The effect of the EU's Directive on non-financial disclosures

of the oil and gas industry

Mona Al-Dosari*

College of Business Administration – King Faisal University

maldosari@kfu.edu.sa

https://orcid.org/0000-0002-8254-927X

Ana Marques

Norwich Business School – University of East Anglia

ana.marques@uea.ac.uk

https://orcid.org/0000-0003-1595-0028

Jenny Fairbrass

Norwich Business School – University of East Anglia

j.fairbrass@uea.ac.uk

https://orcid.org/0000-0001-5292-0720

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* Corresponding author

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Abstract

Owing to its substantial impact on the environment, economy, and society, we choose to examine the oil and gas industry, drawing on neo-institutionalist scholarship to concentrate on the mimetic, coercive, and/or normative effects discernible in the industry's non-financial disclosure (NFD) behaviour. Focusing on Directive 2014/95/EU, we construct scores to assess the evolution of the sector's NFD over time and the spillover effects beyond EU large and listed firms, the latter being directly subject to the legislation. We scrutinise NFD over a decade, producing three main results. First, we find that NFD increases immediately after the directive's publication and further increases during the implementation phase. Second, the directive has a spillover effect, sparking significantly increased NFD among non-EU firms during the implementation period. Third, the NFD level of non-EU firms is associated with the number of EU employees and the extent of EU operations of these firms, but only following the implementation of the directive. These findings have clear repercussions for firms operating both inside and outside the EU as well as implications for EU public policymakers.

1. Introduction

The European Union (EU) has sought to become a global pacesetter, exercising its normative power (Manners, 2002), across several public policy fields, including sustainability reporting. Such is the significance of non-financial disclosure (NFD) among business organisations for the EU that it has enacted legislation in the field: namely, Directive 2014/95/EU.[1] This directive requires all large European listed firms that have more than 500 employees to publish "…certain information on the way they operate and manage social and environmental challenges" (European Commission, 2014).

The EU's Directive provides a critical focal point for the examination of firms in the oil and gas industry because of their significant impact on the environment, economy, and society. Notably, oil and gas firms contribute considerably to the global economy, providing *inter-alia* sizeable employment opportunities (IPIECA, 2015). However, this industry is also perceived as being 'environmentally sensitive', given that, historically, it has been one of the highest producers of carbon dioxide and methane emissions (Ritchie & Roser, 2020) and one whose operations can cause significant environmental damage. Hence, the motivation to investigate this sector.

Building on the above background and drawing on well-established neo-institutionalist scholarship (DiMaggio & Powell, 1983; Scott, 1987; Dillard et al., 2004), we concentrate specifically on Directive 2014/95/EU and the NFD levels of oil and gas firms. We create a novel NFD score that includes 31 variables and use it to assess how disclosure levels change over time, starting from a point in time five years before the directive was issued. This enables us to explore disclosure levels in a period before the enactment of this legal framework and the subsequent changes that occur after the EU's directive was introduced. Additionally, we investigate whether there is a spillover effect of the directive beyond large and listed EU firms, examining its impact on firms with headquarters outside

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[1] Previous literature uses the terms "CSR" and "ESG" but we use NFD, as the EU's Directive is known as the non-financial directive.

the EU. Finally, we study whether the NFD of these firms varies with the number of employees and the scale of operations that they have in the EU.

We examine 204 firms, operating in 35 countries, during the decade from 2009 to 2019, with a final sample of 1,623 observations. We find significant variations in the level of NFD among firms and that EU firms have higher disclosure scores than do non-EU firms. These two sets of firms also differ in terms of (i) the frequency with which they seek assurance of their sustainability reports, (ii) publication of a stand-alone report for Corporate Social Responsibility (CSR), and (iii) use of Global Reporting Initiative (GRI) standards.

Our multivariate analysis indicates that overall NFD levels increased during the transition period (as previously documented) and that a significant increase in disclosure occurs after the directive's implementation, expanding knowledge of its impact. In fact, when we use propensity score matching (PSM), we find that the level of NFD increases significantly only during the implementation phase. This is direct evidence of the impact of the directive issued by the EU. The substantial rise during the implementation phase is also present in our four sub-scores (environmental, social, human rights, and anti-corruption), and when we consider alternative disclosure score calculations. Moreover, our results indicate that the four proxies for the quality of NFD that we use are significantly and positively associated with the NFD score, indicating that firms that provide more disclosures also disclose better-quality information. This finding is aligned with the believe that NFD is one of the four main elements of quality for firms' reporting (Afeltra et al., 2023).

Following neo-institutionalist literature, we posit that although the EU's Directive directly targets EU firms' behaviour, it is also a catalyst for increased NFD among firms operating or based outside the EU, due to spillover or isomorphism. This may take the form of mimetic, and/or normative processes. When focusing on non-EU firms, we find that although their levels of disclosure are not much lower than the level of EU firms overall, this changes significantly during the implementation

of the directive when NFD does increase. This finding is corroborated by our PSM analysis, and by using alternative ways of calculating our disclosure scores. However, this substantial rise during the implementation phase is present in only two of the four sub-scores (namely, the social and environmental), indicating that the increase of disclosure was not homogeneous across all areas.

Next, we analyse non-EU firms separately and find that their number of EU employees is positively associated with NFD disclosures, when considering our unweighted scores, especially when it comes to social disclosures. Moreover, the association between overall NFD and EU employees is stronger after the directive's implementation (in all scores). Another characteristic of non-EU firms is positively associated with the firms' NFD during the implementation period: the scale of the operations that these firms have in the EU. Thus, these variables moderate the relationship between NFD of non-EU firms and the directive's implementation. These results provide evidence of how the interaction between oil and gas firms and their institutional environment affects their disclosures, as predicted by neo-institutional theory, expanding previous studies that only considered the impact of EU actions in specific EU countries and reinforcing the significance of the EU when it comes to NFD.

Our research builds on and extends the extant scholarship in several important ways. First, we provide novel evidence about an industry for which, despite its environmental importance, relatively little is known regarding NFD. Crucially, we furnish data over a longer period following the implementation of the EU's Directive, covering three years of implementation, in contrast to some previous studies that only cover the initial year of implementation (e.g.: Fiechter et al., 2022), a period of adjustment for firms. Thus, we join the many scholars who "argue that regulatory enforcement has an impact, driving high-quality disclosure and compliance" (Afeltra et al., 2023). Second, by custom-building NFD scores, we contribute to the scholarship concerning NFD measurement. While most studies focus on the level of NFD through the publication of a separate report (e.g.: Cuomo et al., 2022) or a manually collected disclosure score and do not address the growing concern about a uniform definition of NFD (Stolowy and Paugam, 2018), our disclosure indexes can be used in future studies,

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allowing for the analysis of disclosures across time, and across four specific areas, in a consistent way. Third, we provide evidence that the directive's impact is not confined to large and listed European firms.

Our findings are relevant to a wide range of stakeholders. Clearly, they have direct relevance for the business managers of the firms in our selected sector, as well as for potential investors and financial analysts interested in this industry. Equally importantly, they are also likely to be germane to public policymakers. While EU regulators would hope and expect to directly influence large EU-based firms via the regulations that they enact, they should also be aware of the mimetic and normative effects on a wider range of firms. Indeed, our evidence suggests that when the EU drafts and ratifies legislation aimed at its largest firms, these decisions have much broader reach. This leads us to expect a wide impact of the recent corporate sustainability reporting directive, as well as the other initiatives that are related to the European Green Deal (European Commission, 2019a),.

After introducing our study, we now outline the structure of this paper. First, we discuss the institutional and regulatory settings relevant to the industry. Next, we review the literature and develop the hypotheses. Next, we outline the research methodology used to test the hypotheses. The discussion of the results comes next. Finally, we present our conclusions.

2. Institutional settings

Several major events have contributed to the increased importance of oil and gas industry NFD, such as the 2010 Deepwater Horizon oil spill in the Gulf of Mexico. This event generated shockwaves for the entire industry, harming the environment and wildlife, and leading to reputational damage to the sector. In response to this unprecedented attention, many oil and gas firms have increased their social and environmental protection activities (Dyck et al., 2019).

In parallel, the oil and gas industry was among the first industries to introduce the disclosure of their non-financial activities (Venturelli et al., 2017) and has a high NFD level when compared to

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other industries (Carini et al., 2018, Matuszak & Różańska, 2017). However, as reported in The New York Times (Tabuchi, 2020), the oil and gas industry may be "a far bigger climate threat than we knew" since it has caused a considerable increase in the amount of methane emissions. Considering this evidence and the environmental sensitivity of this industry, we posit that the oil and gas industry is a prime target for the EU's Directive.

In addition, the industry has a significant global economic impact. According to the International Petroleum Industry Environmental Conservation Association, the sector has considerable social value and can significantly contribute to the growth of a strong economy (IPIECA, 2015). The GRI indicates that "global exports for mineral fuels and associated fuel products totalled USD 1.9 trillion in 2017" (GRI, 2019, p2). Moreover, as the United Nations Development Programme (UNDP, 2017) highlights, some of the importance of the oil and gas industry lies in creating economic growth by providing employment, building infrastructure, and creating services in different countries. In the US alone, the industry contributes 9.8 million jobs to total US employment (American Petroleum Institute, 2020). Accordingly, "this sector has been the focus of regulation and public attention", and therefore oil firms' ability to manage their sustainability issues are likely to affect their assets, liabilities, profits, and capital" (SASB, 2014).

Legal requirements also have an impact on NFD in the selected industry. For example, since 2013, quoted companies in the UK have been required to disclose their greenhouse gas emissions. Beyond such national regulatory interventions, firms must also consider the legislation of supranational entities (such as the EU). EU's Directive 2014/95/EU, also known as the non-financial reporting directive, requires all large European listed firms with more than 500 employees to publish "…certain information on the way they operate and manage social and environmental challenges" (European Commission, 2014). This obligation became effective, starting with the annual reports issued in 2018 (covering the fiscal year 2017 and beyond). The directive obliges firms to disclose information concerning five areas: (i) environmental protection, (ii) responsibility toward society, (iii)

human rights, (iv) anti-corruption, and (v) diversity on company boards. It is intended to benefit stakeholders (such as investors, consumers, and public policymakers), to assist them in assessing the non-financial performance of firms and to motivate firms to adopt a more responsible approach to business. Consequently, many European firms raised their environmental and social standards following the EU's Directive announcement (Fiechter et al., 2022; Mittelbach-Hörmanseder et al., 2020). While a direct impact of the EU's Directive on large European firms' NFD was to be expected, the possible implications of this directive on the NFD of firms located outside the EU has not previously been addressed. Given the importance of the EU in the arena of NFD, we investigate this issue, providing evidence about whether EU officials can expect their actions to have an impact on firms operating outside EU boundaries.

Crucially, firms can choose which NFD guidelines they adopt (EU Directive, paragraph 9). These include those produced by the United Nations Global Compact (UNGC), the Organisation for Economic Co-operation Development (OECD), and the GRI. Concerned about a possible lack of comparability of the disclosures, Breijer and Orij (2022) focus on the existing NFD frameworks and find that mandatory adopters tend to use an investor-oriented framework. Some would argue that regulators should propose even more detailed NFD regulations to better understand the motivation behind firms' actions (Song & Rimmel, 2020). Interestingly, in 2017, the European Commission announced further non-mandatory guidelines, to encourage firms to disclose more relevant, consistent, and comparable NFD. In 2019, the European Commission announced a new set of guidelines on reporting climate-related information (European Commission, 2019b), and decided to review the 2014 Directive in 2020. The corporate sustainability reporting directive, which is part of the European Green Deal, was approved in December of 2022.[2]

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[2] The EU directive 2022/2464 was approved on 14th Dec 2022. The first companies will have to apply the new rules for the first time in financial year 2024, for reports published in 2025. Until then, the rules of the EU directive we study remain in

Finally, we must consider the Paris Agreement, signed in 2015. This was the first global agreement on climate (European Commission, 2015), designed to raise global awareness of the threat of climate change and limit the increase in the average global temperatures. To achieve these aims, each signatory country made a pledge to create and review their nationally determined contributions, a decision that directly impacts the oil and gas firms.

3. Hypotheses' development

In this section, we intertwine extant theory with recent empirical studies to provide the foundations for our hypotheses. Our research draws on well-established neo-institutionalist scholarship that focuses on a range of isomorphic processes. In brief, neo-institutional theory explores how organisations interact with their institutional environment, examining motivations for undertaking activities intended to secure social legitimacy (DiMaggio & Powell, 1983; Meyer and Scott, 1983; Scott, 1987; Dillard et al., 2004). The literature identifies three distinct types of co-existing isomorphic pressures. First, coercive forces are said to derive from institutional forces such as regulation. Second, normative pressure arises from the need and desire to achieve moral conformity. Finally, mimetic factors are deemed to be the result of copying other organisations in the same field or industry. In the work that we undertake, we examine these isomorphic pressures operating and impacting on the NFD of our selected sample of oil and gas producers.

We also build on past empirical research. Some previous scholarship is particularly noteworthy because it addresses the potential impact of the EU's Directive in specific European countries. For example, Carini et al. (2018) share our industry focus by studying the largest ten European oil and gas

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place. Thus, this does not affect our findings. More information can be found here: https://finance.ec.europa.eu/capital-markets-union-and-financial-markets/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en

firms. They find that the disclosure level of non-financial reports is 'satisfactory' but expect the EU's Directive to trigger further development. Other examples include Ogrean's (2017) study of Romania, Szabó & Sørensen's (2015) investigation into Denmark, Venturelli et al. (2017) and Veltri et al. (2020), who research Italy, and Matuszak & Różańska's (2017) review of Poland. Significantly, some of this research does not find any change or much change because of the EU's directive. For example, Szadziewska et al. (2018) find no effect arising from the EU's Directive in Poland. Caputo et al. (2020) find that in Italy, during the transition period, the quality of NFD increased, but only slightly, and suggest that this is due to a previously high standard of reporting.

Given that the EU's Directive first applied to firms' 2017 annual reports, it is important to examine the disclosures made before and after that date, as suggested by Veltri et al. (2020). Similarly, Lock and Seele (2016) call for research on the development of mandatory NFD regulations in the EU over time. Fiechter et al. (2022) assess the first year when disclosures are subject to the EU's Directive and finds evidence of an increase in CSR activities of large and listed European firms before its implementation. Not surprisingly, they find that the most discernible effect was in countries with lower CSR disclosure regulations prior to the EU's Directive. Cuomo et al. (2022) cover the first two years of implementation of the EU's Directive and find that after the directive was issued EU listed firms published a separate sustainability report more frequently. However, these authors do not consider the disclosures included in these reports.

Based on our understanding of isomorphic processes (as envisaged by the institutional theory outlined above and the findings of previous studies), our first hypothesis is as follows:

H1: The NFD level of firms in the oil and gas industry increased after the issuance of the EU's Directive.

The impact of the EU's Directive on the NFD of firms not headquartered in Europe has not been previously reported. However, given the putative impact of the EU on the global economy and international reporting guidelines, as "the world's largest single market with transparent rules and regulations" (European Commission, 2019c), there is a strong case for investigating a potential spillover effect of the EU and its regulations on non-EU firms. Such impacts are likely to be especially discernible in the oil and gas industry because the sector tends to operate in several geographical regions (Carini et al., 2018).

Crucially, it is an empirical question as to whether the introduction of a new directive is a 'disruptive event' that accelerates convergence among firms in the same industry. While large and listed EU firms are legally required to comply with the EU's Directive, non-EU firms may aspire to "keeping up with the Joneses"; that is, the latter may engage in mimetic behaviour or adopt the norms of their EU counterparts. Interestingly, Ioannou and Serafeim (2021) find that the sustainability practices of firms in the same industry converge over time. However, by contrast, some researchers point to the lack of comparability between sustainability reports in the oil and gas industry (Gallego-Alvarez et al., 2018; Cardoni et al., 2019).

Particularly noteworthy regarding the issue of convergence is the trend observed by Li et al. (2022) in the context of CSR awards in China: non-winning firms tend to improve their CSR after their competitors win CSR awards. Under these circumstances, the award can be seen as a 'disruptive event', resulting in a diminished reputation for the non-winning firm (in comparison with the winner). Similarly, Tezer and Tofigi (2021) find evidence of the knock-on effect of a brand's CSR activity in response to competing brands, demonstrating how receiving CSR information about one brand can have a negative effect on a competing brand's image.

Further, using the awareness-motivation-capability framework developed in the competitive dynamics' literature mentioned above (Li et al., 2022), evidence reveals that non-winning firms'

improvement is more salient when there is greater awareness, motivation, and capability. Critically, given how widely the EU's Directive was discussed, awareness of it was extremely high, and this ought to be associated with a strong increase in the NFD of non-EU firms. This greater awareness may even lead non-EU firms to adjust their disclosures as soon as the EU's Directive was issued, that is, before its implementation, to keep pace with their EU peers during the transition period. This increase in NFD of non-EU firms, during the transition period would be consistent with the impact documented for EU firms. Even if this occurred in the first year of application of the directive, European countries were the leaders of CSR disclosure levels (KPMG, 2017); thus, the motivation for change should also be strong during the implementation period, leading to the prediction of a marked increase in the NFD of non-EU firms. This leads to our second hypothesis:

> H2: The NFD level of non-EU oil and gas firms increased after the issuance of the EU's Directive.

Delving deeper, we contend that if spillover from the EU's Directive is revealed, it is vital to determine whether it varies according to the degree of firms' involvement with the EU. As regards the level of financial disclosure, it is already known that voluntary disclosure is positively related to the extent of firms' globalization of operations (Cahan et al., 2005), as companies with a greater presence in foreign countries are more internationally dependent and face higher agency costs (Kumar, 2013). In this respect, Cowan et al. (2013) find evidence that firms with international experience are more likely to be affected by other foreign firms, with the extent of foreign experience (such as having foreign employees or foreign operations) impacting their behaviour. Brammer et al. (2006) use a parallel argument to find evidence that firms' geographical scope significantly and positively affects their social and environmental performance, with their social performance strategy shaped by the breadth of their geographical operations. This is consistent with other findings (e.g., Sharfman et al., 2004), which suggest that geographic diversity forces firms to consider international policies when

determining their NFD. Moreover, firms in highly competitive industries (such as oil and gas) are more likely to adjust their disclosures when they believe that the benefits of that decision outweigh the costs (Verrecchia, 1983, 1990).

Given these previous findings and drawing on institutional theory (DiMaggio & Powell, 1983; Scott, 1987), we anticipate that large international oil and gas firms may be encouraged to copy (i.e., engage in mimetic and normative isomorphism) and adopt the norms of other large European firms in the same industry, at least to some degree. This behaviour is likely to be more accentuated when firms have more experience and operations in the EU. Therefore, we contend that observable increases in NFD among non-EU firms are reinforced by the size of their workforce in the EU and extent of their operations in the region. This leads to our third hypothesis:

H3a: The level of EU employees of a non-EU firm is positively associated with the NFD level of firms in the oil and gas industry.

H3b: The level of EU operations of a non-EU firm is positively associated with the NFD level of firms in the oil and gas industry.

4. Methods

To test H1, we first assess whether the level of NFD changed after the directive was published, creating an indicator variable, *Post_2014,* coded as one if the observation corresponds to a fiscal year after 2014. The definition of this variable is aligned with the study of Cuomo et al. (2022). Second, we test whether the level of NFD changed after directive implementation. We create an indicator variable, *Implementation,* coded as one if the observation corresponds to a fiscal year when the directive was already in effect (2017, 2018, or 2019). Finally, we assess whether there is a difference between the degree of change in NFD that occurs in the period that corresponds to the years after the directive was issued but before its implementation. We create an indicator variable, *Transit*, coded as

one if the observation corresponds to fiscal years 2015 and 2016, and include it in a third model, with *Implementation*.

These three indicator variables are our focus when testing H1. If the disclosures increased only after the directive was implemented, then only the estimated coefficient for *Implementation* will be positive and statistically significant. If the level of disclosure increased after the directive was issued, there are two possibilities: (i) a constant level of increase after the publication of the directive, or (ii) a different level of increase in the transition period when compared with the implementation period. We expect positive associations between the *NFD score* and both the transition and implementation periods.

To measure NFD we create a disclosure score (*NFD_score),* based on the directive, as well as the issued guidance, which covers four dimensions: environmental, social, human rights, and anti-corruption. These specific items were included because (i) they are mentioned specifically in the directive (or guidance), and (ii) refer to disclosures and not actions of the firms (as the variables related to actions could be considered as non-financial performance proxies).[3] Thus, we believe our research instrument considers all relevant issues mentioned in the directive appropriately, having content validity.

Appendix 1 presents the items considered in our score, as well as the variable from the Asset4 ESG database in Thomson Reuters used. The environmental dimension considers 14 variables, that measure firms' disclosures on current and foreseeable impacts of the undertaking's operations on the environment, the use of renewable energy, water use, and air pollution. The social dimension comprises ten variables, related to issues such as gender diversity, human rights, training, and health

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[3] Succinctly, these were the steps followed to identify the items included in our score: (i) reading the directive to identify areas where disclosure is required, (ii) reading the posterior guidance, and adjusting the initial list of areas, (iii) analysing the list of ESG variables in Asset4, identifying all those that are related with the identified areas, (iv) removing the variables related to actions from our list of variables, and (v) further removing those variables that have no data for all our sample, across our time period.

and safety. The human rights dimension includes four variables, reflecting disclosures on the prevention of human rights abuses and freedom of association. The last dimension is anti-corruption and bribery, which contains three variables. Thus, we consider 31 items.

We consider two alternative ways of calculating *NFD_score*, following Tsalavoutas et al. (2010). Our first score is unweighted, and we call it *NFD_scoreU*. In this case, the score of each firm is calculated as the ratio of the total items disclosed to the maximum possible score (31). Next, we consider that the number of items considered in our sub-scores is not the same, and thus our first score puts more weight on environmental and social disclosures than on disclosures related to human rights and corruption. Our second score attributes equal weights to each of the sub-scores. *NFD_scoreE* is calculated as the sum of the sub-scores, divided by four. To control for possible outliers, the values of these scores (as well as the sub-scores and scores' transformations used in the paper) were winsorized at the top and bottom one percent of the observations.

Our first set of empirical tests is based on the following models:

$$\text{NFD\_score} = \beta_0 + \beta_1 \text{Post\_2014} + \text{Firm-level controls} + \text{Country-level controls} + \varepsilon \qquad (1)$$

$$\text{NFD\_score} = \beta_0 + \beta_1 \text{Implementation} + \text{Firm-level controls} + \text{Country-level controls} + \varepsilon \qquad (2)$$

$$\text{NFD\_score} = \beta_0 + \beta_1 \text{Transit} + \beta_2 \text{Implementation} + \text{Firm-level controls} + \text{Country-level controls} + \varepsilon$$
$$(3)$$

Firm-level controls include (i) *Size*, (ii) *ROA*, (iii) *Leverage*, (iv) *Assurance*, (v) *CSR_committee*, (vi) *CSR_report,* (vii) *GRI, (viii) UNGC and (ix) OECD*. These variables are commonly used in the literature on NFD (e.g.: Gallego-Alvarez *et al*., 2018; Venturelli *et al*., 2017; DeVilliers and Marques, 2016). Four variables are indicators of the quality of NFD: *Assurance, CSR_committee, CSR_report* and *GRI* (Michelon *et al.*, 2015), to consider the growing interest in how quality improves after the adoption of disclosure regulations (Afeltra et al., 2023). Data for these control variables come from Thomson Reuters Eikon.

We include two country-level controls. The first is *NFD_Regulations,* an indicator variable coded one if the firm is in a country that has any mandatory non-financial information disclosure regulation.[4] The second is *Paris*, an indicator variable coded one if the firm is in a country that has signed the Paris Agreement. This agreement may have a substantial impact on the NFD of oil and gas firms, as climate-related disclosures of extractive industries tend to be of poor quality (Baboukardos, 2021a), but arguably improving overtime (Baboukardos, 2021b). All variables, as well as the expected signs of their association with *NFD_score*, are presented in Appendix 2. The estimation of all models includes firm fixed effects, and standard errors are clustered by firm-year.

To assess whether the impact of the EU's Directive is also felt by non-EU firms (H2), we use three models. First, we focus on *Non_EU firms,* an indicator variable coded as one if the firm is non-European, and zero otherwise. A firm is considered non-European when its headquarters are not in the EU. We expect the estimated coefficient of this variable to be negative, indicating that non-European firms have lower levels of NFD. Next, we test whether the NFD of non-EU firms remain lower than that of EU firms when controlling for the changes that occur during the transition and implementation periods. Finally, we use a difference-in-differences model to consider these two distinct periods. The models used are:

$$\text{NFD\_score} = \beta_0 + \beta_1 \text{Non\_EU firms} + \text{Firm-level controls} + \text{Country-level controls} + \varepsilon \qquad (4)$$

$$\text{NFD\_score} = \beta_0 + \beta_1 \text{Non\_EU firms} + \beta_2 \text{Transit} + \beta_3 \text{Implementation} + \text{Firm-level controls}$$
$$+ \text{Country-level controls} + \varepsilon \qquad (5)$$

$$\text{NFD\_score} = \beta_0 + \beta_1 \text{Non\_EU firms} + \beta_2 \text{Transit} + \beta_3 \text{Implementation} + \beta_4 \text{Transit*Non\_EU firms} +$$
$$\beta_5 \text{Implementation*Non-EU firms} + \text{Firm-level controls} + \text{Country-level controls} + \varepsilon \quad (6)$$

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[4] We follow the list of countries in Krueger et al. (2021).

The coefficient of the interaction variable *Transit*Non_EU firms* measures the mean additional impact on the *NFD_score*, for a non-European firm, during the transition period. The coefficient of the interaction variable *Implementation*Non_EU firms* measures the mean additional impact on the *NFD_score* for a non-European firm, after the implementation of the EU's Directive. We expect the estimated coefficient for both interaction variables to be positive, indicating that although non-European firms have weaker NFD than EU firms, the EU's Directive is associated with an increase in their level of NFD.

To test H3, we analyse only the subsample of non-EU observations. First, we use *EU_employee*, a variable calculated as the logarithm of the total number of employees in the EU.[5] We expect a positive coefficient for *EU_employee*, indicating that the existence of EU employees in a firm has a positive effect on its NFD levels (H3a). Second, we use *EU_ops*, a variable calculated as the percentage of revenue generated from any EU country.[6] We expect a positive coefficient for *EU_ops*, indicating that firms operating in Europe have higher NFD levels (H3b).

5. Sample, descriptive statistics, and results' discussion

Sample and descriptive statistics

To identify our sample, we start from 9,105 firms classified as oil and gas producers in Refinitiv DataStream.[7] Next, we exclude all passive firms. Second, we remove 471 other firms: 30 have no available data at all, and the others have no total assets data. Third, we exclude firms with missing non-financial information. Finally, as this dataset contains several securities from the same firm, either dual-class shares or cross-listings, we follow the procedure from Landis and Skouras (2021) to identify the unique firms (Table 1). This leads to a final sample of 204 firms, across 35 countries, and we

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[5] In Eikon: Geographic number of employees.
[6] In Eikon: Geographic external revenue.
[7] In Thomson Reuters: industry code 501020 - oil and gas production.

calculate the NFD scores for 1,623 observations. We collect data for fiscal years 2009-2019, covering five years before and five years after the release of the EU's Directive in 2014. This covers three distinct periods: before the directive was issued, the transition period, and the implementation period.

Panel A of Table 2 reports the descriptive statistics of the variables used in regressions. We present three sets of descriptive information: (i) for all observations, (ii) for observations from EU firms, and (iii) for observations from non-EU firms. The overall average *NFD_scoreU* is 0.336 and its standard deviation is 0.199, while the overall average *NFD_scoreE* is 0.409 and its standard deviation is 0.194, showing a significant variation in the level of NFD. *Non_EU firms* represent over 85 percent of the observations. The mean value of *NFD_scoreU (NFD_scoreE)* of EU firms is 0.46 (0.51), but in the case of non-EU firms, this is only 0.31 (0.39). Furthermore, we find that the frequency of assurance, existence of a CSR committee, publication of a stand-alone CSR report, and use of GRI standards are much higher in the EU subsample. For economy of space, Panel B of Table 2 reports descriptive statistics by country, but only for countries with more than 20 observations. The highest average of both *NFD_scoreU* and *NFD_scoreE* is found in a European country (Italy), while Australia has the lowest average (for both NFD scores). These values, together with those in Panel A, demonstrate the heterogeneity in non-financial reporting in this industry, complementing the findings of heterogeneity in financial reporting by Gray *et al.* (2019). Panel C reports the mean values of both our scores for NFD, as well as their subparts, by year. We find that all subparts have been increasing throughout the study period.

Table 2, Panel D presents the pairwise correlations between the variables included in our models. All the independent and the control variables are significantly correlated with *NFD_scoreU*, except for *Transit*, and *Paris,* and the same is true for *NFD_scoreE*. The two score variables are positively and significantly associated (correlation is 0.899), as one would expect.

Main multivariate results

We begin by exploring whether the overall level of NFD is positively associated with the introduction of the directive. Panel A of Table 3 shows the results of our estimation of equations 1-3. In the first three columns we use *NFD_scoreU*, and in the last column we use *NFD_scoreE*. Model 1 (M1) shows a positive and significant coefficient for *Post_2014.* Thus, there is a significant increase in the level of NFD after the announcement of the directive. M2 reports a significant increase in NFD after the implementation of the directive, providing evidence that further supports H1. M3 allows us to compare the level of increase in NFD of the transition period with the increase that occurs after implementation. The results indicate that, although both the transition and implementation periods have significant and positive coefficients, the coefficient of *Implementation* is higher (p-value=0.000). This suggests that although the increase in NFD started immediately after the announcement of the EU's Directive, this increase accelerated after the directive was implemented. When we consider the results for *NFD_scoreE* we find consistent results (last column).

We also find that our four proxies for the quality of NFD (*Assurance, CSR_report*, *CSR_committee,* and *GRI)* are significantly and positively associated with the level of the NFD scores (in all models), indicating that firms that provide a higher number of disclosures also disclose better quality information.

Panel B of Table 3 reports a similar analysis of the four sub-scores. We find that while all sub-scores increased significantly during the implementation period, only the anti-corruption sub-score increased significantly during the transition period. Thus, the increases documented in Panel A are not present in all the NFD topics.

Next, we test H2 to assess whether non-EU firms' NFD is positively associated with the introduction of the directive. Given that we analyse the impact of a firm's location, the results in Table 4 are from random effects models. We find an overall negative association between *NFD_scoreU* and non-EU firms, suggesting that the overall NFD of non-EU firms are lower. This result is consistent

with previous studies that assert that EU firms are leaders in NFD and is robust to controlling for increases in the transition and implementation periods. However, when we use the score that attributes equal weights to our sub-scores, we do not find evidence of this negative association.

More importantly, the coefficient estimated for *Implementation*Non_EU firms* is positive for *NFD_scoreU*, indicating that non-EU firms significantly increased their overall disclosure levels during the implementation period. In the case of *NFD_scoreE* we find no evidence of such an association, which reveals the level of disclosure did not increase consistently across the four sub-scores. In fact, the results from the sub-scores reveal only two of the four sub-scores (social and environmental) of non-EU firms increased during the implementation period. These results support our second hypothesis and the view that mimetic isomorphism and competitive forces are associated with NFD.

Graph 1 complements this analysis by providing a time trend plot of our NFD scores, and sub-scores, for both EU and non-EU firms. The first impression from the graph is that the disclosure of EU firms was significantly higher, by an almost constant value, from 2009 to 2014. However, this difference decreased after that year – for the overall scores, as well as for the social and environmental sub-scores.

Our third hypothesis has two subparts, assessing whether the importance of EU employees or operations influences the NFD level of non-EU firms. For these tests, we use only the subsample of observations from non-EU firms and estimate firm-fixed effects models. Panel A of Table 5 reports a significant and positive estimated coefficient for *EU_employee*, in the case of *NFD_scoreU*, suggesting that non-EU firms have a higher level of NFD when they have more employees in the EU, and supporting H3a. However, the results of equal weighted score do not provide evidence of such an association, once again indicating an unbalanced importance of the sub-scores. In fact, the only sub-score where this association exists is in the social sub-score. We also find that the estimated coefficient for *Implementation*EU_employee* is significantly positive for both our NFD scores, indicating that

non-EU firms with more employees have higher NFD during the implementation period. The results for the sub-scores reveal that this increase is caused by environmental and HR disclosures.

Panel B of Table 5 presents our results, focusing on the EU operations of non-EU firms. Overall, we find no support for H3b. In fact, in the case of *NFD_scoreE*, the estimated coefficient is significantly negative. However, the estimated coefficient for *Implementation*EU_ops* is significantly positive for both *NFD_scoreU* and *NFD_scoreE*, indicating that non-EU firms with more operations have higher NFD during the implementation period. The results for the sub-scores reveal that this increase of disclosures during implementation is found in social, environmental, and human rights disclosures.

Robustness checks

While we believe our main scores are good measures of NFD, we now test an alternative way of measuring NFD, using the log of the odds ratio, based on the work of Abdullah *et al.* (2015). We call these new variables *Log_UW and Log_EW*. The untabulated results for testing H1 indicate that, in both cases, the coefficients estimated for *Transit* and *Implementation* are positive and statistically significant, as in our main results. The untabulated results for testing H2 with these two alternative scores are also consistent with the results reported in Table 4, as the coefficient of *Implementation*Non_EU firms* is significantly positive, but only when considering the unweighted score variable (*Log_UW*). The untabulated results for testing H3a are consistent for both Log variables, and indicate that *EU_employee* is positively and statistically associated with the dependent variables, and that association is lower during the transition period (as the coefficients for the interaction variables with *Transit* are negative, but with lower values than that of *EU_Employee*, and the interaction variables with *Implementation* are not statistically significant). These results support our hypothesis and are consistent with our main ones. Finally, the untabulated results for H3b are also consistent with the main results, as they show that the positive association between the level of EU operations and NFD is only present after the implementation of the EU directive.

We now use propensity score matching (PMS) to create a balanced matched sample (Shipman *et al.*, 2017), using all control variables included in the previous equations (except *OCED, UNGC and NFD regulations*, as they only apply to a few firms). Accordingly, each EU firm (treatment group) in our sample has been matched to the non-EU firm (control group) using the period prior to the EU's Directive, without replacement. Table 6 presents the results of the analysis, using *NFD_scoreU*: (i) a significant increase in NFD during the implementation period (H1), (ii) an increase in the NFD of non-EU firms during the implementation period (H2), (iii) that the NFD of non-EU firms with more EU employees is higher overall (H3a), and (iv) that firms with more EU operations have higher NFD, but only during implementation (H3b – partial support).

It can be argued that disclosure is closely associated with performance. Thus, we consider firms' social and environmental activities, measured by Asset4, as the dependent variable, as in Fiechter *et al.* (2022). Table 7 presents the results. As in Table 3, the coefficients of *Transit* and *Implementation* are positive and statistically significant. However, the results of the tests of the other hypotheses are different from our main results, as non-EU firms have a similar level of CSR performance to the EU firms, and the level of employees or operations in the EU do not seem to be associated with CSR performance. These results suggest the impact of the directive was only on disclosure.

Finally, we focus on the countries of our sample. First, we run our initial model with country fixed effects. Although several country indicator variables are significant, the untabulated results, when using *NFD_ScoreU*, indicate that the coefficient of *Implementation* is positive and statistically significant, reinforcing our belief that the EU's Directive had an impact on NFD. Second, we consider that some countries are policy leaders and, thus, may have implemented the directive sooner than others. Using the results of Knill et al. (2012), who identify the EU countries that were leaders in environmental policy making in 2000, we create an indicator variable (*Leader*) coded as one when a firm is in one of the countries classified as "top leader" or "leader". We then interact this variable with

Transit and *Implementation* and run a model that extends the results in Table 3. The untabulated results indicate that none of the interaction coefficients is statistically significant. Therefore, from the point of view of our study, country-level policy leadership is not relevant.

6. Conclusions

In this study, we focus on the oil and gas industry because of its substantial contribution to the global economy and sizeable impact on the environment and society. We examine the NFD levels exhibited, employing a well-established neo-institutionalist approach and exploring the isomorphic processes associated with the publication and implementation of the EU's Directive 2014/95/EU. For our analyses, we construct scores based on key elements of the EU's directive. The results indicate that NFD increases immediately following the publication of the directive and that a more marked increase occurs after the Directive's implementation. Moreover, there is a spillover from the EU's Directive, resulting in the NFD of non-EU firms increasing significantly after the EU's directive is implemented. Finally, both the level of EU employees and the extent of EU operations of non-EU firms are positively associated with the level of NFD of firms in the oil and gas industry, during the implementation phase of the EU's Directive.

Our study has limitations. First, there may be a lack of external generalized validity, given that this research is based only on oil and gas firms. Therefore, future research should investigate whether these results can be generalized to different industries. Second, we do not assess whether NFD have an impact on the actions of socially responsible institutional investors, which would provide evidence about the usefulness of these disclosures. This is an avenue for future research. Third, the current design assumes that the data we collect from the Asset4 database correctly reflects firms' disclosures, which may not be true in some cases. Lastly, we do not cover the period of the covid pandemic. Future studies could examine whether the level of NFD changes during this unusual period.

We contend that our study is valuable and useful to a range of stakeholders: firms in the oil and gas industry, businesses in other sectors, investors and industry analysts, and public policymakers and regulators. Crucially, our data reveal evidence of isomorphism, indicating that the EU's Directive affects both firms directly targeted by the legislation and others who are not legally subject to the law. Our results should alert EU public policymakers to the likely impact of preparing and enacting NFD legislation, both of which act as catalysts for altered business behaviour, among organisations located and operating within the EU as well as those outside the EU.

We recommend that further research provides deeper insights into how EU policymakers shape regulations on NFD. The EU's Corporate Sustainability Reporting Directive, which amends the directive we study, continues to address the four areas we examine, instead of merely focusing on climate change (as, for example, the International Sustainability Board). Given that it will be applicable to a much larger number of companies than the directive we study, it is important to continue to examine the effects of the current EU's directive and to consider the effects of new standards issued by relevant international institutions, such as the GRI. Thus, future studies must assess how firms manage these two external forces (directives and standards), and whether the resulting disclosures are informative, effective or useful to a range of stakeholders.

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Dimensions	Directive 2014/95/EU	No	Variables	Code	Dummy variable
Environmental	Details of the current and foreseeable impacts of the undertaking's operations on the environment.	1	Biodiversity Impact Reduction	ENERDP019	Does the company report on its impact on biodiversity or on activities to reduce its impact on the native ecosystems and species, as well as the biodiversity of protected and sensitive areas?
		2	Land Environmental Impact Reduction	ENRRDP061	Does the company report on initiatives to reduce the environmental impact on land owned, leased, or managed for production activities or extractive use?
		3	Environmental Investments Initiatives	ENERDP095	Does the company report on making proactive environmental investments or expenditures to reduce future risks or increase future opportunities?
	The use of renewable and/or non-renewable energy	4	Total Renewable Energy	ENRRDP060	Does the company report on total primary renewable energy purchased and produced in gigajoules?
		5	Renewable Energy Produced	ENRRDP0452	Does the company report on total energy produced from primary renewable energy sources in gigajoules?
		6	Renewable Energy Purchased	ENRRDP0451	Does the company report on total primary renewable energy purchased in gigajoules?
	Greenhouse gas emissions	7	NOx and Sox emission reduction	ENERDP033	Does the company report on initiatives to reduce, reuse, recycle, substitute, or phase out SOx (sulfur oxides) or NOx (nitrogen oxides) emissions?
		8	Green Buildings	ENRRDP052	Does the company report about environmentally friendly or green sites or offices?
	Water use	9	Water Pollutant Emissions	ENERDP058	Does the company report on total weight of water pollutant emissions in tonnes?
		10	Water Recycled	ENRRDP056	Does the company report on amount of water recycled or reused in cubic meters?
		11	Water Withdrawal Total	ENRRDP054	Does the company report on total water withdrawal in cubic meters?
	Air pollution	12	CO2 Equivalent Emissions Total Disclosure	ENERDP023	Does the company report about total Carbon dioxide (CO2) and CO2 equivalents emission in tonnes?
		13	Emissions Trading	ENERDP068	Does the company report on its participation in any emissions trading initiative?
	Waste management (e.g., recycling rates).	14	Waste Reduction Initiatives	ENERDP062	Does the company report on initiatives to recycle, reduce, reuse, substitute, treat or phase out total waste?
			Sub-score		**14**

Appendix 1 (Cont.): Disclosure score

Dimensions	Directive 2014/95/EU	No	Variables	Code	Dummy variable
Social	Gender equality	1	Executive Members Gender Diversity	CGBSO19	Does the company report on the percentage of female executive members?
	Implementation of fundamental conventions of the International Labour Organisation	2	Fundamental Human Rights ILO UN	SOHRDP012	Does the company claim to comply with the fundamental human rights convention of the ILO or support the UN declaration of human rights?
	Working conditions	3	Flexible Working Hours	SODODP026	Does the company claim to provide flexible working hours or working hours that promote a work-life balance?
		4	Training Hours Total	SOTDDP019	Does the company report on total training hours performed by all employees?
	Respect for the right of workers to be informed and consulted	5	Employee Satisfaction	ECPEDP039	Does the company report on the percentage of employee satisfaction as reported by the company?
	Respect for trade union rights, health and safety at work	6	Employee Health & Safety Training	SOHSDP009	Does the company report about the total hours of employee training on health & safety policies and procedures?
		7	Supply Chain Health & Safety Improvements	SOHSDP0183	Does the company show through the use of surveys or measurements that it is improving the level of employee health & safety in its supply chain?
	The dialogue with local communities, and/or the actions taken to ensure the protection and the development of those communities.	8	Voluntary Turnover of Employees	SOEQDP038	Does the company report on the percentage of employee voluntary turnover?
	Gender diversity and other aspects of diversity;	9	Board Gender Diversity	CGBSO03V	Does the company report the percentage of females on the board?
	Average hours of training per year per employee, by gender;	10	Average Training Hours	SOTDDP018	Does the company report on average hours of training per year per employee?
			Sub-score		**10**

Appendix 1 (Cont.): Disclosure score

Dimensions	Directive 2014/95/EU	No	Variables	Code	Dummy variable
Human rights	Include information on the prevention of human rights abuses and/or on instruments in place to fight corruption and bribery.	1	Human Rights Contractor	SOHRDP026	Does the company report or show to use human rights criteria in the selection or monitoring process of its suppliers or sourcing partners?
	Operations and suppliers at significant risk of human rights violations;	2	Human Rights Breaches Contractor	SOHRDP029	Does the company report or show to be ready to end a partnership with a sourcing partner if human rights criteria are not met?
	Respect for freedom of association;	3	Policy Freedom of Association	SOHRDP0101	Does the company describe, claim to have or mention the processes in place to ensure the freedom of association of its employees?
	Engagement with relevant stakeholders:	4	Stakeholder Engagement	CGVSDP023	Does the company explain how it engages with its stakeholders?
			Sub-score		**4**

Dimensions	Directive 2014/95/EU	No	Variables	Code	Dummy variable
Anti-corruption and bribery	Anti-corruption policies, procedures, and standards;	1	Policy Business Ethics	SOCODP0069	Is the company under the spotlight of the media because of a controversy linked to bribery and corruption, political contributions, improper lobbying, money laundering, parallel imports, or any tax fraud?
		2	Policy Bribery corruption	SOCODP0067	Does the company describe in the code of conduct that it strives to avoid bribery and corruption at all its operations?
	The number of pending or completed legal actions on anti-competitive behaviour.	3	Policy Fair Competition	SOCODP0066	Does the company describe in the code of conduct that it strives to be a fair competitor?
			Sub-score		**3**
			Total score		**31**

Appendix 2: List of variables

Variable	Measurement	Expected impact
NFD_scoreU	Measures the level of NFD score, without attributing equal weights to the sub-scores.	
NFD_scoreE	Measures the level of NFD score, attributing equal weights to the sub-scores.	
Post_2014	Dummy variable coded one for the fiscal years 2015, 2016, 2017, 2018 and 2019, and zero otherwise.	+
Implementation	Dummy variable coded one for the fiscal years 2017, 2018 and 2019, and zero otherwise.	+
Transit	Dummy variable coded one for the fiscal years 2015, and 2016, and zero otherwise.	+
Non_EU firms	Dummy variable coded one when the firm's headquarter is in non-European Union countries, and zero otherwise.	-
EU_employee	A logarithm of the total number of employees from European Union countries.	+
EU_ops	A percentage of the total revenues generated from European Union countries.	+
EU_firms	Dummy variable coded one when the firm's headquarter is in European Union countries, and zero otherwise.	+
Size	Firms' size, measured as the log of total assets	+
ROA	Return on assets, measured as earnings before extraordinary items divided by total assets, at the end of the fiscal year.	+
Leverage	Leverage, measured as total debt / total assets.	+
Assurance	Dummy variable coded one when sustainability report is assured, and zero otherwise.	+
CSR_committee	Dummy variable coded one when the firm has a CSR committee or team, and zero otherwise.	+
CSR_report	Dummy variable coded one when the firm publishes a separate CSR/ health and safety (H&S)/Sustainability report or publish a section in its annual report on CSR/health and safety (H&S)/Sustainability, and zero otherwise.	+
GRI	Dummy variable coded one if the firm's CSR report published in accordance with the GRI guidelines, and zero otherwise.	+
UNGC	Dummy variable coded one if the firm signed the UN Global Compact, and zero otherwise.	+
OECD	Dummy variable coded one if the firm claims to follow the OECD Guidelines for Multinational Enterprises, and zero otherwise.	+
NFD_Regulations	Dummy variable coded one if the firm is in a country that has any mandatory non-financial information disclosure regulation.	+

Paris	Dummy variable coded one if the firm is in a country that signed and applied Paris climate agreement, and zero otherwise.	+
Penalty	Dummy variable coded one if the firm is liable to a penalty for non-compliance with the EU Directivity and zero otherwise.	+

Graph 1: NFD score, and its sub-scores, by fiscal year

Note: the values of the y-axis represent the score, times 100.

Unweighted score

(*NFD_scoreU*)
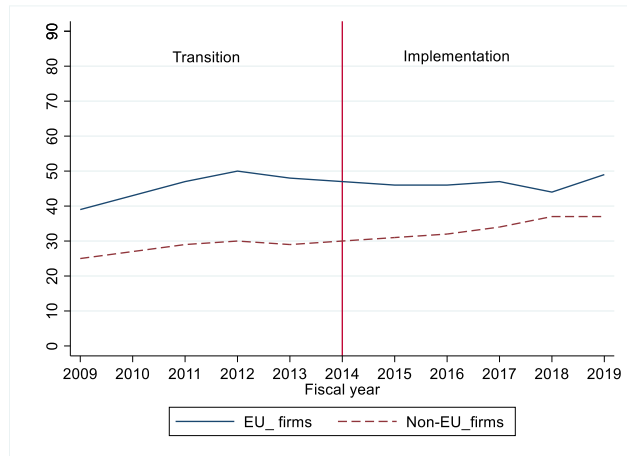
Equal weighted score

(*NFD_scoreE*)
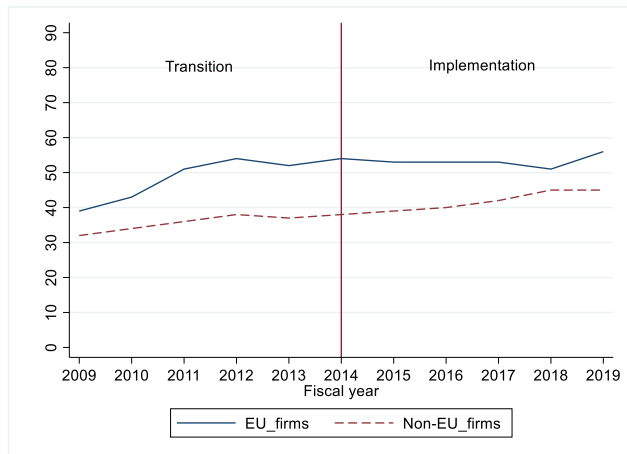
Social sub-score
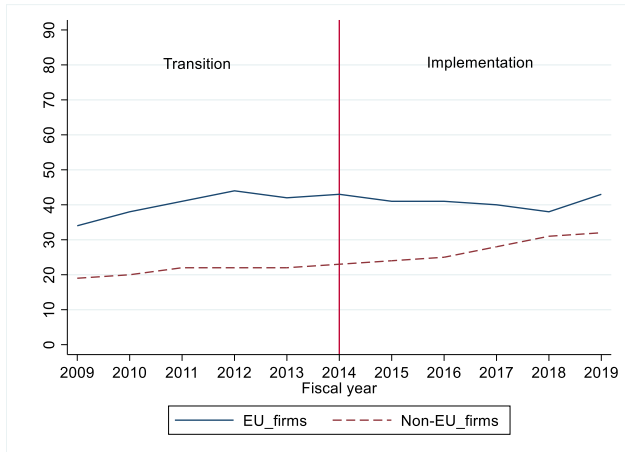
Environmental sub-score
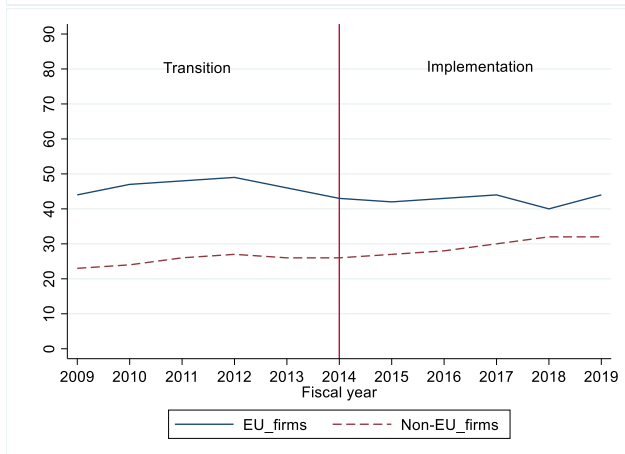
HR sub-score
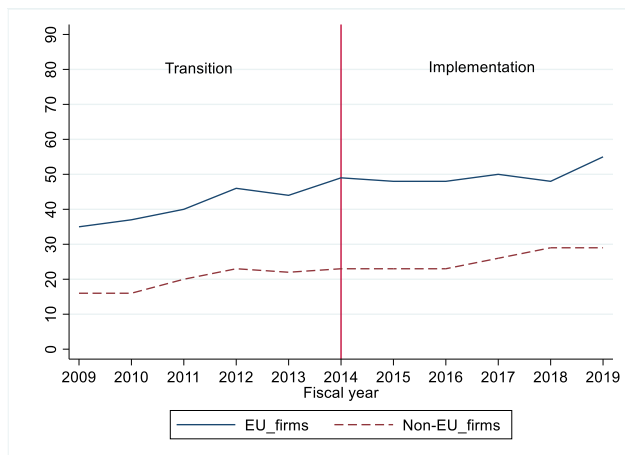
Anti-corruption sub-score
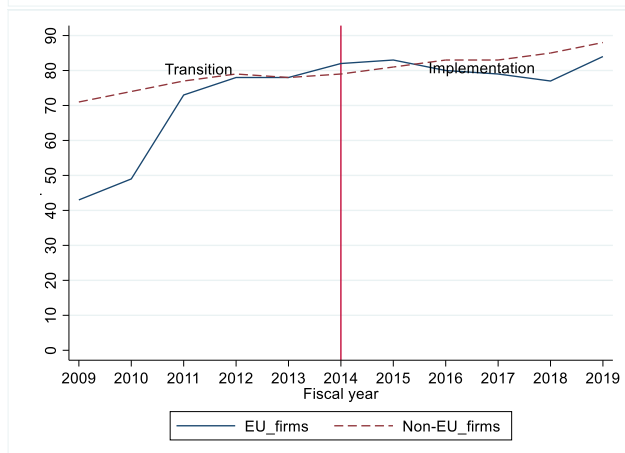
Table 1: Sample

	Number of firms
Oil and Gas producers (Refinitiv DataStream)	9,105
Dead firms	(6,899)
No data available	(30)
Total assets information not available	(441)
Non-financial information not available	(1,075)
Duplicate identifiers	(456)
Final sample	204

This table shows the final total number of firms in the sample.

Table 2: Panel A - Descriptive statistics

	All firms					EU firms					Non-EU firms				
	Mean	Std. Dev.	Median	Min	Max	Mean	Std. Dev.	Median	Min	Max	Mean	Std. Dev.	Median	Min	Max
NFD_scoreU	0.336	0.199	0.323	0.032	0.774	0.462	0.204	0.484	0.032	0.774	0.314	0.190	0.290	0.032	0.774
NFD_scoreE	0.409	0.194	0.375	0.000	0.816	0.511	0.206	0.504	0.000	0.816	0.392	0.187	0.354	0.000	0.816
Non_EU firms	0.856	0.351	1.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	1.000	1.000	1.000
EU_employee	0.327	1.616	0.000	0.000	11.095	1.905	3.575	0.000	0.000	11.095	0.062	0.653	0.000	0.000	9.243
EU_ops	2,625.291	12,444.213	0.000	0.000	112,587.477	10,218.794	26,082.334	0.000	0.000	112,587.477	1,352.424	7,477.655	0.000	0.000	84,360.031
Assurance	0.324	0.468	0.000	0.000	1.000	0.614	0.488	1.000	0.000	1.000	0.276	0.447	0.000	0.000	1.000
ROA	1.937	17.204	4.180	-226.290	268.740	1.964	10.799	3.970	-62.750	62.700	1.933	18.060	4.260	-226.290	268.740
CSR committee	0.628	0.483	1.000	0.000	1.000	0.738	0.441	1.000	0.000	1.000	0.610	0.488	1.000	0.000	1.000
CSR report	0.624	0.485	1.000	0.000	1.000	0.948	0.221	1.000	0.000	1.000	0.569	0.495	1.000	0.000	1.000
GRI	0.480	0.500	0.000	0.000	1.000	0.708	0.456	1.000	0.000	1.000	0.442	0.497	0.000	0.000	1.000
Leverage	0.252	0.177	0.236	0.000	1.978	0.248	0.159	0.235	0.000	1.351	0.252	0.180	0.236	0.000	1.978
Size	15.728	2.040	15.803	3.738	19.829	15.906	1.750	15.586	12.229	19.535	15.698	2.084	15.833	3.738	19.829
UNGC	0.234	0.423	0.000	0.000	1.000	0.481	0.501	0.000	0.000	1.000	0.192	0.394	0.000	0.000	1.000
OECD	0.062	0.241	0.000	0.000	1.000	0.253	0.436	0.000	0.000	1.000	0.029	0.169	0.000	0.000	1.000
NFD Regulations	0.183	0.387	0.000	0.000	1.000	0.614	0.488	1.000	0.000	1.000	0.111	0.314	0.000	0.000	1.000
Paris	0.094	0.292	0.000	0.000	1.000	0.090	0.287	0.000	0.000	1.000	0.095	0.293	0.000	0.000	1.000

See Appendix 2 for definition of variables.

Table 2: Panel B - Means by country

	Freq.	NFD_scoreU	NFD_scoreE
Australia	140	0.191	0.269
Brazil	30	0.378	0.448
Canada	354	0.261	0.346
China	34	0.308	0.322
France	22	0.469	0.470
India	44	0.520	0.545
Italy	22	0.657	0.672
Japan	43	0.324	0.310
Korea, Rep.	39	0.443	0.501
Norway	25	0.422	0.498
Poland	20	0.423	0.426
Russian Federation	75	0.435	0.452
Thailand	42	0.545	0.623
Turkey	20	0.510	0.588
United Kingdom	92	0.369	0.465
United States	454	0.287	0.391

Only shows countries with more than 20 observations. See Appendix 2 for definition of variables.

Table 2: Panel C - Means of NFD scores, and sub-scores, by fiscal year

	Social_scr	Envir_scr	HR_scr	Corrup_scr	NFD_scoreU	NFD_scoreE
2009	0.215	0.264	0.192	0.660	0.277	0.333
2010	0.232	0.272	0.195	0.702	0.291	0.350
2011	0.250	0.290	0.233	0.765	0.316	0.384
2012	0.255	0.303	0.261	0.790	0.330	0.403
2013	0.249	0.290	0.250	0.782	0.320	0.393
2014	0.260	0.281	0.266	0.794	0.323	0.400
2015	0.261	0.288	0.265	0.813	0.327	0.407
2016	0.271	0.302	0.264	0.824	0.338	0.415
2017	0.296	0.318	0.294	0.827	0.358	0.434
2018	0.324	0.334	0.316	0.841	0.378	0.454
2019	0.330	0.334	0.324	0.876	0.383	0.465

See Appendix 2 for definition of variables.

Table 2: Panel D - Pairwise Correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
(1) NFD_scoreU	1.000																		
(2) NFD_scoreE	0.899*	1.000																	
(3) Post_2014	0.117*	0.117*	1.000																
(4) Implementation	0.118*	0.118*	0.502*	1.000															
(5) Transit	-0.007	-0.006	0.470*	-0.258*	1.000														
(6) Non_EUfirms	-0.259*	-0.257*	0.024	0.010	0.010	1.000													
(7) EU_employee	0.250*	0.250*	-0.037	-0.030	-0.002	-0.400*	1.000												
(8) EU_ops	0.087*	0.087*	-0.033	0.001	-0.031	-0.250*	0.070*	1.000											
(9) Assurance	0.644*	0.643*	-0.029	0.001	-0.018	-0.253*	0.260*	0.113*	1.000										
(10) ROA	0.144*	0.144*	-0.120*	0.029	-0.185*	-0.001	0.026	0.027	0.124*	1.000									
(11) CSR_comm	0.491*	0.490*	0.044	0.066*	-0.018	-0.093*	0.109*	0.077*	0.396*	0.071*	1.000								
(12) CSR_report	0.717*	0.716*	0.057*	0.059*	-0.010	-0.275*	0.148*	0.124*	0.538*	0.156*	0.468*	1.000							
(13) GRI	0.730*	0.730*	0.030	0.041	-0.005	-0.187*	0.161*	0.138*	0.636*	0.135*	0.455*	0.746*	1.000						
(14) Lev	0.054*	0.054*	0.167*	0.046	0.120*	0.008	-0.023	-0.043	0.016	-0.131*	-0.029	0.019	0.052*	1.000					
(15) Size	0.628*	0.626*	-0.102*	-0.067*	-0.035	-0.036	0.157*	0.019	0.483*	0.304*	0.398*	0.567*	0.517*	0.047	1.000				
(16) UNGC	0.506*	0.505*	-0.009	-0.018	0.008	-0.239*	0.220*	0.090*	0.514*	0.068*	0.259*	0.399*	0.513*	0.061*	0.396*	1.000			
(17) OECD	0.365*	0.361*	-0.017	0.009	-0.010	-0.326*	0.493*	0.079*	0.310*	0.032	0.165*	0.189*	0.221*	0.001	0.203*	0.313*	1.000		
(18)NFI_Regulations	0.198*	0.197*	0.054*	0.030	0.025	-0.456*	0.091*	0.161*	0.265*	0.049*	0.120*	0.322*	0.257*	-0.034	0.215*	0.285*	0.051*	1.000	
(19) Paris	-0.006	-0.005	0.308*	-0.159*	0.629*	0.006	-0.007	-0.024	-0.025	-0.049*	-0.009	-0.019	-0.023	0.077*	-0.053*	-0.004	-0.013	-0.011	1.000

* Statistical significance at the 0.05 level. See Appendix 2 for definition of variables

Table 3: Panel A - The association of EU's Directive with NFD scores

	M1- NFD_scoreU				M2 - NFD_scoreU				M3 - NFD_scoreU				M3 - NFD_scoreE		
	Coef.	p-value	Sig		Coef.	p-value	Sig		Coef.	p-value	Sig		Coef.	p-value	Sig
Post_2014	0.072	0.000	***												
Implementation					0.075	0.000	***		0.077	0.000	***		0.082	0.000	***
Transit									0.010	0.045	**		0.017	0.001	***
Assurance	0.037	0.001	***		0.031	0.010	***		0.031	0.009	***		0.039	0.005	***
ROA	0.000	0.956			0.000	0.059	*		0.000	0.095	*		-0.000	0.379	
CSR_committee	0.043	0.000	***		0.041	0.000	***		0.041	0.000	***		0.034	0.003	***
CSR_report	0.063	0.000	***		0.069	0.000	***		0.069	0.000	***		0.049	0.000	***
GRI	0.052	0.000	***		0.054	0.000	***		0.054	0.000	***		0.049	0.005	***
Leverage	0.014	0.444			0.053	0.004	***		0.049	0.009	***		0.041	0.036	**
Size	0.024	0.000	***		0.019	0.001	***		0.019	0.001	***		0.017	0.026	**
UNGC	0.012	0.479			0.024	0.188			0.023	0.205			0.047	0.055	*
OECD	0.056	0.023	**		0.046	0.050	*		0.047	0.050	**		0.025	0.364	
NFD_Regulations	0.006	0.796			0.036	0.095	*		0.033	0.120			0.061	0.027	**
Paris	-0.022	0.000	***		0.028	0.000	***		0.021	0.000	***		0.016	0.002	***
Constant	-0.184	0.047	**		-0.109	0.222			-0.115	0.200			-0.005	0.970	
Firm FE	Included				Included				Included				Included		
N	1,623				1,623				1,623				1,623		
Adjusted R-squared	0.722				0.719				0.719				0.592		
Prob>F	0.000				0.000				0.000				0.000		
Mean VIF	1.610				1.590				1.760				1.670		

*** p<.01, ** p<.05, * p<.1. See Appendix 2 for definition of variables.

Table 4: Non-EU firms

	NFD_scoreU			NFD_scoreE			Social			Environmental			HR			Anti-corruption		
	Coef.	p-value	Sig	Coef.	p-value	Sig	Coef.	p-value	Sig	Coef.	p-value	Sig	Coef.	p-value	Sig	Coef.	p-value	Sig
Non_EU firms	-0.050	0.096	*	-0.009	0.781		-0.066	0.053	*	-0.083	0.039	**	-0.013	0.750		0.138	0.112	
Implementation	0.046	0.000	***	0.074	0.000	***	0.033	0.064	*	0.021	0.230		0.110	0.001	***	0.138	0.004	***
Transit	0.014	0.279		0.037	0.012	**	0.012	0.505		-0.012	0.427		0.054	0.063	*	0.092	0.001	***
Transit*Non_EU firms	-0.004	0.785		-0.021	0.184		-0.010	0.617		0.021	0.197		-0.045	0.137		-0.050	0.096	*
Implementation*Non_EU firms	0.030	0.040	**	0.004	0.799		0.049	0.017	**	0.047	0.014	**	-0.039	0.284		-0.048	0.335	
Assurance	0.039	0.001	***	0.043	0.001	***	0.041	0.023	**	0.032	0.018	**	0.074	0.006	***	0.035	0.245	
ROA	0.000	0.026	**	-0.000	0.194		0.000	0.063	*	0.000	0.042	**	0.000	0.261		0.000	0.720	
CSR_committee	0.045	0.000	***	0.040	0.000	***	0.053	0.000	***	0.044	0.000	***	0.054	0.013	**	0.012	0.581	
CSR_report	0.069	0.000	***	0.049	0.000	***	0.055	0.000	***	0.104	0.000	***	0.048	0.078	*	-0.008	0.776	
GRI	0.063	0.000	***	0.057	0.001	***	0.065	0.000	***	0.069	0.000	***	0.092	0.002	***	0.014	0.728	
Leverage	0.039	0.021	**	0.037	0.045	**	0.041	0.085	*	0.038	0.078	*	0.058	0.093	*	-0.006	0.891	
Size	0.026	0.000	***	0.021	0.000	***	0.016	0.000	***	0.038	0.000	***	0.024	0.000	***	0.008	0.487	
UNGC	0.032	0.036	**	0.051	0.017	**	0.015	0.515		0.018	0.257		0.112	0.010	**	0.075	0.054	*
OECD	0.067	0.001	***	0.047	0.059	*	0.101	0.002	***	0.072	0.001	***	0.059	0.268		-0.023	0.726	
NFD_Regulations	0.010	0.585		0.022	0.389		0.000	0.998		-0.005	0.807		0.106	0.000	***	-0.020	0.811	
Paris	0.021	0.000	***	0.015	0.004	***	0.022	0.001	***	0.028	0.000	***	0.009	0.419		0.004	0.645	
Constant	-0.202	0.002	***	-0.075	0.329		-0.078	0.262		-0.407	0.000	***	-0.313	0.001	***	0.474	0.020	**
N		1,623			1,623			1,623			1,623			1,623			1,623	
Adjusted R-squared		0.726			0.598			0.518			0.710			0.586			0.108	
Prob > chi2		0.000			0.000			0.000			0.000			0.000			0.000	
Mean VIF		3.360			3.360			3.360			3.360			3.360			3.360	

*** p<.01, ** p<.05, * p<.1. See Appendix 2 for definition of variables.

Table 5: Panel A - EU employees

	NFD_scoreU			NFD_scoreE			Social			Environmental			HR			Anti-corruption		
	Coef.	p-value	Sig	Coef.	p-value	Sig	Coef.	p-value	Sig	Coef.	p-value	Sig	Coef.	p-value	Sig	Coef.	p-value	Sig
EU_employee	0.004	0.028	**	0.003	0.190		0.006	0.015	**	0.005	0.230		0.008	0.273		-0.007	0.205	
Implementation	0.080	0.000	***	0.081	0.000	***	0.088	0.000	***	0.074	0.000	***	0.076	0.000	***	0.087	0.000	***
Transit	0.007	0.166		0.013	0.018	**	0.002	0.759		0.005	0.499		0.009	0.428		0.037	0.001	***
Transit*EU_employee	-0.009	0.702		-0.013	0.347		-0.004	0.774		-0.008	0.878		-0.019	0.298		-0.024	0.145	
Implementation*EU_employee	0.051	0.081	*	0.037	0.096	*	0.035	0.446		0.067	0.050	*	0.160	0.007	***	-0.113	0.051	*
Assurance	0.033	0.016	**	0.040	0.008	***	0.035	0.091	*	0.018	0.247		0.086	0.006	***	0.023	0.426	
ROA	0.000	0.117		-0.000	0.516		0.000	0.160		0.000	0.084	*	0.000	0.614		0.000	0.536	
CSR_committee	0.042	0.000	***	0.038	0.001	***	0.043	0.021	**	0.047	0.001	***	0.043	0.092	*	0.017	0.394	
CSR_report	0.062	0.000	***	0.045	0.002	***	0.044	0.007	***	0.095	0.000	***	0.041	0.143		0.002	0.954	
GRI	0.058	0.001	***	0.048	0.010	***	0.063	0.000	***	0.065	0.003	***	0.064	0.057	*	-0.001	0.979	
Leverage	0.059	0.002	***	0.054	0.005	***	0.056	0.050	**	0.063	0.010	**	0.087	0.028	**	0.009	0.832	
Size	0.018	0.002	***	0.016	0.040	**	0.016	0.060	*	0.023	0.000	***	0.015	0.075	*	0.012	0.628	
UNGC	0.033	0.131		0.050	0.100		0.011	0.743		0.027	0.149		0.047	0.465		0.116	0.029	**
OECD	0.040	0.072	*	0.014	0.641		0.045	0.252		0.067	0.006	***	0.082	0.227		-0.123	0.080	*
NFD_Regulations	0.035	0.137		0.069	0.027	**	0.013	0.778		-0.001	0.983		0.175	0.000	***	0.087	0.416	
Paris	0.023	0.000	***	0.016	0.006	***	0.022	0.002	***	0.032	0.000	***	0.007	0.607		0.004	0.672	
Constant	-0.114	0.201		0.003	0.982		-0.123	0.332		-0.240	0.016	**	-0.180	0.171		0.550	0.141	
Firm FE	Included			Included			Included			Included			Included			Included		
N	1,390			1,390			1,390			1,390			1,390			1,390		
Adjusted R-squared	0.735			0.592			0.500			0.738			0.581			0.163		
Prob > chi2	0.000			0.000			0.000			0.000			0.000			0.000		
Mean VIF	1.640			1.650			1.640			1.640			1.640			1.640		

*** p<.01, ** p<.05, * p<.1. See Appendix 2 for definition of variables.

Table 5: Panel B - EU operations

	NFD_scoreU			NFD_scoreE			Social			Environmental			HR			Anti-corruption		
	Coef.	p-value	Sig	Coef.	p-value	Sig	Coef.	p-value	Sig	Coef.	p-value	Sig	Coef.	p-value	Sig	Coef.	p-value	Sig
EU_ops	-0.010	0.591		-0.000	0.027	**	0.001	0.965		0.002	0.923		-0.002	0.956		-0.116	0.082	*
Implementation	0.076	0.000	***	0.077	0.000	***	0.082	0.000	***	0.073	0.000	***	0.071	0.000	***	0.083	0.000	***
Transit	0.005	0.358		0.011	0.054	*	0.000	0.993		0.002	0.754		0.008	0.469		0.035	0.002	***
Transit* EU_ops	0.037	0.145		0.022	0.241		0.045	0.244		0.051	0.230		0.007	0.741		-0.017	0.505	
Implementation* EU_ops	0.086	0.001	***	0.080	0.048	**	0.160	0.003	***	0.043	0.076	*	0.173	0.038	**	-0.008	0.927	
Assurance	0.033	0.013	**	0.039	0.010	***	0.033	0.110		0.019	0.209		0.084	0.006	***	0.025	0.397	
ROA	0.000	0.106		-0.000	0.516		0.000	0.135		0.000	0.081	*	0.000	0.617		0.000	0.540	
CSR_committee	0.044	0.000	***	0.038	0.001	***	0.045	0.012	**	0.048	0.001	***	0.044	0.086	*	0.019	0.362	
CSR_report	0.062	0.000	***	0.045	0.002	***	0.046	0.004	***	0.095	0.000	***	0.041	0.140		0.002	0.935	
GRI	0.057	0.001	***	0.049	0.006	***	0.061	0.000	***	0.064	0.004	***	0.064	0.058	*	-0.001	0.972	
Leverage	0.059	0.002	***	0.054	0.005	***	0.057	0.044	**	0.063	0.013	**	0.092	0.022	**	0.007	0.860	
Size	0.018	0.002	***	0.016	0.039	**	0.016	0.057	*	0.023	0.000	***	0.015	0.073	*	0.012	0.616	
UNGC	0.033	0.140		0.048	0.120		0.009	0.774		0.026	0.161		0.046	0.475		0.118	0.025	**
OECD	0.043	0.029	**	0.010	0.719		0.055	0.085	*	0.066	0.018	**	0.091	0.148		-0.127	0.076	*
NFD_Regulations	0.030	0.172		0.050	0.096	*	0.007	0.864		-0.003	0.926		0.169	0.000	***	0.069	0.516	
Paris	0.023	0.000	***	0.017	0.004	***	0.022	0.002	***	0.032	0.000	***	0.006	0.626		0.005	0.593	
Constant	-0.117	0.196		0.005	0.969		-0.126	0.320		-0.244	0.016	**	-0.183	0.166		0.552	0.142	
Firm FE	Included			Included			***			Included			Included			Included		
N	1,390			1,390			1,390			1,390			1,390			1,390		
Adjusted R-squared	0.737			0.592			0.503			0.738			0.583			0.164		
Prob > chi2	0.000			0.000			0.000			0.000			0.000			0.000		
Mean VIF	1.660			1.630			1.660			1.660			1.660			1.660		

	H1			H2			H3a			H3b		
	Coef.	p-value	Sig	Coef.	p-value	Sig	Coef.	p-value	Sig	Coef.	p-value	Sig
Non_EUfirm				-0.061	0.224							
EU_employee							0.004	0.000	***			
EU_ops										0.111	0.002	***
Implementation	0.087	0.000	***	0.065	0.000	***	0.067	0.000	***	0.125	0.000	***
Transit	-0.001	0.961		0.009	0.399		-0.007	0.384		-0.020	0.402	
Transit*Non_EU firms				-0.010	0.677							
Implementation*Non_EUfirms				0.055	0.085	*						
Transit* EU_employee							0.008	0.303				
Implementation* EU_employee							-0.008	0.817				
Transit* EU_ops										0.074	0.114	
Implementation* EU_ops										0.016	0.666	
Firm-level controls	Included			Included			Included			Included		
Firm FE	Included			-			Included			Included		
N	262			262			131			131		
Adjusted R-squared	0.446			0.477			0.599			0.657		
Prob > chi2	0.000			0.000			0.000			0.000		
Mean VIF	1.600			1.920			1.600			2.070		

*** p<.01, ** p<.05, * p<.1. See Appendix 2 for definition of variables.

Table 7: The association of EU's Directive with CSR activities

	H1			H2			H3a			H3b		
	Coef.	p-value	Sig	Coef.	p-value	Sig	Coef.	p-value	Sig	Coef.	p-value	Sig
Non_EUfirms				-4.683	0.137							
EU_employee							0.340	0.158				
EU_ops										-2.511	-7.894	
Implementation	3.879	0.000	***	2.428	0.133		3.878	0.000	***	3.756	2.395	***
Transit	1.814	0.001	***	2.768	0.098	*	1.605	0.004	***	1.612	0.481	***
Transit*Non_EU firms				-1.100	0.530							
Implementation*Non_EUfirms				0.859	0.633							
Transit*EU_employee							1.784	0.654				
Implementation*EU_employee							6.143	0.003	***			
Transit* EU_ops										-0.539	0.761	
Implementation* EU_ops										3.398	0.467	
Firm-level controls	Included			Included			Included			Included		
Firm FE	Included			-			Included			Included		
N	1,623			1,623			1,390			1,390		
Adjusted R-squared	0.799			0.807			0.767			0.770		
Prob > chi2	0.000			0.000			0.000			0.000		
Mean VIF	1.750			2.990			1.700			1.750		

*** p<.01, ** p<.05, * p<.1. See Appendix 2 for definition of variables.