response variable follows a Poisson distribution and using the logarithm as link function.

In the same way that in M-quantile regression has been imposed in the linear specification the continuous case, Tzavidis et al. (2016) propose the log-linear specification for count data. That is,

$$MQ_y(\tau|\mathbf{x}_j; \psi) = t_j \exp(\mathbf{x}_j^T \boldsymbol{\beta}_\tau), \quad (2)$$

where  $t_j$  is an offset term,  $\mathbf{x}_j$  is the vector of covariates for firm  $j$ ,  $j = 1, \dots, n$ ,  $\boldsymbol{\beta}_\tau$  is the vector  $p \times 1$  of regression coefficients and  $\psi$  function is introduced to control deviation in  $y$ -space. For estimating  $\boldsymbol{\beta}_\tau$ , Tzavidis et al. (2016) consider extensions of the robust version of the estimating equations for GLMs by Cantoni and Ronchetti (2001) to the M-quantile case.

For M-quantile regression the estimating equations can be written as:

$$\Psi(\boldsymbol{\beta}_\tau) := \frac{1}{n} \sum_{j=1}^n \left\{ \psi_q(r_{j\tau}) w(\mathbf{x}_j) \frac{1}{\sigma(MQ_y(q|\mathbf{x}_j; \psi))} MQ'_y(\tau|\mathbf{x}_j; \psi) - a(\boldsymbol{\beta}_\tau) \right\} = \mathbf{0}, \quad (3)$$

where  $r_{j\tau} = \sigma(MQ_y(\tau|\mathbf{x}_j; \psi))^{-1}(y_j - MQ_y(\tau|\mathbf{x}_j; \psi))$ ,  $\sigma(MQ_y(\tau|\mathbf{x}_j; \psi)) = MQ_y(\tau|\mathbf{x}_j; \psi)^{1/2}$ ,  $MQ'_y(\tau|\mathbf{x}_j; \psi) = MQ_y(\tau|\mathbf{x}_j; \psi)\mathbf{x}_j^T$  and  $a(\boldsymbol{\beta}_\tau)$  is a correction term ensures the Fisher consistency of the estimator (Tzavidis et al., 2016). The weights  $w(\cdot)$  are used to down-weight the leverage points.

When  $w(\mathbf{x}_j) = 1, j = 1, \dots, n$  a Huber quasi-likelihood estimator is again obtained.

An alternative simple choice for  $w(\mathbf{x}_j)$  suggested by robust estimation in linear models is  $w(\mathbf{x}_j) = \sqrt{1 - h_j}$  where  $h_j = \mathbf{x}_j^T (\sum_{j=1}^n \mathbf{x}_j \mathbf{x}_j^T)^{-1} \mathbf{x}_j$ , i.e. the  $j$ th diagonal element of the hat matrix. The solution to the estimating equations (3) can be obtained numerically by using a Fisher scoring procedure. R routines for fitting M-quantile regression for count data are available from Tzavidis et al. (2016).

In the continuous  $y$  case, the M-quantile coefficient for observation  $j$  is simply defined as the unique solution  $\tau_j$  to the equation  $y_j = \widehat{MQ}_y(\tau_j | \mathbf{x}_j; \psi)$ . However, for count data the equation  $y_j = \widehat{MQ}_y(\tau_j | \mathbf{x}_j; \psi)$  does not have a solution when  $y_j = 0$ . To overcome this problem we use the definition by Tzavidis et al. (2016):

$$\widehat{MQ}_y(\tau_j | \mathbf{x}_j; \psi) = \begin{cases} \min \left\{ 1 - \epsilon, \frac{1}{\exp(\mathbf{x}_j^T \hat{\beta}_{0.5})} \right\} & y_j = 0 \\ y_j & y_j = 1, 2, \dots \end{cases} \quad (4)$$

where  $\epsilon > 0$  is a small positive constant. For a detailed discussion see Tzavidis et al. (2016) and Chambers et al. (2016). The results of equation (4) gives the index of CSIR for each firm at any period.

***B M-quantile regressions for derogable, non-derogable, direct and indirect abuses of human rights***

	$\tau = 0.10$		$\tau = 0.25$		$\tau = 0.50$		$\tau = 0.75$		$\tau = 0.90$	
	<i>Estimate</i>	<i>p-value</i>	<i>Estimate</i>	<i>p-value</i>	<i>Estimate</i>	<i>p-value</i>	<i>Estimate</i>	<i>p-value</i>	<i>Estimate</i>	<i>p-value</i>
Intercept	-8.98	0.00	-7.16	0.00	-6.27	0.00	-6.00	0.00	-5.59	0.00
Media Exposure	8.99	0.00	7.00	0.00	5.71	0.00	4.57	0.00	3.22	0.00
Media Exposure2	-5.78	0.00	-4.76	0.00	-4.32	0.00	-3.72	0.00	-2.55	0.00
VA home country	0.75	0.06	0.32	0.05	0.26	0.00	0.16	0.00	0.12	0.03
VA host	0.05	0.38	0.07	0.20	0.05	0.12	0.04	0.08	0.02	0.19
Firm Size	0.25	0.00	0.26	0.00	0.34	0.00	0.43	0.00	0.46	0.00
Internationalization	0.49	0.33	0.60	0.14	0.37	0.14	-0.15	0.29	-0.43	0.08
Sector group 1	-0.25	0.29	-0.57	0.01	-0.91	0.00	-0.97	0.00	-0.74	0.00
Sector group 2	-0.26	0.26	-0.42	0.02	-0.74	0.00	-0.92	0.00	-0.85	0.00
Advanc. Indicator	0.71	0.18	0.92	0.00	0.66	0.00	0.64	0.00	0.55	0.00
Time dummy	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 6: The estimated M-quantile regression using non-derogable human rights abuses.

	$\tau = 0.10$		$\tau = 0.25$		$\tau = 0.50$		$\tau = 0.75$		$\tau = 0.90$	
	<i>Estimate</i>	<i>p-value</i>	<i>Estimate</i>	<i>p-value</i>	<i>Estimate</i>	<i>p-value</i>	<i>Estimate</i>	<i>p-value</i>	<i>Estimate</i>	<i>p-value</i>
Intercept	-7.04	0.00	-5.62	0.00	-4.65	0.00	-3.53	0.00	-2.24	0.00
Media Exposure	7.95	0.00	5.95	0.00	4.64	0.00	3.57	0.00	3.25	0.00
Media Exposure2	-4.99	0.00	-3.92	0.00	-3.32	0.00	-2.61	0.00	-2.42	0.00
VA home country	0.88	0.00	0.61	0.00	0.46	0.00	0.37	0.00	0.31	0.00
VA host	0.28	0.03	0.24	0.00	0.21	0.00	0.13	0.00	0.07	0.00
Firm Size	0.17	0.03	0.19	0.00	0.23	0.00	0.24	0.00	0.21	0.00
Internationalization	0.99	0.13	1.29	0.00	1.08	0.00	0.98	0.00	1.26	0.00
Sector group 1	-0.34	0.13	-0.55	0.00	-0.61	0.00	-0.46	0.00	-0.33	0.00
Sector group 2	-1.38	0.00	-1.31	0.00	-1.25	0.00	-1.00	0.00	-0.80	0.00
Advanc. Indicator	0.20	0.35	0.25	0.15	0.31	0.01	0.19	0.02	0.02	0.41
Time dummy	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 7: The estimated M-quantile regression model using derogable human rights abuses.

	$\tau = 0.10$		$\tau = 0.25$		$\tau = 0.50$		$\tau = 0.75$		$\tau = 0.90$	
	<i>Estimate</i>	<i>p-value</i>	<i>Estimate</i>	<i>p-value</i>	<i>Estimate</i>	<i>p-value</i>	<i>Estimate</i>	<i>p-value</i>	<i>Estimate</i>	<i>p-value</i>
Intercept	-6.60	0.00	-5.24	0.00	-4.30	0.00	-3.88	0.00	-3.26	0.00
Media Exposure	7.93	0.00	7.19	0.00	5.54	0.00	3.48	0.00	2.13	0.00
Media Exposure2	-5.21	0.00	-5.03	0.00	-4.17	0.00	-2.60	0.00	-1.62	0.00
VA home country	1.03	0.00	0.79	0.00	0.69	0.00	0.49	0.00	0.37	0.00
VA host	0.20	0.06	0.18	0.00	0.14	0.00	0.09	0.00	0.05	0.02
Firm Size	0.21	0.01	0.22	0.00	0.26	0.00	0.31	0.00	0.33	0.00
Internationalization	-0.19	0.44	0.11	0.43	0.48	0.06	0.39	0.06	0.73	0.00
Sector group 1	-1.53	0.00	-1.60	0.00	-1.56	0.00	-1.15	0.00	-0.80	0.00
Sector group 2	-1.42	0.00	-1.38	0.00	-1.38	0.00	-1.08	0.00	-0.83	0.00
Advanc. Indicator	-0.39	0.22	-0.23	0.18	-0.25	0.03	-0.12	0.10	-0.21	0.01
Time dummy	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 8: The estimated M-quantile regression using direct human rights abuses.

	$\tau = 0.10$		$\tau = 0.25$		$\tau = 0.50$		$\tau = 0.75$		$\tau = 0.90$	
	<i>Estimate</i>	<i>p-value</i>	<i>Estimate</i>	<i>p-value</i>	<i>Estimate</i>	<i>p-value</i>	<i>Estimate</i>	<i>p-value</i>	<i>Estimate</i>	<i>p-value</i>
Intercept	-9.86	0.00	-7.89	0.00	-6.59	0.00	-5.66	0.00	-4.48	0.00
Media Exposure	7.44	0.00	5.00	0.00	4.17	0.00	4.23	0.00	4.24	0.00
Media Exposure2	-4.11	0.00	-2.74	0.00	-2.62	0.00	-3.18	0.00	-3.43	0.00
VA home country	0.66	0.10	0.17	0.23	-0.00	0.50	-0.07	0.16	-0.08	0.08
VA host	0.20	0.18	0.17	0.05	0.15	0.00	0.10	0.00	0.07	0.01
Firm Size	0.22	0.01	0.22	0.00	0.25	0.00	0.32	0.00	0.34	0.00
Internationalization	1.47	0.05	1.85	0.00	1.31	0.00	0.70	0.00	0.66	0.01
Sector group 1	1.04	0.01	0.69	0.00	0.38	0.00	0.04	0.31	-0.07	0.16
Sector group 2	-0.07	0.44	-0.17	0.23	-0.38	0.00	-0.61	0.00	-0.70	0.00
Advanc. Indicator	1.41	0.06	1.68	0.00	1.64	0.00	1.32	0.00	0.91	0.00
Time dummy	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 9: The estimated M-quantile regression using indirect human rights abuses