Migration of Global Supply Chains: A Real Effect of Mandatory ESG Disclosure[*]

Hai Lu
University of Toronto and Peking University
Hai.lu@rotman.utoronto.ca

Qilin Peng
University College Dublin
Qilin.peng@rotman.utoronto.ca

Jee-Eun Shin
University of Toronto
Je.shin@rotman.utoronto.ca

Luping Yu
Xiamen University
lupingyu@xmu.edu.cn

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Abstract

This study examines firms' global supply chain strategies following the staggered introduction of mandatory ESG disclosure in different countries. We find that mandatory ESG disclosure is associated with migration of suppliers to countries with opaque ESG-related corporate information environments and that such migration results in improvement of firms' perceived ESG profile. These findings suggest that mandated ESG disclosures motivate firms to appear *de jure* compliant with the mandates, but *de facto* ignorant about their real ESG-related responsibilities of their suppliers. Our findings also show that such effects are mitigated if the disclosure mandates include more targeted demands on supply chain due diligence processes. Further results indicate that supply chain composition changes in response to mandated ESG disclosure are less pronounced for firms located in countries with higher ESG-related social awareness, and firms subject to stronger external governance mechanisms such as monitoring of analysts and institutional investors. Our study informs policymakers and regulators on the global supply chain consequences stemming from the implementation of sustainability reporting guidelines.

Key Words: ESG, Disclosure, Supply Chain, Regulations

1. INTRODUCTION

Heightened awareness on environmental, social, and governance (ESG) issues led to enhanced demand for ESG-related information to understand corporate performance by various stakeholders. A major criticism of many ESG disclosure regulations, however, is extreme heterogeneity in firms' ESG-related practices with regards to measurement, comparability, and standardization in reporting guidelines (Christensen, Hail, and Leuz, 2021). Given the absence of well-defined measurement, auditing, and enforcement systems that have posed significant challenges in mandating ESG information disclosure, this study examines whether and how mandatory ESG information disclosure regulations impact firms' global supply chain decisions.

Our motivation to examine firms' supply chain practices stems from existing research that documents how current reporting standards fail to adequately capture firms' sustainability-related activities along the entire supply chain (Kaplan and Ramanna, 2021). For example, multinational firms have long been accused of unethical sourcing practices in countries with poor working conditions to save on labor costs.[1] Supply chain decisions also span many environmental issues such as pollution activities of factories at which manufacturing is outsourced (Dai, Duan, Liang, and Ng, 2022). Accordingly, implementing *real* changes in ESG-related supply chain management practices requires significant investments and time in firms' supply chains. Yet, requiring detailed disclosure of such practices may also likely invite significant attention from social activists, given that their demands extend beyond compliance-based minimum standards.[2]

Whether mandatory ESG disclosure regulations will impact firms' supply chain decisions remains an open empirical question. On the one hand, if firms experience pressures to improve their ESG-related corporate image due to the mandate and when switching costs are marginal, they may choose a supply chain network that can minimize exposure to ESG-related risks. Firms may do so by only appearing to be compliant with ESG-related issues in their supply chain. That is,

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1 See for example the article: https://www.theguardian.com/world/2001/may/20/burhanwazir.theobserver.

2 See for example the article that illustrates the significant involvement of social activist campaigns that induced changes in corporate behavior: https://www.theguardian.com/sustainable-business/2015/feb/09/corporate-ngo-campaign-environment-climate-change.

they may select suppliers located in jurisdictions that do not provide detailed ESG-related information and, thereby, being *de jure* compliant with the ESG-related disclosure mandates but *de facto* ignorant about their ESG-related responsibilities of their suppliers. Despite heightened ESG-related social awareness echoed by various stakeholders including social activist campaigns, these supply chain strategies may go unnoticed because obtaining in-depth information and actual monitoring of suppliers' local management practices is costly. On the other hand, although responding by changing firms' supplier selections may comprise an immediate strategy to evade reputational risks stemming from mandatory ESG disclosure standards, doing so may be too costly if firms rely on long-term contractual supplier relationships in their operations (e.g., Costello, 2013). If so, it is possible that heightened stakeholder attention on ESG issues accompanied by the implementation of mandatory ESG disclosures may incentivize firms to pressure existing suppliers to adhere to ESG standards.[3] This would predict no change in firms' supply chain configurations. At the other extreme, the mandate might also exert pressure on firms to adjust their supplier selections by choosing suppliers that provide more high-quality ESG-related information (e.g., Darendeli, Fiechter, Hitz, and Lehmann, 2022).

We examine our research question by using supply chain data of 22,400 global firms from FactSet Revere Global Supply Chain spanning 2003 to 2019. We collect data on mandatory ESG disclosure regulations in different countries using a variety of data sources, and examine the change in firms' global supply chain composition following the implementation year of the mandatory ESG disclosure regulations.[4] Thus, our empirical estimation follows a standard difference-in-differences design with firm- and year- fixed effects whereby we compare the supply chain composition of firms subject to mandatory disclosure (i.e., treated) to those that were not

[3] A recent survey of Chinese listed firms documents that 45% of upstream firms feel pressure from downstream firms on the improvement of ESG performance after China increases its ESG disclosure requirements in 2022 (Figure 9, https://mp.weixin.qq.com/s/ElqA8XVNr9tKmZAcUNgNtQ).

[4] Data on mandatory ESG disclosure regulations are collected from Carrots & Sticks, the UN PRI regulation database, the Sustainable Stock Exchanges Initiative, CSR Europe and the GRI. We also reference recent studies that use country-level data on mandatory ESG disclosure regulations (i.e., Krueger, Sautner, Tang, and Zhong, 2023; Wang, 2023; and Gibbons, 2023). Appendix A provides a summary of the details of these regulations.

(i.e., control).[5] To capture firms' global supply chain composition, we classify suppliers based on whether they are located in countries with or without mandatory ESG disclosure. The intuition is that customer firms are more likely to appear transparent about their ESG-related responsibilities without disclosing details of the management practices of their suppliers when the regulations in the countries in which suppliers are located neither require nor enforce the disclosure of such information. Specifically, we consider two proxies. First, we examine supply chain *expansion* by using the natural logarithm of the number of new suppliers from countries without mandatory ESG disclosure. Second, we examine *switching* from existing suppliers to new suppliers located in countries without mandatory ESG disclosure, controlling for the size of the overall supplier network.[6]

Our empirical findings lend support for the conjecture that mandatory ESG disclosure leads firms to adjust their supply chain composition to benefit from more opaque ESG standards of their suppliers. We find that, after the introduction of mandatory ESG disclosure, firms reduce their existing relationship with suppliers located in their country (hereafter, domestic suppliers) and establish more new relationships with suppliers from countries without mandatory ESG disclosure (hereafter, foreign opaque suppliers) but not with suppliers from countries with mandatory ESG disclosure (hereafter, foreign transparent suppliers). These results hold for both, when we consider only the number of new suppliers and the fraction of suppliers from countries without mandatory ESG disclosure out of the entire supply chain. Collectively, these findings highlight a real effect of mandating ESG reporting in individual jurisdictions. That is, due to complex global supply chain configurations, firms located in areas with enhanced ESG disclosure requirements transfer their ESG-related responsibilities to their suppliers.

Our findings also highlight the importance of targeted and more detailed guidelines that accompany mandatory ESG disclosure regulations to mitigate the potential adverse effects

[5] For countries with multiple treatments (i.e., countries that passed several mandatory ESG disclosure regulations), we take the earliest year. Moreover, the term country effectively refers to countries and regions because our sample includes Hong Kong Special Administrative Region (S.A.R.) and the Taiwan region.

[6] We note that the two supply chain composition changes need not necessarily be mutually exclusive.

associated with supplier selection decisions. Countries may specifically require the disclosure of supply chain due diligence processes either by including supply chain related elements along with other ESG-related guidelines, and/or by implementing a stand-alone regulation focusing on supply chain elements in later years. To examine the *incremental* effect of mandated ESG disclosure regulations that specifically target supply chain due diligence processes, we confine our analyses on the sample of firms located in countries that have ever implemented mandatory ESG disclosure regulations (i.e., "ever-treated") and include an indicator for such regulations that explicitly mandate the disclosure of supply chain due diligence processes. We continue to find that firms rely on fewer domestic suppliers and more foreign opaque suppliers following mandatory ESG disclosures. However, we also find that those ESG disclosure regulations specifically including supply chain due diligence processes are associated with firms selecting a higher number of more transparent suppliers.

Next, we examine heterogeneous treatment effects for the observed supply chain composition changes following the introduction of mandatory ESG disclosure depending on country-level and firm-level contextual factors that have been shown to influence firms' corporate governance practices. At the country-level, we examine the impact of social awareness on ESG-related issues and the strength of legal enforcement. To examine the former, we use the Environmental Performance Index (EPI) and Social Progress Index (SPI) as a proxy for social awareness on ESG-related issues of the firms' country in which the mandatory ESG disclosure regulation has been passed.[7] Our results show that greater social awareness on ESG-related issues mitigates the supply chain strategy of transferring ESG-related responsibilities to more opaque suppliers. That is, in countries where ESG-related awareness is strong, we find that mandatory ESG disclosure is associated with a decrease in the number of new foreign opaque suppliers, but with an increase in new foreign transparent suppliers. To examine the impact of the strength of legal enforcement, we

[7] The Environmental Performance Index (EPI) provides a data-driven summary of the state of sustainability around the world. EPI data is obtained from Yale Center for Environmental Law & Policy. The Social Progress Index (SPI) measures the extent to which countries provide for the social and environmental needs of their citizens. SPI data is provided by the Social Progress Imperative.

use the Rule of Law index that captures the extent to which agents in a country have confidence in and abide by the rules of society. We find that the supply chain migration activities are concentrated by firms in countries with a higher degree of law enforcement, aligning with previous research that highlights the importance of enforcement by regulatory bodies, rather than the regulation per se (e.g., Kedia and Rajgopal, 2011).

At the firm-level, we consider two external corporate governance mechanisms: analyst coverage (e.g., Chen, Harford, and Lin, 2015) and institutional ownership (e.g., Bushee, 1998; Chen, Dong, and Lin, 2020). We find that supply chain migration activities are mitigated in firms that are followed by more analysts and in firms that have higher institutional ownership. Collectively, these results corroborate the role of financial intermediaries as external monitors. Moreover, previous research shows that financially constrained firms face higher regulatory costs stemming from ESG-related policies (Bartram, Hou, and Kim, 2022). Consistent with these findings, we document that the shift towards suppliers located in countries without mandatory ESG disclosure is more likely to occur among firms subject to greater financial constraints.

We also examine potential consequences following the introduction of mandatory ESG disclosure. First, we explore whether mandatory ESG disclosure is associated with reported ESG performance using two outcome measures: reported ESG incidents and reported greenhouse gas emissions. We find that the introduction of mandatory ESG disclosure is associated with an overall decline in the number of reported ESG incidents – i.e., an improvement in firms' overall ESG profile. This effect is more pronounced for firms that engaged in supply chain migration activities in the three years following the introduction of mandated ESG disclosure. Greenhouse gas emissions specifically focus on environment-related elements. Thus, in our analyses examining changes in firms' reported greenhouse gas emissions, we focus on the implementation of mandatory environment-related ESG disclosures. Consistent with the results using reported ESG incidents as the outcome variable, we find an overall decline in reported greenhouse gas emissions following mandatory disclosures that include environment-related considerations and that such effects are primarily driven by firms that engage in supply chain migration activities. Collectively, these results suggest that firms adjust their supply chain management strategies to improve perceived ESG profiles and they are at least partially successful.

Second, we explore whether and how mandatory ESG disclosure is associated with changes in firms' cost structure. A potential explanation for observing changes in the global supply chain composition towards suppliers may be that it is simply driven by rising production costs such that firms have incentives to relocate production to relatively underdeveloped countries. Whereas we find an overall increase in production costs following the introduction of mandatory ESG disclosure, we do not find significant differences in cost increases between firms that engaged in supply chain migration activities and those that did not in the three years following the introduction of mandated ESG disclosure. This latter finding corroborates that the differential adjustments in supply chain composition in response to mandatory ESG disclosure may not be driven purely by cost-based motives, but partially also based on reputational concerns associated with ESG-related responsibilities.

This paper contributes to mainly two strands of literature. First, our study adds to the literature that examines the real effects of mandatory disclosure regulations. Whereas the intended benefits from mandatory disclosure primarily revolve around reducing information asymmetry that allows for better capital allocation across the economy, a growing literature also documents (costly) unintended consequences arising from the introduction of mandatory disclosures. For example, Jayaraman and Wu (2019) argue that mandatory disclosure elicits lower investment efficiency by discouraging informed trading. Studies also document unintended spillover effects resulting from the introduction of mandatory disclosure regulations across different jurisdictions. For example, Breuer, Hombach, and Müller (2022) show that regulated firms' mandatory disclosures can have a crowding-out effect on unregulated firms' voluntary disclosures. Specifically, with regards to mandatory *ESG-related* information, prior research provides evidence suggestive of supply chain-related real effects that improve ESG-related firm outcomes (e.g., Darendeli et al., 2022; Fiechter, Hitz, and Lehmann, 2022; She, 2022). Our study documents one potential mechanism for how firms improve their reported ESG performance. That is, customer firms transfer their ESG-related responsibilities to suppliers located in opaque corporate information environments.

Second, our study adds to the supply chain literature on sustainable practices that examines how firm policies are influenced by customers and suppliers (Dai et al., 2021), and how risks are transmitted within the supply chain (Schiller, 2018). Our analyses address whether the limited availability of information on suppliers' ESG practices may induce firms to improve their ESG images by migrating their poor ESG activities to their suppliers. Confining our analyses to environment-related disclosures only due to the relative availability of well-defined environmental performance metrics (i.e., greenhouse gas emissions), we indeed provide corroborating evidence that mandatory environment disclosures resulted in a decrease in reported greenhouse gas emissions with the effect being primarily driven by firms that engaged in such supply chain migration strategies. An important policy implication from our findings is, thus, that mandates requiring the disclosure of ESG information requires sufficient accompanying guidelines and reporting systems instead of merely requiring firms to provide such disclosures.

2. PRIOR LITERATURE & HYPOTHESES DEVELOPMENT

Increased societal pressure for sustainable management practices has prompted regulatory changes *mandating* the disclosure of such information in many countries (e.g., Christensen et al., 2021; Krueger et al., 2023). The increase in ESG transparency resulting from these mandatory disclosures would enhance firms' commitment to ESG-related activities, thereby satisfying the demands of various external stakeholders. However, reporting on firms' ESG activities significantly differs from traditional financial reporting. Whereas the purpose of financial reporting lies in providing external stakeholders (mainly investors) information about the results of operations, financial position, and cash flows of an organization, there is considerable heterogeneity in the range of interests, preferences, and objectives for reporting on firms' ESG-related activities. This inevitably creates many challenges in defining, measuring, and standardizing guidelines for firms' ESG-related information. As a result, external stakeholders are predominantly reliant on firms' voluntary and selective disclosures in evaluating ESG performance. Accordingly, credibly differentiating between firms' actual ESG-related activities and what they report remains a significant challenge (Christensen et al., 2021).

The ambiguity surrounding well-defined ESG information, given its overarching focus spanning a variety of different topics and stakeholders, creates managerial opportunities to shape ESG information disclosures with the primary goal of maximizing firm valuation. In fact, earlier research in accounting shows that, in the context of earnings announcements, managers have incentives to time the release of information disclosures (e.g., Kothari, Shu, and Wysocki, 2009), use various information disclosure channels (e.g., Crowley, Huang, and Lu, 2022), and leverage communication style and tone (e.g., Huang, Teoh, and Zhang, 2014) to influence market returns. Moreover, research examining the effects of voluntary ESG-related information disclosures documents associations with decreased cost of capital and analyst forecast errors (e.g., Dhaliwal, Li, Tsang, and Yang, 2011; Dhaliwal, Radhakrishnan, Tsang, and Yang, 2012), thereby providing evidence of positive capital market effects from signaling engagement in ESG-related activities to external stakeholders.

On the contrary, using the passage of a directive in the European Union (EU) which *mandated* increased ESG disclosures, Grewal, Riedl, and Serafeim (2019) document an average negative market reaction across all firms, and that such negative effects are more pronounced with weak ESG performance and disclosure. Prior research also suggests that mandating ESG disclosures is associated with wider-reaching impacts affecting society, beyond just shareholders. Chen, Hung, and Wang (2018) examine the impact of mandating ESG disclosure on social externalities using China's 2008 mandate requiring firms to disclose CSR activities. They find that mandatory CSR reporting firms experience a decrease in profitability, but that cities most impacted by the disclosure mandate also experienced a decrease in their pollution levels. Whereas the empirical evidence in their study suggests that mandatory ESG disclosure alters firm behaviors to generate positive social externalities at the expense of shareholders, such “redistribution” effects may be difficult to materialize in the absence of strong regulatory institutions capable of enforcing ESG obligations.

Without well-defined measurement, auditing, and enforcement systems, mandating ESG information disclosure can create firm incentives that may generate negative social externalities. The passage of mandatory ESG disclosure regulations is likely accompanied by heightened awareness for ESG issues. Social activists advocating for improvement in many environmental and social issues have long targeted corporations due to their irresponsible practices. In recent years, many multinational corporations have invested resources in their supply chains to address the demands from such activists. For example, H&M, a large clothing retailer, addressed the issue of low payment to factory workers at their supplier factories by implementing wage management systems. Distelhorst and Shin (2022) show that the wage interventions were associated with some increase in overall average annual worker wages. Yet, initial investments in the wage-related interventions in H&M’s supply chain had been heavily criticized by social activists for not having met their commitments.[8] The difficulty in achieving substantial changes on many ESG-related issues stems from a lack of collective effort that involves various stakeholders. In the case of H&M’s wage goals, for example, the involvement of other retail brands, along with local governments and markets, is imperative in making a significant impact.

When substantial ESG-related efforts disclosed by large corporations like H&M received negative attention, smaller firms with relatively weaker ESG profiles may be even more deterred from disclosing details about their internal operations. That is, firms may consider it a safer strategy to respond to mandated ESG disclosure by signaling compliance with an acceptable minimum ESG standard as opposed to offering more detailed disclosures. Signaling such compliance is relatively more feasible considering firms’ supply chain practices as it transcends

[8] For example, see the article published at https://www.business-humanrights.org/en/latest-news/hm-accused-of-failing-to-ensure-fair-wages-for-global-factory-workers.

beyond the legal boundaries of the firm. Moreover, current limitations in reporting standards fail to adequately capture firms' sustainability-related activities along the entire supply chain (Kaplan and Ramanna, 2021). For example, Dai et al. (2022) show that firms "outsource" their carbon emissions to foreign suppliers – a tendency that is more pronounced for firms that face heightened domestic pressures for better environmental performance. Accordingly, mandating ESG-related disclosures may encourage firms to resort to suppliers with weaker ESG-related corporate information environments because it would allow them to evade disclosure obligations at their supplier firms. Thereby, the costly obligation to obtain detailed information on *actual* supplier practices would be tossed to the firms' external stakeholders. In fact, to address this issue, an increasing number of countries have adopted supply chain laws which hold customer firms liable for the due diligence process in their supply chains.[9] In other words, merely mandating ESG-related information disclosures can result in firms being *de jure* compliant with the regulation, but *de facto* ignorant about their ESG-related responsibilities at their suppliers.

On the other hand, it may be possible that the reputational costs resulting from mandatory ESG disclosure regulations are insufficient in inducing any changes to firms' real behaviors including their supply chain decisions. Moreover, if, as documented in Chen et al. (2018), mandating ESG disclosure can generate positive externalities and/or firms are reliant on long-term contractual supplier relationships (e.g., Costello, 2013), firms may decide to increase their investments in improving the management practices of their existing supplier firms. In fact, She (2022) documents how mandatory nonfinancial disclosure affects firms' real decisions by showing that suppliers' human rights performance improves following the regulation, thus, suggesting that firms have improved supply chain due diligence following enhanced disclosure requirements. Under these situations, we would not expect to observe any changes to firms' global supply chain composition subsequent to the introduction of mandatory ESG disclosure.

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[9] An example is the recent German Supply Chain Due Diligence Act effective since January 1, 2023. https://www.bmas.de/DE/Service/Gesetze-und-Gesetzesvorhaben/Gesetz-Unternehmerische-Sorgfaltspflichten-Lieferketten/gesetz-unternehmerische-sorgfaltspflichten-lieferketten.html.

Another possibility is that mandatory ESG disclosure regulations incentivize firms to improve their ESG profile by encouraging the selection of suppliers with higher ESG-related standards. For example, Darendeli et al. (2022) show that the availability of more firm-specific sustainability-related information alters contractual relationships between customer firms and their suppliers. Specifically, they show that firms are less likely to contract with firms that exhibit poor corporate social responsibility performance after an information shock that reveals their type. Yet, they also acknowledge that their empirical results have limitations in explaining where and how customer firms redirect their supplier relationships. Accordingly, if firms choose to improve their perceived ESG profile by signaling the selection of high-quality supplier firms instead of keeping silent on their ESG-related obligations in their supply chain, we expect an increase in the selection of suppliers located in countries with more transparent ESG-related information environments.

Due to the above opposing arguments, whether and how firms' global supply chain composition changes following the introduction of mandatory ESG disclosure regulations is an open empirical question, and we state the hypothesis (in null form):

Hypothesis: Mandatory ESG disclosure regulations are not associated with changes in firms' global supply chain composition.

3. DATA AND SAMPLE

3.1. Mandatory ESG Disclosure Regulations

An increasing number of countries have adopted mandatory ESG disclosure regulations, albeit these regulations significantly differ in terms of the range of applicable firms, disclosure scope, disclosure channels, and enforcement mechanisms. Appendix A provides a summary of the 35 regulations in each country that mandate disclosure of ESG information by firms. To collect the data, we begin with regulations identified by Carrots & Sticks, the UN PRI regulation database, the Sustainable Stock Exchanges Initiative, CSR Europe and the GRI. We also reference recent studies that use country-level data on mandatory ESG disclosure regulations (i.e., Krueger, Sautner, Tang, and Zhong, 2023; Wang, 2023; and Gibbons, 2023). As pointed out by many critics, the ESG disclosure mandates across countries exhibit significant variation, not only in the adoption years but also in terms of the disclosure scope (i.e., addressing E, S, and/or G-related issues), applicability of firms, and regulatory authorities that enacted the regulation (Christensen, Hail, and Leuz, 2021).[10] While we expect that firm pressures from heightened awareness for sustainability-related issues is stemming from the passage of *any* ESG disclosure related mandate, regulations may also differ in the extent by which they specifically require disclosure of supply chain related due diligence processes and associated risks. For 22 countries of the 35 countries with mandated ESG disclosure regulations, supply chain due diligence processes constitute an explicit disclosure requirement either along with other ESG-related guidelines (e.g., EU/NFDR), and/or due to a stand-alone regulation that has been implemented in later years (e.g., Australia/UK Modern Slavery Act). Appendix B provides a summary of these regulations that specifically entail supply chain due diligence processes.

3.2. FactSet Revere Supply Chain Relationship Data

We obtain data on supply chain relationships from FactSet Revere. The dataset covers 157,956 customers around the world comprising 1,880,141 business relationships from 2003 to 2021. We confine our analyses to the sample until 2019 to isolate the impact of the COVID19 pandemic on supply chains. The supply chain information is collected from 10-Ks/annual reports, investor presentations, websites, press releases, corporate actions, and 10-Q, 8-K filings and is updated on an annual basis. The data uniquely identifies each customer-supplier pair for which we have information on the supplier, customer, as well as the start and end dates of the relationship. FactSet Revere also collects company data that include their location information, enabling us to generate a dataset with the geographical distribution of a firm's global supplier network.[11]

[10] In additional analyses, we also examine heterogeneous treatment effects depending on the different types of mandated ESG disclosures depending on disclosure venue (annual report vs. stand-alone sustainability report), implementing authority (government vs. stock exchange), and applicability scope (all vs. only listed/large firms).

[11] We admit that our supply chain data retrieved from the FactSet Revere data does not cover the entirety of customer-supplier relationships as firms do not have the obligation to reveal their complete supplier list. Thus, our sample is likely biased towards supply chain relationships with larger firms. Yet, we also note that this bias likely works against finding an effect.

3.3. Refinitiv Worldscope

The Refinitiv Worldscope Fundamentals data of Thomson Reuters provides annual financial statement information of over 95,000 globally listed companies in over 120 countries since 1980. We obtain data on firm-level characteristics and define firm-level variables as follows: *Ln(Asset)* as the natural logarithm of [1 + Raw Total Assets]; *Leverage* ratio as the ratio of total debt to total assets; *ROA* calculated as [Net Income / Total Assets] * 100; *Market-to-Book* ratio as Market Capitalization / (Total Assets - Total Liabilities); *Tangibility* calculated as Property, Plant And Equipment / Total Assets; *Liquidity* calculated as Total Current Assets / Total Current Liabilities; *Sales Growth* calculated as (Current Year's Net Sales or Revenues / Last Year's Total Net Sales or Revenues - 1) * 100; and *Market Share* calculated as the firm's percentage share of sales by all public firms in the same Fama & French 48 industry and in the same country.

3.4. Sample Selection and Descriptive Statistics

We begin by merging the location information from the company level data into the customer-supplier-year level dataset by FactSet Revere. The final dataset used for our empirical analyses collapses the data to the customer-year level whereby for each customer we aggregate supply chain characteristics based on the country location of the supplier firms. We then merge in the Refinitiv Worldscope data for the remaining firm-level characteristics. Table 1 provides descriptive statistics of all variables used in our empirical analyses which are defined in Appendix C. The final sample comprises 100,478 firm-year observations, representing 22,400 unique firms from 2003 to 2019. Regarding supply chain characteristics, each customer firm has an average of 8.83 supplier firms. The average total number of suppliers is similar to what has been reported in the prior literature (Gofman, Segal, and Wu, 2020; Agca, Babich, Birge, and Wu, 2022). We winsorize all continuous variables at 1% and 99% to mitigate the influence of outliers.

(Insert Table 1 about here)

4. EMPIRICAL RESEARCH DESIGN

For our empirical analyses, we exploit the variation of mandatory ESG disclosure in different countries and examine the associated changes in firms' global supply chain composition following the introduction of mandatory ESG disclosure in the country where a firm is located. Our main treatment variable of interest *Mandatory Disclosure* is defined at the country-year level. It is an indicator variable that equals one if the country in which the firm is located has passed a nationwide requirement for companies that mandates ESG disclosure, and zero otherwise (as shown in Appendix A). The merged dataset contains firms located in 115 countries, with only 35 countries introducing mandatory ESG disclosure (i.e., become "treated") during our sample period between 2003 and 2019. In contrast, firms located in the remaining 80 countries serve as "never-treated" controls. Since Australia and France have passed their mandatory ESG disclosure policies as early as 2003 and 2001 respectively, firms located in these two countries are coded as "always-treated."[12]

Our estimation resembles a staggered difference-in-differences design. We estimate the following model using ordinary least squares (OLS):

$$Y_{i,j,t} = \beta_0 + \beta_1 Mandatory\ Disclosure_{j,t} + \gamma X_{i,t-1} + \alpha_i + \alpha_t + \varepsilon_{i,j,t} \tag{1}$$

where $Y_{i,j,t}$ assumes different supply chain composition variables for firm i in country j at time t. Specifically, we consider three types of suppliers: suppliers located in the same country as the focal firm (*Domestic Suppliers*), suppliers located in countries without mandatory ESG disclosures (*Foreign Opaque Suppliers*), and suppliers located in countries with mandatory ESG disclosures (*Foreign Transparent Suppliers*). Moreover, we consider both, the natural logarithm of the number of new suppliers corresponding to each of the three types, and the fraction of each supplier type.[13] $Mandatory\ Disclosure_{j,t}$ equals one if country j has passed a mandatory ESG disclosure regulation at time t and zero if otherwise (i.e., corresponding to treatment years in Appendix A). $X_{i,t-1}$ denotes the lagged firm-level control variables including *Total Assets*, *Leverage*, *ROA*,

[12] In unreported tables, we also conduct all analyses on the sample that is limited to the firms in the "ever-treated" countries. We note similar but more significant effects.

[13] Note that renewed contracts with the same customer and supplier are not considered as new suppliers. Our findings remain robust even if we treat renewed contracts as new contracts.

Market-to-book Ratio, *Tangibility*, *Liquidity*, *Sales Growth* and *Market Share*.[14] α_i and α_t represent firm- and year- fixed effects, respectively. The coefficient of interest is β_1 which measures the effect of mandated ESG disclosure on the firm's supply chain composition. Standard errors are clustered at the country level.

5. EMPIRICAL RESULTS

5.1. Treatment Effects on Supply Chain Composition

Results reported in Table 2 support our stated hypothesis. Specifically, the significant negative coefficient on *Mandatory Disclosure* in column 1 suggests that firms select fewer domestic suppliers, and instead a higher number of *new* suppliers from countries without mandatory ESG disclosure – an increase corresponding to about 6.4 percent. Similarly, the result in column 5 indicates an increase of about 6.1 percent in the fraction of suppliers without mandatory ESG disclosure obligations in the overall global supply chain. Overall, these findings suggest that firms exploit their suppliers' weak corporate information environment to cope with the reputational costs associated with mandatory ESG disclosure. A perusal of our results on the firm-level control variables suggests that larger firms are more likely to experience changes in their supply chain composition (e.g., Wagner and Neshat, 2012). The coefficient on *Total Assets* is positive in columns 1 through 6, except in column 4, where it is significantly negative. The negative coefficient when the *fraction* of domestic suppliers is considered is consistent with findings from prior literature that smaller firms are more likely to rely on domestic suppliers and less likely to import their inputs (Oberholtzer, Dimitri, and Jaenicke, 2013). Moreover, smaller firms are less likely to raise financial capital by issuing debt (Rajan and Zingales, 1995). Thus, the results regarding *Leverage* are also consistent with smaller firms being more likely to rely on domestic suppliers, while larger firms are more capable of resorting to global outsourcing practices.

[14] To isolate the impact of mandatory ESG disclosure, we control for firm fundamentals (*Total Assets*, *Leverage*, *Tangibility*, and *Liquidity*) and firm performance (*ROA* and *Market-to-book*) following Krueger et al. (2023). These variables are also likely to affect our dependent variables of interest (Luo and Nagarajan, 2015). Moreover, because of the theorized impact of sales growth and market share on supply chain (Hendricks and Singhal, 2005), we further control for *Sales Growth* and *Market Share*.

(Insert Table 2 about here)

In Figure 1, we plot the results from the event study analyses following Sun and Abraham (2021). Instead of *Mandatory Disclosure*, the event study model includes a series of indicators $Time_{jk}$ where k represents the number of years until (i.e., negative values for k) or since (positive values for k) the year that country j introduced mandatory ESG disclosure. Specifically, we estimate models that includes individual time indicators for the five years prior to the implementation year and an indicator for all earlier years. Similarly, we include individual time indicators for the five years following the implementation year and an indicator for all years beyond. This allows for estimating changes in supply chain composition relative to treatment timing, including an empirical examination of the parallel pre-trend assumption. The figures on the left (right) plot the results when the number of new suppliers (fraction) corresponding to each supplier types are considered. These figures confirm that the implementation of mandatory ESG disclosures was associated with a shift in the composition of firms' global supply chains towards suppliers located in jurisdictions with opaque ESG-related corporate information environments.

(Insert Figure 1 about here)

So far, our results provide empirical evidence consistent with both supply chain strategies – i.e., *expanding* the supplier network by adding new suppliers from countries without mandatory ESG disclosure (as documented in Table 2 column 2) and *switching* from existing suppliers to new suppliers from countries without mandatory ESG disclosure (as documented in Table 2 column 5). To further examine the possibility of the expansion strategy, we conduct additional analyses that use the natural logarithm of the total number of suppliers as the outcome variable in equation (1). Untabulated results suggest that the overall supply chain size is not significantly associated with the introduction of mandatory ESG disclosure. Thus, while our empirical results seem to lend greater support to the switching strategy, we note that both supply chain strategies are not mutually exclusive and are likely to operate simultaneously.

In the Online Appendix, we report results of several additional tests that address potential concerns of our empirical model specification in equation (1). First, we note that the staggered difference-in-differences research design is based on the assumption that a country's adoption of mandatory ESG disclosure regulation is not correlated with the prevailing supply chain composition of firms within that country. To validate this assumption, we follow the approach of Gao et al. (2020) and estimate a Weibull hazard model, where the "failure event" corresponds to the adoption of mandatory ESG disclosure regulation in a given country.[15] Our results indicate that a country's adoption of mandatory ESG disclosure regulation is not related to the prevailing supply chain composition of its local firms, supporting our assumption that the adoption of mandatory ESG disclosure regulation is likely to be exogenous to local firms' supply chain composition.[16]

Next, we also conduct several robustness tests based on alternative empirical model specifications. First, we conduct our analyses using Poisson regressions to account for the dependent variables censored at zero. Our results remain robust to this alternative estimation method. Second, we replicate the primary findings by incorporating industry-year fixed effects to address the impact of structural changes within the industry. Our results remain robust. Third, we limit our sample to "ever-treated" countries – i.e., countries that have adopted mandatory ESG disclosure regulations during our sample period. That is, observations in the "control" group comprise only firms that are located in countries that have not yet passed mandatory ESG disclosure regulations. Our results remain robust. Fourth, we split our sample into EU and non-EU countries. European countries are subject to the EU Directive which also required firms to disclose

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[15] The sample encompasses all countries over our selected time period, and treated countries are excluded from the sample once they have adopted mandatory ESG disclosure regulation. The independent variables of interest—*# Average Domestic Suppliers*, *# Average Foreign Opaque Suppliers*, and *# Average Foreign Transparent Suppliers*—represent the average number of suppliers located in the same country as the focal firm, suppliers located in countries without mandatory ESG disclosures, and suppliers located in countries with mandatory ESG disclosures, respectively. Additionally, we incorporate several country-level variables into our analysis, including *Log(GDP)*, *Log(GDP per capita)*, *GDP Growth*, *Stocks Turnover*, *Stocks Traded/GDP*, *Market Capitalization/GDP*, *Tax Revenue/GDP*, and *Inflation*. Country-level variables are obtained from World Bank Open Data.

[16] In the Online Appendix, we show that the coefficients on *# Average Domestic Suppliers*, *# Average Foreign Opaque Suppliers*, and *# Average Foreign Transparent Suppliers* are not statistically significant across all columns.

their supply chain due diligence processes and have been shown to impact firm activities (Fiechter et al., 2022). By limiting the sample to firms that were all subject to a similar level of corporate disclosure requirements, we leverage the variation in the staggered adoption of *local* mandates within the EU that were likely accompanied by more applicable guidelines and regulatory enforcement efforts in each jurisdiction. Our results remain robust. Fifth, to examine whether the effect is due to mandatory regulations as opposed to voluntary disclosures, we re-estimate our tests based on $Voluntary\ Disclosure_{j,t}$ that equals one if country j introduced voluntary ESG information disclosure guidelines at time t and zero if otherwise.[17] The results validate that supply chain composition is not associated with the documented treatment effects as shown in Table 2 based on *Mandatory Disclosure*.[18] Finally, we address potential biases of staggered difference-in-differences regression methods by repeating our tests using the Callaway and Sant'Anna estimators (Callaway and Sant'Anna, 2021). Our results remain robust.

5.2. Types of Mandatory ESG Disclosure

We also conduct tests that leverage details on the different approaches to mandating ESG disclosures as shown in the Online Appendix. First, we construct an indicator variable that distinguishes between different types of disclosure venues – i.e., *Stand-Alone Sustainability Report* – defined as one if firms are required to issue a stand-alone report containing ESG-related information, and zero if the information is required as part of their annual reports. Our results suggest that firms are more likely to engage in outsourcing behavior when they are required to disclose ESG information in a stand-alone sustainability report. Second, we construct an indicator variable that distinguishes between differences in the implementing authority of the regulation – i.e., *Government* – defined as one if it is the government and zero if it is a stock exchange. No

[17] Information on implementation years of country-level mandatory and voluntary disclosure guidelines is available at: https://www.carrotsandsticks.net.

[18] We note that firms may also disclose information voluntarily even in the absence of the implementation of any voluntary or mandatory ESG disclosure guidelines. Prior research shows that institutional investors actively engage firms in order to improve their voluntary ESG disclosures and document robust evidence of a positive association between voluntary ESG disclosure and institutional ownership (e.g., Ilhan, Krueger, Sautner, and Starks, 2021; Krueger et al., 2023). In that regard, our results for the heterogeneous treatment effects based on institutional ownership reported in Table 6 may speak to such firm-level variation with respect to the availability of voluntary ESG information.

significant differences are observed depending on the implementing authority. Finally, we construct an indicator variable that distinguishes between differences in scope of applicability of the regulation – i.e., *Apply to All Firms* – defined as one if all firms are subject to the regulation and zero if only listed/large firms are subject to the regulation. Our results suggest that outsourcing tendencies are higher when the regulatory requirement applies to all firms, as opposed to being limited to listed/large firms only. This finding is also suggestive of the possibility that mandated disclosure requirements targeting listed/larger firms only may lead firms to outsource to domestic private firms (Leuz, Triantis, and Wang, 2008).

In tests reported in Table 3, we further refine our analyses to examine the *incremental* effect of regulations that specifically mention supply chain related components as an integral component for mandated disclosure by leveraging the list of regulations identified in Appendix B. Specifically, we re-estimate equation (1) by including an interaction term between *Mandatory Disclosure* and *Supply Chain Due Diligence* based on the subsample of ever-treated firms (i.e., firms located in the 35 countries with mandatory ESG disclosure regulations). The coefficient on the interaction term captures the treatment effect for mandated ESG disclosure regulations that explicitly require disclosure of supply chain due diligence processes. We continue to observe a negative coefficient on *Mandatory Disclosure* in column 1 suggesting that firms select fewer domestic suppliers. We also observe a positive coefficient on *Mandatory Disclosure* in column 2 suggesting that firms select a higher number of *new* suppliers from countries without mandatory ESG disclosure. In terms of the *incremental* impact of *Supply Chain Due Diligence*, the interaction term in column 1 indicates that firms are less inclined to reduce the number of new domestic suppliers in response to mandatory ESG disclosure regulations that explicitly demand the disclosure of supply chain due diligence processes. Besides, another notable finding is the significantly positive coefficient on the interaction term in column 3 which suggests that mandatory ESG disclosure regulations that were more targeted towards including supply chain due diligence processes resulted in firms selecting a higher number of new suppliers in better ESG disclosure environments. The results suggests supply chain due diligence requirements mitigate the firms' propensity to engage in supply chain migration strategies.

(Insert Table 3 about here)

5.3. Heterogeneous Treatment Effects

In the following tests, we explore whether the main treatment effects documented in Table 2 vary depending on country-level and firm-level contextual factors that have been shown to influence firms' corporate governance practices.[19]

5.3.1. ESG-Related Social Awareness

As echoed by many social activists, meaningful impact on ESG-related issues requires a collective approach that involves various stakeholders covering private and public sectors, and the social awareness of individual citizens. To proxy for the strength of ESG-related social awareness of the corporate environment in which a firm is located, we use the Environmental Performance Index (EPI) scores from the Yale Center for Environmental Law and Policy (YCELP). The data utilizes a proximity-to-target methodology focused on a core set of environmental outcomes linked to policy goals that facilitate cross-country comparisons among economic and regional peer groups of 180 countries. Specifically, EPI derives a score for each of the 180 countries on 32 performance indicators. The indicators span 11 different environmental categories: air quality, sanitation and drinking water, heavy metals, waste management, biodiversity and habitat, ecosystem services, fisheries, climate change, pollution emissions, agriculture, and water resources. Our intuition for the use of the EPI measure is that it captures the institutional environment on environmental regulation and protection at the country-year level. That is, we consider countries with lower EPI to have lower levels of ESG-related social awareness. We also use the Social Progress Index (SPI) as an alternative proxy for ESG-related social awareness. While the EPI index is focused on

[19] While we report results on using the number of new suppliers corresponding to each supplier type as the dependent variable, we note that all our results on the heterogeneous treatment effects reported in Tables 4 through 8 are robust to using the overall supply chain composition that includes existing suppliers (i.e., the fraction of suppliers corresponding to each supplier type).

environment-related matters, the SPI index focuses on social issues such as the development for basic human needs, foundations of well-being, and opportunity to progress.[20]

Specifically, we include an interaction term between *Mandatory Disclosure* and the EPI/SPI index in equation (1) that captures the heterogeneous treatment effect depending on the strength of ESG-related social awareness for the country in which a firm is located. The results of the analyses are tabulated in Table 4 and show that the supply chain migration strategies in response to mandatory ESG disclosure are mitigated with greater ESG-related social awareness. Columns 1-3 (4-6) examine the change in the number of new suppliers using the EPI (SPI) index as a proxy for ESG-related social awareness in the country where firms face mandated ESG disclosures. The results in columns 2 and 5 show that greater ESG-related social awareness is associated with a lower tendency by firms to select their suppliers located in countries without mandatory ESG disclosure. Instead, as shown in columns 3 and 6, firms exhibit greater tendency to select suppliers with more transparent ESG-related corporate information environments.

(Insert Table 4 about here)

5.3.2. Legal Enforcement Strength of ESG Disclosure Mandate

Prior research suggests that enforcement strength by regulatory bodies can significantly impact corporate governance oversight (e.g., Kedia and Rajgopal, 2011). To examine the role of enforcement as opposed to the ESG disclosure mandate per se, we use the Rule of Law index provided by World Governance Indicators (WGI) provided by the World Bank.[21] Specifically, we include an interaction term between *Mandatory Disclosure* and *Rule of Law Index* in equation (1) that captures the heterogeneous treatment effect depending on the strength of legal enforcement for the country in which a firm is located. The results of the analyses are tabulated in Table 5. As shown by the significant positive coefficient on the interaction term in column 2, each unit increase

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[20] Details on the EPI framework and the data can be obtained at: https://sedac.ciesin.columbia.edu/data/set/epi-environmental-performance-index-2020. The Social Progress Index can be found at: https://www.socialprogress.org.

[21] Skaaning (2010) compares seven commonly-used rule of law indexes and concludes that WGI measures legal compliance while other indices focus on legal equality. The WGI index captures perceptions of the extent by which agents have confidence in and abide by the rules of society, especially with regard to contract enforcement, property rights, the police, and the court. Biglaiser and Staats (2012), for example, use the WGI index and document significant positive effects with bond ratings.

in the Rule of Law index is associated with an increase of about 3 percent in the number of new suppliers from countries without mandatory ESG disclosure requirements. However, the interaction effect remains insignificant when considering suppliers from countries with mandatory ESG disclosure requirements. Overall, these cross-sectional results provide corroborating evidence that firms' tendency to select suppliers with weak corporate information environments to cope with the reputational costs associated with mandatory ESG disclosure is more pronounced when the accompanied level of regulatory enforcement of the mandatory ESG disclosure regulation is stronger.

(Insert Table 5 about here)

5.3.3. Firm-level External Governance Mechanisms

5.3.3.1. Analyst Coverage

Research suggests that analyst following can serve as effective external monitors by mitigating agency problems between firm insiders and outsiders. For example, studies show that higher analyst coverage is associated with fewer earnings management activities (Yu, 2008), stock crash risks (Kim, Lu, and Yu, 2019), and management compensation (Chen et al., 2015). Consistent with the external monitoring hypothesis, we, thus, expect that firms' propensity to evade and/or hide ESG-related obligations to their suppliers following mandatory ESG disclosure will be less pronounced for firms that have greater analyst coverage. To test this conjecture, we use the number of analysts who made forecasts about firms' earnings in a specific year in the I/B/E/S database, and construct the variable *Residual Coverage* following Yu (2008) by estimating the residual of the regression that controls for firm size, past performance, growth, external financing activities, and volatility of business (Bhushan, 1989; Dechow and Dichev, 2002; Kasznik, 1999).[22] Table 6 presents the results of analyses that include an interaction term between *Mandatory Disclosure* and *Residual Coverage* in equation (1). The interaction term is significantly positive in column 1 and significantly negative in column 2. This suggests that firms' supply chain migration activities

[22] We note that our results are robust to using the raw number of *Analyst Coverage,* instead of *Residual Coverage.*

following the introduction of mandatory ESG disclosure regulation are mitigated with greater analyst coverage, and corroborates the role of analysts as external monitors.

(Insert Table 6 about here)

5.3.3.2. Institutional Ownership

Prior literature has documented that institutional ownership is positively associated with management conservatism (Ramalingegowda and Yu, 2012), corporate governance (Chung and Zhang, 2011), and innovation (Aghion, Van Reenen, and Zingales, 2013). Recent years have seen an increasing demand for sustainability principles in asset management by institutional investors (e.g., Krueger, Sautner, and Starks, 2020). For example, in 2020, the United States Forum for Sustainable and Responsible Investment (USSIF) reports \$16.6 trillion of assets under management according to sustainable and responsible investment principles with significant representation by institutional investors. This constitutes an increase by more than 8 times since 2003, the beginning of our sample period.[23] To examine the role of institutional investors, we include an interaction term between *Mandatory Disclosure* and *Institutional Ownership* in equation (1) that captures the heterogeneous treatment effect depending on the fraction of shares held by institutional investors. The results of the analyses are tabulated in Table 7. The interaction term in column 1 of Table 7 reveals that firms with higher institutional ownership are less likely to decrease the number of new domestic suppliers in response to mandatory ESG disclosure compared to firms with lower institutional ownership. The results also suggest that such firms are less likely to hide ESG-related obligations by choosing new foreign opaque suppliers (column 2) and more likely to select new foreign transparent suppliers (column 3). Collectively, these results corroborate the role of institutional investors as external monitors when faced with elevated reputational costs from mandated ESG disclosures.

(Insert Table 7 about here)

[23] The full report can be accessed here: https://www.ussif.org/currentandpast.

5.3.4. Financial Constraints

The corporate finance literature suggests that financial constraints comprise a significant factor in explaining firm dynamics including growth, volatility of growth, job creation, job destruction, and exit (Cooley and Quadrini, 2001). Financial constraints arise due to frictions in the supply of capital, primarily due to information asymmetries between investors and the firm, and research shows that financially constrained firms exhibit different firm behaviors including corporate investment (e.g., Rauh, 2006; Almeida and Campello, 2007; Duchin, Ozbas, and Sensoy, 2010), and entrepreneurship (e.g., Kerr and Nanda, 2009). Financial constraints and cost reduction considerations often affect how firms choose suppliers, including from whom to outsource. Accordingly, we posit that the extent by which firms adjust their supply chain practices in response to mandatory ESG disclosure may vary depending on their financial constraints. In fact, prior research documents consistent evidence that financially constrained firms exhibit differences when coping with heightened regulatory compliance costs. For example, exploiting the cap-and-trade program implemented in California that universally applied to all industrial greenhouse gas emissions, Bartram et al. (2022) show that financially constrained firms shifted emissions from California to other states, while unconstrained firms did not.

To examine whether firms' financial constraints pose a significant factor in how firms adjust their supply chain practices in response to mandatory ESG disclosure, we explore heterogeneous treatment effects depending on firms' financial constraints. We rely on prior literature to measure firms' financial constraints by constructing the SA (size-age) Index (Hadlock and Pierce, 2010). A higher SA index value captures higher reliance on external financing, thus, a higher likelihood of experiencing difficulties in financing ongoing operations when financial conditions tighten. Specifically, we include an interaction term between *Mandatory Disclosure* and *SA Index* in equation (1). The results of these analyses are reported in Table 8. Consistent with expectations that financially constrained firms exhibit heightened pressures to enhance their ESG profile by adjusting their supply chain practices, the results suggest that firms with greater financial constraints are more likely to shift their ESG-related obligations away from domestic suppliers (column 1) by choosing new foreign opaque suppliers (column 2) – thus, hiding their ESG-related supply chain activities.

(Insert Table 8 about here)

5.4. Effects of the Supply Chain Migration Strategy

5.4.1. ESG Performance Profile

Our results so far suggest that mandatory ESG disclosure is associated with changes in firms' supply chain practices whereby firms hide their ESG-related supply chain activities by choosing suppliers subject to less ESG-related disclosure requirements. In this section, we explore whether firms that adjusted their supply chain practices in response to the introduction of mandatory ESG disclosure were indeed successful in creating an enhanced ESG profile. To do so, we examine changes in reported ESG performance using two outcome measures: (1) the number of reported ESG-related incidents using data from RepRisk (*ESG Incidents*) and (2) reported greenhouse gas emissions using data from Trucost (*GHG Emissions*). Ex-ante, it is unclear whether mandatory ESG disclosure should influence firms' reported ESG performance. Elevated disclosure requirements alone should not have an impact unless they are accompanied by enhanced regulatory ESG-related enforcement efforts and/or public scrutiny on firms' reported ESG performance. For example, we would expect worse reported ESG performance when mandatory ESG disclosure is also reflective of enhanced ESG-related monitoring that can uncover many ESG events that were previously unrecognized. On the contrary, if firms invest in improving their ESG performance or engage in activities that can boost their ESG profile – one of such strategies being via the adjustment to their supply chain practices as we document in our earlier analyses – we may also expect to observe better reported ESG performance following the ESG disclosure mandates.

We report the results on the number of reported ESG-related incidents in Table 9. The estimated negative coefficient on *Mandatory Disclosure* in column 1 suggests that the introduction of mandatory ESG disclosure resulted in a decrease in reported ESG incidents.[24] To the extent that some of the decreases in reported ESG incidents can be attributed to firms' supply chain migration strategies, we expect to observe a larger decrease for firms that engaged in such supply chain practices in response to the introduction of mandatory ESG disclosure. Column 2 examines this conjecture. The interaction term between *Mandatory Disclosure* and *Migration to Countries without Mandatory ESG Disclosure*, a dummy indicating whether a firm's propensity to choose new suppliers from countries without mandatory ESG disclosure increases within three years after mandatory ESG disclosure, is negative and statistically significant.[25] In columns 3 and 4, we repeat the analyses by focusing on reported ESG incidents that are unrelated to supply chain issues (*Onsite ESG Incidents*) to examine whether firms engaging in supply chain migration strategies also exerted efforts to improve their ESG profile via other channels.[26] The reported results support this conjecture.

(Insert Table 9 about here)

We report the results on reported greenhouse gas emissions in Table 10. Since greenhouse gas emissions constitute outcomes that are only relevant to the environment, we confine our analyses to mandatory ESG disclosures that include environment-related considerations (i.e., *Mandatory Disclosure (Environmental)*). The model specification is similar to Table 9. In columns 1 and 2, the dependent variable is the natural logarithm of reported GHG emissions. The dependent variable in columns 3 and 4 is greenhouse gas intensity which is calculated as a firm's GHG emission divided by its revenue. Consistent with the results in Table 9, we find that the introduction of

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[24] RepRisk provides due diligence data on corporate conduct around ESG-related matters by screening over 90,000 public media sources daily in 20 languages and flags negative ESG-related incidents (e.g., environmental degradation, child labor, corruption, etc.). RepRisk uses two indicators to classify ESG events: *Primary* and *All*. *Primary* indicates negative ESG events directly associated with the corresponding firm, while *All* maps the events to the hierarchical structure of a corporate group. We rely on the indicator *All* in the construction of the variable *ESG incidents* used in the reported analyses.

[25] 39.5% of firms exhibit an increase in the supply chain composition towards suppliers without mandatory ESG disclosure within 3 years after the disclosure law. A firm is considered to have outsourcing behavior if the average percentage of suppliers from countries without mandatory ESG disclosure in the three years prior to the disclosure is lower than the percentage of suppliers from such countries in the three years following the disclosure.

[26] An ESG incident is classified as an *Onsite* ESG incident when the RepRisk variable "related_issues" does not include keywords related to "supply chain issues".

mandatory environment disclosure resulted in a decrease in reported greenhouse gas emissions with the effect being primarily driven by firms that engaged in such supply chain migration strategies. These results provide corroborating evidence that mandatory ESG disclosures subjected firms to ESG-related risks which they attempted to manage by engaging in supply chain migration strategies.

(Insert Table 10 about here)

5.4.2. Cost Savings

Rather than the introduction of mandatory ESG disclosure per se, one may argue that the changes in firms' supply chain practices are due to firms facing higher operating costs to comply with higher ESG-related demands from various stakeholders (which is likely correlated with the passage of mandatory ESG disclosure policies). That is, firms may invest more in internal systems to track and monitor compliance with ESG-related standards of their internal business operations which in turn may pressure them to seek out cheaper suppliers. To examine this possibility, we examine whether the introduction of mandatory ESG disclosure resulted in lower profit margins using the Cost of Goods Sold (COGS) ratio that divides COGS by total sales revenue. The results in column 1 of Table 11 document an increase in the COGS ratio after the introduction of mandatory ESG disclosure suggesting that the policies were also associated with an overall higher operating cost burden for firms.

(Insert Table 11 about here)

In column 2 of Table 11, we further examine whether changes in profit margins exhibit variation depending on firms adjusting their supply chain practices in response to mandatory ESG disclosure. If the cost channel explains firms' supply chain practices, we would expect that firms adjusting their supply chain practices in response to mandatory ESG disclosure would enjoy cost reductions by doing so. As shown by the insignificant coefficient on the interaction terms, our results do not support the cost channel as a primary driver that explains firms' changing supply chain practices. Instead, these results support the explanation that firms tend to hide their ESG-related obligations to their suppliers in response to mandatory ESG disclosure. In columns 3 and 4, we repeat the analyses by using the Selling, General, and Administrative Expense (SG&A) ratio as the dependent variable. Unlike in column 1, the results do not suggest a significant increase in SG&A. This suggests that manufacturing firms facing relatively higher ESG-related concerns were more likely affected by the mandatory ESG disclosure policies than service firms. Similar to the result in column 2, the coefficient on the interaction terms is insignificant which yields further support that our results cannot be solely driven by the cost channel as a primary driver that explains firms' supply chain migration activities.

We also note that the results showing insignificant differences in firms' cost structures in columns 2 and 4 are consistent with the switching rather than the expansion strategy. While firms may enjoy cost savings by expanding the supplier network to new (also potentially lower-cost) suppliers from countries with a weaker ESG-related regulatory and corporation information environment because it provides them with the flexibility to adjust to lower-cost supply chain outsourcing configurations especially in the longer-term, switching mostly from domestic to international suppliers is not associated with such flexibility. That is, if the expansion strategy would be dominant, we may also observe significantly lower operating costs for firms that engage in either of the two supply chain migration strategies (i.e., reflected in a significant negative coefficient on the interaction terms) which we do not find in our empirical analyses.

6. CONCLUSION

We document that mandatory ESG disclosure is associated with changes in firms' supply chain composition. Specifically, we show that while firms select a smaller number of new suppliers located in the same country, they select a larger number of suppliers located in countries with more opaque ESG-related corporate information environments following the introduction of mandatory ESG disclosure. These findings are consistent with mandatory ESG disclosures leading firms to manage their overall ESG profile. That is, in order to hide their ESG-related obligations which firms are forced to publicly communicate due to the implementation of mandatory ESG disclosures, our findings suggest that firms decide to engage in supply chain migration strategies that transfer the ESG-related risks to supplier firms located in countries with weaker ESG-related corporate information environments. This strategy is not purely driven by cost saving related motives. Further findings show that such supply chain migration strategies following mandatory ESG disclosures are mitigated with more targeted disclosure guidelines that include mentions of supply chain due diligence processes, greater local awareness of ESG-related issues, and external monitoring by financial intermediaries such as analysts and institutional investors.

Overall, our findings suggest that mandatory ESG disclosure policies can have long-lasting real effects in changing firms' global outsourcing practices. While prior research provides evidence suggestive of customer-supplier relationship consequences that improve ESG-related firm outcomes with the implementation of more stringent ESG disclosure policies (e.g., Darendeli et al., 2022; Fiechter et al., 2022; She, 2022), we document evidence of customer firms transferring their ESG-related responsibilities to suppliers located in opaque corporate information environments. Our research, thus, sheds light on one potential mechanism for how firms improve their reported ESG performance.

REFERENCES

Agca, S., Babich, V., Birge, J.R., Wu, J., 2022. Credit shock propagation along supply chains: Evidence from the CDS market. Manag. Sci. 68 (9), 6506–6538.

Aghion, P., Van Reenen, J., Zingales, L., 2013. Innovation and institutional ownership. Am. Econ. Rev. 103 (1), 277–304.

Almeida, H., Campello, M., 2007. Financial constraints, asset tangibility, and corporate investment. Rev. Financ. Stud. 20 (5), 1429–1460.

Bartram, S.M., Hou, K.W., Kim, S., 2022. Real effects of climate policy: Financial constraints and spillovers. J. Financ. Econ. 143 (2), 668–696.

Bhushan, R., 1989. Firm characteristics and analyst following. J. Account. Econ. 11 (2–3), 255–274.

Biglaiser, G., Staats, J.L., 2012. Finding the "democratic advantage" in sovereign bond ratings: The importance of strong courts, property rights protection, and the rule of law. Int. Organ. 66 (3), 515–535.

Breuer, M., Hombach, K., Müller, M.A., 2022. When you talk, I remain silent: Spillover effects of peers' mandatory disclosures on firms' voluntary disclosures. Account. Rev. 97 (4), 155–186.

Bushee, B.J., 1998. The influence of institutional investors on myopic R&D investment behavior. Account. Rev. 73 (3), 305–333.

Callaway, B., Sant'Anna, P.H.C., 2021. Difference-in-differences with multiple time periods. J. Econom. 225 (2), 200–230.

Chen, T., Dong, H., Lin, C., 2020. Institutional shareholders and corporate social responsibility. J. Financ. Econ. 135 (2), 483–504.

Chen, T., Harford, J., Lin, C., 2015. Do analysts matter for governance? Evidence from natural experiments. J. Financ. Econ. 115 (2), 383–410.

Chen, Y.C., Hung, M.Y., Wang, Y.X., 2018. The effect of mandatory CSR disclosure on firm profitability and social externalities: Evidence from China. J. Account. Econ. 65 (1), 169–190.

Christensen, H.B., Hail, L., Leuz, C., 2021. Mandatory CSR and sustainability reporting: Economic analysis and literature review. Rev. Account Stud. 26 (3), 1176–1248.

Chung, K.H., Zhang, H., 2011. Corporate governance and institutional ownership. J. Financ. Quant. Anal. 46 (1), 247–273.

Cooley, T.F., Quadrini, V., 2001. Financial markets and firm dynamics. Am. Econ. Rev. 91 (5), 1286–1310.

Costello, A.M., 2013. Mitigating incentive conflicts in inter-firm relationships: Evidence from long-term supply contracts. J. Account. Econ. 56 (1), 19–39.

Crowley, R.M., Huang, W., Lu, H., 2022. Discretionary dissemination on Twitter. SSRN Working paper. https://ssrn.com/abstract_id=3105847.

Dai, R., Duan, R., Liang, H., Ng, L., 2021. Outsourcing climate change. SSRN Working paper. https://ssrn.com/abstract_id=3765485.

Dai, R., Liang, H., Ng, L.L., 2021. Socially responsible corporate customers. J. Financ. Econ. 142 (2), 598–626.

Darendeli, A., Fiechter, P., Hitz, J.-M., Lehmann, N., 2022. The role of corporate social responsibility (CSR) information in supply-chain contracting: Evidence from the expansion of CSR rating coverage. J. Account. Econ. 74 (2–3), 101525.

Dechow, P.M., Dichev, I.D., 2002. The quality of accruals and earnings: The role of accrual estimation errors. Account. Rev. 77 (1), 35–59.

Dhaliwal, D.S., Li, O.Z., Tsang, A., Yang, Y.G., 2011. Voluntary nonfinancial disclosure and the cost of equity capital: The initiation of corporate social responsibility reporting. Account. Rev. 86 (1), 59–100.

Dhaliwal, D.S., Radhakrishnan, S., Tsang, A., Yang, Y.G., 2012. Nonfinancial disclosure and analyst forecast accuracy: International evidence on corporate social responsibility disclosure. Account. Rev. 87 (3), 723–759.

Distelhorst, G., Shin, J., 2022. Assessing the social impact of corporations: Evidence from management control interventions in the supply chain to increase worker wages. J. Account. Res. 61 (3), 855–890.

Duchin, R., Ozbas, O., Sensoy, B.A., 2010. Costly external finance, corporate investment, and the subprime mortgage credit crisis. J. Financ. Econ. 97 (3), 418–435.

Fiechter, P., Hitz, J.M., Lehmann, N., 2022. Real effects of a widespread CSR reporting mandate: Evidence from the European Union's CSR Directive. J. Account. Res. 60 (4), 1499–1549.

Gao, H., Hsu, P.H., Li, K. and Zhang, J., 2020. The real effect of smoking bans: Evidence from corporate innovation. J. Financ. Quant. Anal. 55(2), 387–427.

Gibbons, B., 2023. The financially material effects of mandatory nonfinancial disclosure. J. Account. Res. https://doi.org/10.1111/1475-679X.12499.

Gofman, M., Segal, G., Wu, Y.C., 2020. Production networks and stock returns: The role of vertical creative destruction. Rev. Financ. Stud. 33 (12), 5856–5905.

Grewal, J., Riedl, E.J., Serafeim, G., 2019. Market reaction to mandatory nonfinancial disclosure. Manag. Sci. 65 (7), 3061–3084.

Hadlock, C.J., Pierce, J.R., 2010. New evidence on measuring financial constraints: Moving beyond the KZ index. Rev. Financ. Stud. 23 (5), 1909–1940.

Hendricks, K.B., Singhal, V.R., 2005. Association between supply chain glitches and operating performance. Manag. Sci. 51 (5), 695–711.

Huang, X., Teoh, S.H., Zhang, Y.L., 2014. Tone management. Account. Rev. 89 (3), 1083–1113.

Ilhan, E., Krueger, P., Sautner, Z., Starks, L.T., 2021. Climate Risk Disclosure and Institutional Investors. SSRN Working paper. https://ssrn.com/abstract_id=3437178.

Jayaraman, S., Wu, J.S., 2019. Is silence golden? Real effects of mandatory disclosure. Rev. Financ. Stud. 32 (6), 2225–2259.

Kaplan, R.S., Ramanna, K., 2021. Accounting for climate change. Harv. Bus. Rev. 99 (6), 120–131.
Kaplan, S.N., Zingales, L., 1997. Do investment-cash flow sensitivities provide useful measures of financing constraints? Q. J. Econ. 112 (1), 169–215.
Kasznik, R., 1999. On the association between voluntary disclosure and earnings management. J. Account. Res. 37 (1), 57–81.
Kedia, S., Rajgopal, S., 2011. Do the SEC's enforcement preferences affect corporate misconduct? J. Account. Econ. 51 (3), 259–278.
Kerr, W.R., Nanda, R., 2009. Democratizing entry: Banking deregulations, financing constraints, and entrepreneurship. J. Financ. Econ. 94 (1), 124–149.
Kim, J.B., Lu, L.Y., Yu, Y.X., 2019. Analyst coverage and expected crash risk: Evidence from exogenous changes in analyst coverage. Account. Rev. 94 (4), 345–364.
Kothari, S.P., Shu, S., Wysocki, P.D., 2009. Do managers withhold bad news? J. Account. Res. 47 (1), 241–276.
Krueger, P., Sautner, Z., Starks, L.T., 2020. The importance of climate risks for institutional investors. Rev. Financ. Stud. 33 (3), 1067–1111.
Krueger, P., Sautner, Z., Tang, D.Y., Zhong, R., 2023. The effects of mandatory ESG disclosure around the world. SSRN Working paper. https://ssrn.com/abstract_id=3832745.
Kuruvilla, S., 2021. Private regulation of labor standards in global supply chains: problems, progress, and prospects. Cornell University Press.
Lamont, O., Polk, C., Saa-Requejo, J., 2001. Financial constraints and stock returns. Rev. Financ. Stud. 14 (2), 529–554.
Leuz, C., Triantis, A., Wang, T.Y., 2008. Why do firms go dark? Causes and economic consequences of voluntary SEC deregistrations. J. Account. Econ. 45 (2–3), 181–208.
Luo, S.Q., Nagarajan, N.J., 2015. Information complementarities and supply chain analysts. Account. Rev. 90 (5), 1995–2029.
Oberholtzer, L., Dimitri, C., Jaenicke, E.C., 2013. International trade of organic food: Evidence of US imports. Renew. Agric. Food Syst. 28 (3), 255–262.
Rajan, R.G., Zingales, L., 1995. What do we know about capital structure? Some evidence from international data. J. Finance 50 (5), 1421–1460.
Ramalingegowda, S., Yu, Y., 2012. Institutional ownership and conservatism. J. Account. Econ. 53 (1–2), 98–114.
Rauh, J.D., 2006. Investment and financing constraints: Evidence from the funding of corporate pension plans. J. Finance 61 (1), 33–71.
Schiller, C., 2018. Global supply-chain networks and corporate social responsibility. SSRN Working paper. https://ssrn.com/abstract_id=3089311.
She, G., 2022. The real effects of mandatory nonfinancial disclosure: evidence from supply chain transparency. Account. Rev. 97 (5), 399–425.
Skaaning, S.E., 2010. Measuring the rule of law. Polit. Res. Q. 63 (2), 449–460.

Sun, L.Y., Abraham, S., 2021. Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. J. Econom. 225 (2), 175–199.

Wagner, S.M., Neshat, N., 2012. A comparison of supply chain vulnerability indices for different categories of firms. Int. J. Prod. Res. 50 (11), 2877–2891.

Wang, L.L., 2023. Transmission effects of ESG disclosure regulations through bank lending networks. J. Account. Res. 61 (3), 935–978.

Yu, F., 2008. Analyst Coverage and Earnings Management. J. Financ. Econ. 88 (2), 245–271.

Appendix A: Mandatory ESG Disclosure Policies

This table summarizes the 35 regulations that mandates ESG disclosure policies and disclosure venues and their corresponding introduction year in different countries.

Country	Year	Disclosure Venue	Regulation	Authority	ESG Pillars	Scope
Argentina	2008	Stand-Alone Report	Ley N° 2594 de Balance de Responsabilidad Social y Ambiental (Corporate Social Responsibility Law No. 2594 of Buenos Aires)	Buenos Aires City Council	E, S, G	All firms
Australia	2003	Annual Report	ASX Listing Rule 4.10.3: Corporate Governance Statement	Australian Stock Exchange	G	Listed companies
Austria	2016	Stand-Alone Report	Transposition of EU NFR Directive: Sustainability and Diversity Improvement Act 257/ME	Ministry of Justice	E, S, G	Large private and listed companies
Belgium	2009	Annual Report	The 2009 Belgian Code on Corporate Governance	Corporate Governance Committee	S, G	All firms
Canada	2004	Stand-Alone Report	The TSX Timely Disclosure Policy	Toronto Stock Exchange	E, S, G	Listed companies
Chile	2015	Annual Report	Norma de Caracter General N°385/386	Superintendencia de valores y seguros (Superintendency of Securities and Insurance)	S, G	Listed companies
China	2008	Stand-Alone Report	Guidelines on Listed Companies' Environmental Information Disclosure	Shanghai Stock Exchange	E	Listed companies
Denmark	2016	Both	Transposition of EU NFR Directive: Act Amending the Danish Financial Statements Act L 117	Danish Business Authority	E, S, G	All firms
Finland	2016	Annual Report	Transposition of EU NFR Directive: HE 208/2016 Government Proposal to Parliament for Amendments to Accounting Act and Certain Related Acts	Ministry of Economic Affairs and Employment	E, S, G	All firms
France	2001	Annual Report	New Economic Regulations Act (Nouvelles Regulations Economiques, or NRE Act 2001)	French Parliament	E, S	Large private and listed companies
Germany	2016	Annual Report	Transposition of EU NFR Directive: CSR Directive Implementation Act (CSR-Richtlinie-Umsetzungsgesetz)	Ministry of Justice and Consumer Affairs	E, S, G	All firms
Greece	2006	Annual Report	Transposition of EU Directive 2003/51/EC: Law 3487, 2006	Greek Parliament	E, S	All firms
Hong Kong	2015	Stand-Alone Report	HKEX Listing Rules Appendix 27 Environmental, Social and Governance Reporting Guide 2015	Hong Kong Stock Exchange	E, G	Listed companies

Hungary	2016	Annual Report	Transposition of EU NFR Directive: Amendments to Accounting Act C of 2000	Ministry of National Economy, Accounting and Supervision	E, S, G	All firms
India	2015	Stand-Alone Report	Circular No. CIR/CFD/CMD/10/2015 Format for Business Responsibility Report	Securities and Exchange Board of India	E, S, G	Listed companies
Indonesia	2012	Annual Report	Rule No.KEP-431/BL/2012 Concerning the Obligation to Submit Annual Reports for Issuers of Public Companies	Capital Market and Financial Institutions Supervisory Agency	E, S	Listed companies
Ireland	2016	Stand-Alone Report	Transposition of EU NFR Directive: S.I. No. 360/2017 European Union (Disclosure of Non-Financial and Diversity Information by certain large undertakings and groups) Regulations	Department of Jobs, Enterprise and Innovation	E, S, G	Large private and listed companies
Italy	2016	Stand-Alone Report	Transposition of EU NFR Directive: Legislative Decree 30 December 2016, n.254	Ministry of Economic Affairs	E, S, G	Large private and listed companies
Malaysia	2007	Annual Report	Main Markets listing requirements paragraph 9.45(2) and paragraph (29), Part A of Appendix 9C: Sustainability Reporting Guide	Bursa Malaysia Securities Berhad	G	Listed companies
Netherlands	2016	Stand-Alone Report	Transposition of EU NFR Directive: Decree Disclosure of Non-financial Information PbEU, 2014, L330 and Decree Disclosure Diversity Policy PbEU, 2014, L330	Ministry of Security and Justice	E, S, G	Large private and listed companies
Norway	2013	Both	Act Amending the Norwegian Accounting Act	Norwegian Parliament	E, S, G	All firms
Pakistan	2009	Stand-Alone Report	Companies (Corporate Social Responsibility) General Order	Securities and Exchange Commission of Pakistan	E, S	Listed companies
Peru	2015	Stand-Alone Report	Resolución SMV Nº 033-2015-SMV/01	Peruvian Capital Markets Superintendency	E, S, G	Listed companies
Philippines	2011	Annual Report	Corporate Social Responsibility Act, 2011	Committee on Trade and Commerce	S	Large private and listed companies
Poland	2016	Annual Report	Transposition of EU NFR Directive: Act of 15 December 2016, Amending the Accounting Act 61	Ministry of Finance	E, S, G	All firms

Portugal	2010	Annual Report	The Financial Reporting Accounting Standard No. 26	Commission for Accounting Normalization	E	All firms
Romania	2016	Stand-Alone Report	Transposition of EU NFR Directive: Act No 1938 (Order Regarding Changes and Additions to Existing Accounting Regulations)	Ministry of Public Finance	E, S, G	All firms
Singapore	2016	Stand-Alone Report	SGX0ST Listing Rules Practice Note 7.6 Amendments to sustainability reporting guide	Singapore Stock Exchange	E, S, G	Listed companies
Slovenia	2017	Annual Report	Transposition of EU NFR Directive: Amending the Companies Act	National Assembly of the Republic of Slovenia	E, S, G	All firms
South Africa	2010	Both	Johannesburg Stock Exchange Listing Requirement 2010	Johannesburg Stock Exchange	E, S	Listed companies
Spain	2012	Both	Spanish Sustainable Economy Law (Revision of 2011)	The National Securities Market	E, S, G	Listed companies
Sweden	2016	Stand-Alone Report	Transposition of EU NFR Directive: Corporate Reporting on Sustainability and Diversity Policy CU2	Ministry of Justice	E, S, G	All firms
Taiwan (China)	2019	Stand-Alone Report	Taiwan Stock Exchange Corporation Rules Governing the Preparation and Filing of Corporate Social Responsibility Reports by TWSE Listed Companies	Taiwan Stock Exchange	E, S, G	Listed companies
Turkey	2014	Both	GHG Monitoring Regulation/Communique on corporate governance principles	Capital Markets Board of Turkey	E	Listed companies
United Kingdom	2013	Stand-Alone Report	The Companies Act 2006 Regulations 2013	Secretary of State	E, S, G	All firms

Appendix B: ESG Disclosure Policies with Supply Chain Due Diligence Clauses

This table summarizes the 22 ESG disclosure policies (of the 35 reported in Appendix A) that explicitly require disclosure on supply chain due diligence processes. Supply chain related risks encompass risks that stem from the firm's undertaking of its own activities or those that are linked to its operations, and, where relevant, its products, services and business relationships, including its supply and subcontracting chains.

Country	Year	Disclosure Venue	Regulation	Authority	ESG Pillars	Scope
Australia	2018	Stand-Alone Report	Modern Slavery Bill 2018	Ministry of Foreign Affairs and Aid Subcommittee	S, G	Large private and listed companies
Austria	2016	Stand-Alone Report	Transposition of EU NFR Directive: Sustainability and Diversity Improvement Act 257/ME	Ministry of Justice	E, S, G	Large private and listed companies
Belgium	2016	Stand-Alone Report	Transposition of EU NFR Directive: Amendments to Companies Act	Commissie boekhoudkundige normen	E, S, G	Large private and listed companies
Canada	2018	Annual Report	An Act respecting the fight against certain forms of modern slavery through the imposition of certain measures and amending the Customs Tariff	42nd Parliament	S, G	All firms
Denmark	2016	Both	Transposition of EU NFR Directive: Act amending the Danish Financial Statements Act L 117	Danish Business Authority	E, S, G	All firms
Finland	2016	Annual Report	Transposition of EU NFR Directive: HE 208/2016 Government proposal to Parliament for Amendments to Accounting Act and certain related Acts	Ministry of Economic Affairs and Employment	E, S, G	All firms
France	2016	Annual Report	Transposition of EU NFR Directive: Amendments to the Law on Accounting PZE No. 51	French National Assembly	E, S, G	All firms
Germany	2016	Annual Report	Transposition of EU NFR Directive: CSR Directive Implementation Act (CSR-Richtlinie-Umsetzungsgesetz)	Ministry of Justice and Consumer Affairs	E, S, G	All firms
Greece	2016	Annual Report	Transposition of EU NFR Directive: Law 4403/2016	Ministry of Economy, Development	E, S, G	Large private and listed companies
Hungary	2016	Annual Report	Transposition of EU NFR Directive: Amendments to Accounting Act C of 2000	Ministry of National Economy, Accounting and Supervision	E, S, G	All firms

Ireland	2016	Stand-Alone Report	Transposition of EU NFR Directive: S.I. No. 360/2017 European Union (Disclosure of Non-Financial and Diversity Information by certain large undertakings and groups) Regulations	Department of Jobs, Enterprise and Innovation	E, S, G	Large private and listed companies
Italy	2016	Stand-Alone Report	Transposition of EU NFR Directive: Legislative Decree 30 December 2016, n.254	Ministry of Economic Affairs	E, S, G	Large private and listed companies
Netherlands	2016	Stand-Alone Report	Transposition of EU NFR Directive: Decree Disclosure of Non-financial Information PbEU, 2014, L330 and Decree Disclosure Diversity Policy PbEU, 2014, L330	Ministry of Security and Justice	E, S, G	Large private and listed companies
Peru	2015	Stand-Alone Report	Resolución SMV Nº 033-2015-SMV/01	Peruvian Capital Markets Superintendency	E, S, G	Listed companies
Poland	2016	Annual Report	Transposition of EU NFR Directive: Act of 15 December 2016, Amending the Accounting Act 61	Ministry of Finance	E, S, G	All firms
Portugal	2016	Both	Transposition of EU NFR Directive: Amendment to the Accounting Act	Ministry of Finance	E, S	Large private and listed companies
Romania	2016	Stand-Alone Report	Transposition of EU NFR Directive: Act No 1938 as "Order regarding changes and additions to existing accounting regulations"	Ministry of Public Finance	E, S, G	All firms
Slovenia	2017	Annual Report	Transposition of EU NFR Directive: Amending the Companies Act	National Assembly of the Republic of Slovenia	E, S, G	All firms
South Africa	2014	Stand-Alone Report	Broad-Based Black Economic Empowerment Act 2003 as amended by Act 46 of 2013 and Code of Good Practices	Department of Trade and Industry	S, G	All firms
Spain	2018	Both	Transposition of EU NFR Directive: Law 11/2018	Ministry of Employment and Social Security	E, S, G	Large private and listed companies
Sweden	2016	Stand-Alone Report	Transposition of EU NFR Directive: Corporate Reporting on Sustainability and Diversity Policy CU2	Ministry of Justice	E, S, G	All firms
United Kingdom	2015	Stand-Alone Report	Modern Slavery Act	Parliament	S	All firms

Appendix C: Variable Definitions

This table reports the details about the data source and means of constructing the independent variables and control variables used in our paper.

	Dependent Variables	Source
Cost of Goods Sold / Sales	Firm-year variable. For manufacturing companies, cost of goods sold (Worldscope item 01051) represents specific or direct manufacturing cost of material and labor entering in the production of finished goods. Excise taxes and windfall profits taxes are not included. Most non-U.S. corporations do not disclose cost of goods sold. For merchandise companies, cost of goods sold represents the purchase price of items sold, as well as indirect overhead such as freight, inspecting, and warehouse costs. If a breakdown of total operating cost of non-manufacturing companies is not available then it is treated as cost of goods sold. Cost of Goods Sold is scaled by net sales and in percentage.	Worldscope
GHG Emissions	Natural logarithm of [1 + Greenhouse Gases (Scope 1)]. Greenhouse gas (GHG) emissions from sources that are owned or controlled by the company (categorised by the Greenhouse Gas Protocol).	Trucost
GHG Intensity	Firm-year variable. Greenhouse gas (GHG) Intensity is GHG emissions from sources that are owned or controlled by the company (categorised by the Greenhouse Gas Protocol) divided by the company's revenue.	Trucost
Log(# ESG Incidents)	Natural logarithm of [1 + # of ESG incidents]. # of ESG incidents is the number of negative ESG incidents in a firm-year. We measure negative ESG events using data on ESG incidents compiled by RepRisk, a company that collects firm-specific ESG news in multiple languages from public media sources.	RepRisk
Log(# New Domestic Suppliers)	Natural logarithm of [1 + # of New Suppliers from the Same Country]. # of New Suppliers from the Same Country is the number of new domestic suppliers.	Revere
Log(# New Foreign Opaque Suppliers)	Natural logarithm of [1 + # of New Suppliers from Countries without Mandatory ESG Disclosure]. # of New Suppliers from Countries without Mandatory ESG Disclosure is the natural logarithm of the total number of new suppliers located in countries that have not yet past any mandatory disclosure before the customer firms.	Revere
Log(# New Foreign Transparent Suppliers)	Natural logarithm of [1 + # of New Suppliers from Countries with Mandatory ESG Disclosure]. # of New Suppliers from Countries with Mandatory ESG Disclosure is the total number of new suppliers located in countries that have already passed mandatory disclosure before the customer firms.	Revere
Log(# Onsite ESG Incidents)	Natural logarithm of [1 + # of Onsite ESG incidents]. # of Onsite ESG incidents is the number of negative ESG incidents in a firm-year. We measure negative ESG events using data on ESG incidents compiled by RepRisk, a company that collects firm-specific ESG news in multiple languages from public media sources. Onsite ESG Incidents refer to ESG incidents that are independent of supply chain issues. A case is classified as an onsite ESG incident when the RepRisk variable "related_issues" does not include keywords "Supply chain issues".	RepRisk

Percentage of Domestic Suppliers	Firm-year variable. It is the composition of domestic suppliers.	Revere
Percentage of Foreign Opaque Suppliers	Firm-year variable. It is the composition of suppliers in countries that have not yet past any mandatory disclosure before the customer firms over the total number of suppliers.	Revere
Percentage of Foreign Transparent Suppliers	Firm-year variable. It is the composition of suppliers in countries that have already passed mandatory disclosure before the customer firms over the total number of suppliers.	Revere
Selling, General & Administrative Expense / Sales	Firm-year variable. Selling, General & Administrative Expense (Worldscope item 01101) represents expenses not directly attributable to the production process but relating to selling, general and administrative functions. General & Administrative Expense is scaled by net sales and in percentage.	Worldscope
	Independent Variables	**Source**
Analyst Coverage	The number of analysts who made forecasts about firm's earnings in the year.	I/B/E/S
EPI Index	Country-year variable. The Environmental Performance Index (EPI) provides a data-driven summary of the state of sustainability around the world. Using 40 performance indicators across 11 issue categories, the EPI ranks 180 countries on climate change performance, environmental health, and ecosystem vitality. These indicators provide a gauge at a national scale of how close countries are to established environmental policy targets. The raw EPI data is obtained from Yale Center for Environmental Law & Policy.	Yale Center for Environmental Law & Policy
Institutional Ownership	Firm-year variable. The percent of shares held by institutional investors (in percentage). Calculated as [SharesHeld / Common Shares Outstanding (Worldscope item 05301)] * 100. SharesHeld represents the number of shares held by institutional investors. Winsorized at level 1% and 99% levels.	Thomson Reuters Ownership
Mandatory Disclosure	Dummy variable that equals one for all years starting with the first year after the implementation of mandatory ESG disclosure in a country, and zero otherwise.	Manually Collected
Rule of Law Index	Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.	WorldBank
SA Index	Firm-year variable. SA (size-age) Index is based on the Hadlock and Pierce (2010) paper on financing constraints. The index is calculated as (−0.737 * Size) + (0.043 * Size * Size) − (0.040 * Age), where Size equals the log of book assets, and Age is the number of years the firm is listed with a non-missing stock price on Worldscope. In calculating this index, Size is winsorized (i.e., capped) at (the log of) $4.5 billion, and Age is winsorized at thirty-seven years.	Worldscope

SPI Index	Country-year variable. The Social Progress Index (SPI) measures the extent to which countries provide for the social and environmental needs of their citizens. It uses 12 components and 60 indicators to measure the social performance of 169 countries fully and an additional 27 countries partially. SPI data is provided by the Social Progress Imperative.	Social Progress Imperative
Supply Chain Due Diligence	Dummy variable that equals one for all years starting with the first year after the implementation of mandatory ESG disclosure with clauses mandating supply chain reports or supply chain due diligence in a country, and zero otherwise.	Manually Collected
	Control Variables	**Source**
Cash Flow Volatility	Cash flow volatility is estimated by the standard deviations of cash flows of a firm in the entire sample period, scaled by total assets. Cash flow is the sum of Funds from Operations (Worldscope item 04201) and Total Other Cash Flow (Worldscope item 04151). Winsorized at level 1% and 99% levels.	Worldscope
External Financing	Firm-year variable. Calculated as [External Financing (Worldscope item 04500) / Total Assets (Worldscope item 02999)] * 100. External Financing (Worldscope item 04500) represents company financing from outside sources, including the issuance and retirement of stock and debt. Winsorized at level 1% and 99% levels.	Worldscope
Leverage	Firm-year variable. Worldscope item 08236. Calculated as the ratio of total debt to total assets. Winsorized at level 1% and 99% levels.	Worldscope
Liquidity	Liquidity. Firms with more liquid assets can use them as another internal source of funds instead of debt, leading to lower optimal debt equity ratio. Calculated as Total Current Assets (Worldscope item 02201) / Total Current Liabilities (Worldscope item 03101). Total Current Assets represents cash and other assets that are reasonably expected to be realized in cash, sold or consumed within one year or one operating cycle. Total Current Liabilities represent debt or other obligations that the company expects to satisfy within one year. Winsorized at level 1% and 99% levels.	Worldscope
Market Share	Firm-year variable. Firm’s percentage share of sales by all public firms in the same Fama & French 12 industry and the same country. Winsorized at level 1% and 99% levels.	Worldscope
Market-to-Book	A higher market-to-book tends to be a sign of more attractive future growth options, which a firm tends to protect by limiting its leverage. Calculated as Market Capitalization / (Total Assets - Total Liabilities), where Total Liabilities (Worldscope item 03351) represent all short- and long-term obligations expected to be satisfied by the company. Winsorized at level 1% and 99% levels.	Worldscope
ROA	Firm-year variable. Calculated as [Net Income (Worldscope item 01651) / Total Assets (Worldscope item 02999)] * 100. Winsorized at level 1% and 99% levels.	Worldscope
Sales Growth	Firm-year variable. Worldscope item 08631. The growth rate of firm's net sales (in percentage). Calculated as (Current Year's Net Sales or Revenues / Last Year's Total Net Sales or Revenues - 1) * 100. Winsorized at level 1% and 99% levels.	Worldscope

Tangibility	Firms operating with greater tangible assets have a higher debt capacity. Calculated as Property, Plant And Equipment (Worldscope item 02501) / Total Assets (Worldscope item 02999). Property, Plant And Equipment represents Gross Property, Plant and Equipment less accumulated reserves for depreciation, depletion and amortization. Winsorized at level 1% and 99% levels.	Worldscope
Total Assets	Natural logarithm of [1 + Raw Total Assets (Worldscope item 07230)]. Raw Total Assets represent the total assets of the company converted to U.S. dollars using the fiscal year-end exchange rate.	Worldscope

Figure 1. Dynamic Effects of Mandatory ESG Disclosure

This figure shows the dynamic changes of coefficients with respect to the year to disclosure. Year to disclosure is defined as the time difference by subtracting the current year from the disclosure year. Negative numbers correspond to years prior to the ESG mandate and positive numbers correspond to years after the ESG mandate (i.e., the coefficients on the indicators $Time_{jk}$ where k represents the number of years until or since the year that country j introduced the ESG mandate). The models estimate coefficients on the time indicators for five years prior and following the implementation year.

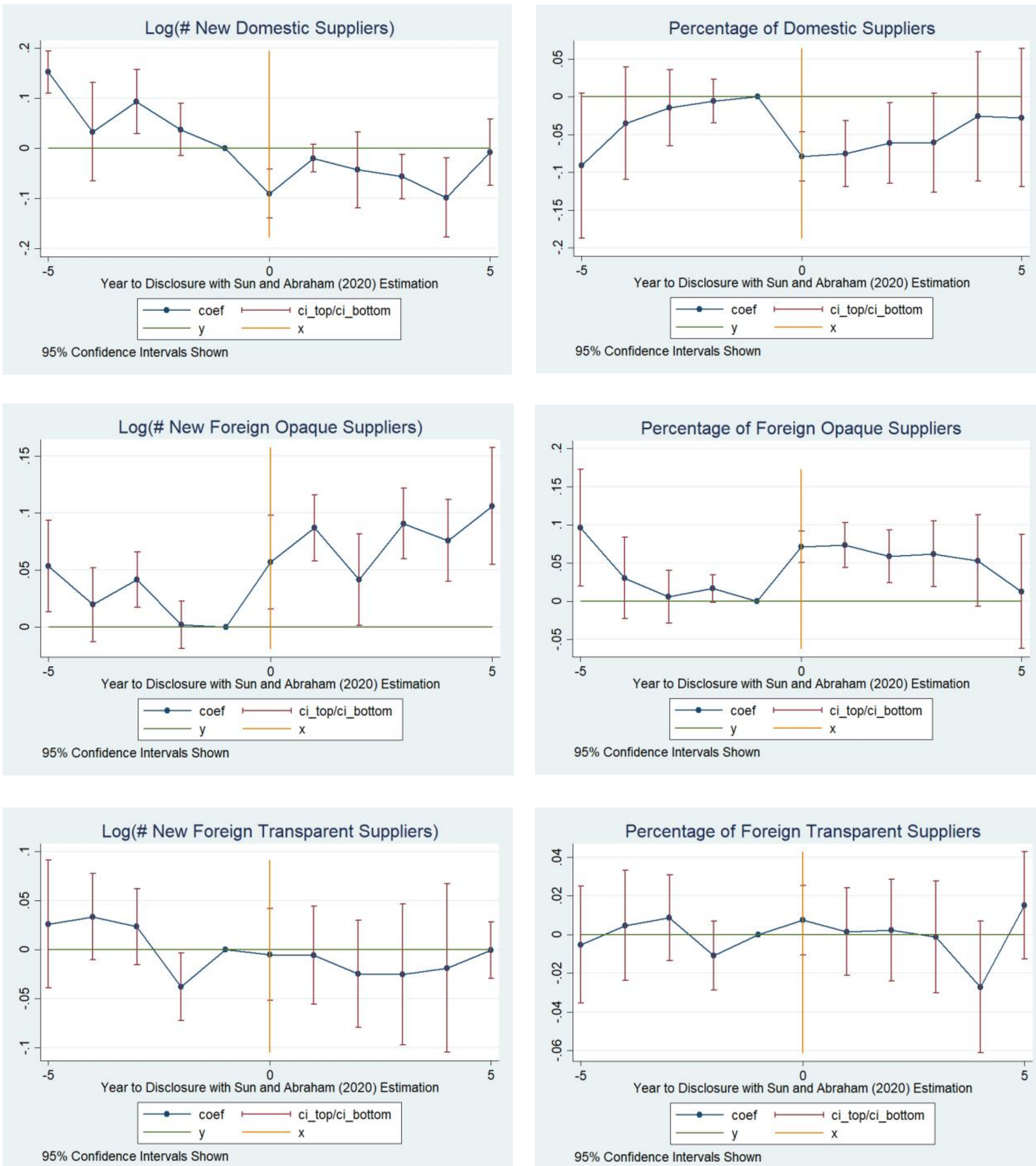

Table 1: Descriptive Statistics

This table contains summary statistics for the key variables used in all subsequent estimations. Definitions of variables are in Appendix C.

	Obs	Mean	Std Dev	5%	Median	95%
Dependent Variables						
Cost of Goods Sold / Sales	95,639	61.1	25.0	12.8	65.4	92.7
GHG Emissions	41,724	10.8	2.8	6.6	10.6	15.9
GHG Intensity	41,724	327	1066	2.1	22.1	1772
Log(# ESG Incidents)	42,207	0.64	0.93	0	0	2.64
Log(# New Domestic Suppliers)	100,478	0.50	0.69	0	0	1.95
Log(# New Foreign Opaque Suppliers)	100,478	0.25	0.52	0	0	1.39
Log(# New Foreign Transparent Suppliers)	100,478	0.34	0.63	0	0	1.61
Log(# Onsite ESG Incidents)	42,207	0.60	0.90	0	0	2.48
Percentage of Domestic Suppliers	100,478	0.54	0.41	0	0.58	1
Percentage of Foreign Opaque Suppliers	100,478	0.20	0.31	0	0	1
Percentage of Foreign Transparent Suppliers	100,478	0.26	0.33	0	0.09	1
Selling, General & Administrative Expense / Sales	89,606	32.8	84.3	3.16	17.3	69.8
Independent Variables						
Analyst Coverage	90,800	5.80	7.04	0	3	21
EPI Index	100,278	60.8	15.3	32.2	66.2	78.7
Institutional Ownership	67,654	24.4	29.5	0.10	10.9	90.2
Mandatory Disclosure	100,478	0.36	0.48	0	0	1
Rule of Law Index	100,320	1.09	0.80	-0.41	1.53	1.84
SA Index	99,622	2.12	1.53	-0.54	2.20	4.30
SPI Index	76,462	80.2	11.7	58.7	86.6	90.5
Supply Chain Due Diligence	100,478	0.10	0.29	0	0	1
Control Variables						
Cash Flow Volatility	90,800	6.65	7.53	0.91	4.14	21.9
External Financing	90,800	2.55	13.2	-10.5	0	24.1
Leverage	100,478	23.4	20.7	0	20.5	60.7
Liquidity	100,478	2.36	2.41	0.56	1.64	6.61
Market Share	100,478	7.81	19.0	0.01	0.68	49.6
Market-to-Book	100,478	1.37	1.58	0.15	0.84	4.49
ROA	100,478	-0.50	19.6	-32.3	3.26	15.6
Sales Growth	100,478	12.7	40.7	-25.8	6.07	62.9
Tangibility	100,478	29.1	23.8	1.43	23.1	77.3
Total Assets	100,478	20.3	1.97	17.1	20.3	23.6

Table 2: Main Effect on Global Supply Chain Composition

This table reports the effect of introducing mandated ESG disclosure policies on firms' supply chain composition change based on the ESG-related corporate information environment of the country suppliers are located in. In Columns 1-3, the dependent variables are the natural logarithm of new suppliers from the same country or from countries with/without mandatory ESG disclosure. In Columns 4-6, the dependent variables are the fraction of suppliers in each of the different types of countries over the total number of suppliers. The independent variable of interest is *Mandatory Disclosure*, which equals one in the years after the implementation of mandatory ESG disclosure and zero otherwise. The control variables include *Total Assets*, *Leverage*, *ROA*, *Market-to-Book Ratio*, *Tangibility*, *Liquidity*, *Sales Growth*, and *Market Share*. The reported coefficients are multiplied by 100 for ease of readability. All variables are defined in Appendix C. Firm fixed effects and year fixed effects are controlled in all columns. The standard errors clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

	(1) Log(# New Domestic Suppliers)	(2) Log(# New Foreign Opaque Suppliers)	(3) Log(# New Foreign Transparent Suppliers)	(4) Percentage of Domestic Suppliers	(5) Percentage of Foreign Opaque Suppliers	(6) Percentage of Foreign Transparent Suppliers
Mandatory Disclosure	-11.36***	6.378***	0.196	-7.600**	6.097**	1.503
	(3.775)	(1.901)	(4.035)	(3.770)	(2.565)	(2.075)
Total Assets	6.689***	3.288***	3.902***	-1.920***	1.783**	0.137
	(2.483)	(0.566)	(1.070)	(0.647)	(0.741)	(0.349)
Leverage	-0.0992***	-0.0258	0.0499**	-0.0579***	0.0311*	0.0268***
	(0.030)	(0.016)	(0.020)	(0.019)	(0.016)	(0.009)
ROA	-0.0495	-0.0244**	0.0120	0.00453	-0.0169	0.0124
	(0.047)	(0.012)	(0.023)	(0.007)	(0.011)	(0.010)
Market-to-Book Ratio	1.331***	0.294	0.289	-0.190	0.172	0.0177
	(0.252)	(0.206)	(0.199)	(0.252)	(0.226)	(0.075)
Tangibility	0.0196	-0.0363*	-0.0632	0.0252	-0.0293	0.00418
	(0.050)	(0.021)	(0.040)	(0.016)	(0.022)	(0.022)
Liquidity	-0.181	-0.0480	0.168	-0.0701**	-0.0558	0.126***
	(0.177)	(0.084)	(0.113)	(0.034)	(0.041)	(0.041)
Sales Growth	0.0107	0.0131***	0.00595	0.00381	-0.000421	-0.00339**
	(0.007)	(0.005)	(0.004)	(0.003)	(0.003)	(0.002)
Market Share	0.106	0.197**	0.230	-0.0718*	0.0452	0.0266
	(0.068)	(0.095)	(0.141)	(0.040)	(0.046)	(0.036)
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Cluster at Country Level	Yes	Yes	Yes	Yes	Yes	Yes
Observations	100,478	100,478	100,478	100,478	100,478	100,478
R-squared	0.588	0.571	0.615	0.816	0.740	0.756

Table 3: Supply Chain Due Diligence in Mandatory Disclosure

This table estimates the incremental effects of mandatory ESG disclosures that explicitly entail guidelines for supply chain due diligence based on the sample of "ever-treated" firms. The dependent variables are the natural logarithm of new suppliers from the same country or from countries with/without mandatory ESG disclosure. *Mandatory Disclosure* is a dummy variable that equals one if a mandated disclosure policy has been introduced. *Supply Chain Due Diligence* is a dummy variable that equals one if a mandated ESG disclosure policy explicitly demands disclosures on supply chain due diligence processes. The reported coefficients are multiplied by 100 for ease of readability. All other variables are defined in Appendix C. Firm fixed effects and year fixed effects are controlled in all columns. The standard errors clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

	(1) Log(# New Domestic Suppliers)	(2) Log(# New Foreign Opaque Suppliers)	(3) Log(# New Foreign Transparent Suppliers)
Mandatory Disclosure * Supply Chain Due Diligence	9.274***	2.151	9.938***
	(2.518)	(1.551)	(2.695)
Mandatory Disclosure	-12.48***	5.803***	1.029
	(3.724)	(2.021)	(3.568)
Total Assets	1.656	3.581***	2.693
	(1.003)	(1.283)	(1.661)
Leverage	-0.0970***	-0.0365	-0.0182
	(0.030)	(0.047)	(0.036)
ROA	0.0303	-0.0191	0.0484
	(0.025)	(0.031)	(0.033)
Market-to-Book Ratio	0.350	0.121	-0.187
	(0.398)	(0.436)	(0.644)
Tangibility	0.0572	-0.0724**	-0.0392
	(0.055)	(0.034)	(0.048)
Liquidity	0.182	-0.108	0.0912
	(0.205)	(0.179)	(0.199)
Sales Growth	-0.00554	0.0182***	0.00418
	(0.006)	(0.005)	(0.007)
Market Share	0.0366	0.261**	0.155*
	(0.057)	(0.110)	(0.082)
Constant	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes
Cluster at Country Level	Yes	Yes	Yes
Observations	43,646	43,646	43,646
R-squared	0.500	0.591	0.630

Table 4: Heterogeneous Treatment Effect by ESG-Related Social Awareness

This table reports the heterogeneous effect of introducing mandated ESG disclosure policies on firms' supply chain composition change depending on the strength of ESG-related social awareness. *Mandatory Disclosure* is a dummy variable that equals one if a mandated disclosure policy has been introduced. *EPI Index* is the Environmental Performance Index, which capture the institutional environment on environmental regulation and protection at the country-year level. *SPI Index* is the Social Progress Index, which capture the social and environmental outcomes of nations. Controls include *Total Assets*, *Leverage*, *ROA*, *Market-to-Book* ratio, *Tangibility*, *Liquidity*, *Sales Growth*, and *Market Share*. The reported coefficients are multiplied by 100 for ease of readability. All variables are defined in Appendix C. Firm fixed effects and year fixed effects are controlled in all columns. The standard errors clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

	(1) Log(# New Domestic Suppliers)	(2) Log(# New Foreign Opaque Suppliers)	(3) Log(# New Foreign Transparent Suppliers)	(4) Log(# New Domestic Suppliers)	(5) Log(# New Foreign Opaque Suppliers)	(6) Log(# New Foreign Transparent Suppliers)
Mandatory Disclosure	0.265*	-0.206**	0.274*			
* EPI Index	(0.153)	(0.099)	(0.156)			
Mandatory Disclosure				0.307*	-0.181**	0.256*
* SPI Index				(0.169)	(0.086)	(0.137)
Mandatory Disclosure	-28.35***	18.28***	-16.90	-33.32**	24.38***	-16.23
	(10.791)	(6.113)	(10.624)	(14.051)	(6.284)	(11.213)
EPI/SPI Index	-1.397*	0.250	-1.864*	-2.600***	0.0865	-3.197***
	(0.748)	(0.297)	(1.042)	(0.613)	(0.377)	(0.714)
Total Assets	6.824***	3.253***	4.035***	4.912***	3.384***	4.798***
	(2.311)	(0.546)	(0.825)	(1.033)	(0.536)	(1.031)
Leverage	-0.101***	-0.0278*	0.0501***	-0.115**	-0.0264	0.0116
	(0.029)	(0.016)	(0.017)	(0.044)	(0.023)	(0.023)
ROA	-0.0522	-0.0241**	0.00902	-0.00179	-0.0205	0.0294*
	(0.045)	(0.011)	(0.021)	(0.024)	(0.017)	(0.017)
Market-to-Book Ratio	1.303***	0.321	0.255	1.009***	-0.00610	0.423
	(0.258)	(0.196)	(0.235)	(0.283)	(0.223)	(0.528)
Tangibility	0.0226	-0.0321	-0.0648*	0.00795	-0.0747***	-0.0917**
	(0.049)	(0.020)	(0.038)	(0.048)	(0.023)	(0.042)
Liquidity	-0.195	-0.0486	0.153	-0.193	-0.0143	0.0803
	(0.172)	(0.082)	(0.105)	(0.194)	(0.104)	(0.132)
Sales Growth	0.0107	0.0132***	0.00552	0.00560	0.0136**	-6.47e-05
	(0.007)	(0.005)	(0.004)	(0.009)	(0.006)	(0.005)
Market Share	0.0994	0.216**	0.227	-0.0331	0.152**	0.124
	(0.071)	(0.095)	(0.142)	(0.059)	(0.074)	(0.076)
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Cluster at Country Level	Yes	Yes	Yes	Yes	Yes	Yes
Observations	100,278	100,278	100,278	76,462	76,462	76,462
R-squared	0.589	0.573	0.616	0.588	0.601	0.661

Table 5: Heterogeneous Treatment Effect by Legal Enforcement Strength

This table reports the heterogeneous effect of introducing mandated ESG disclosure policies on firms' supply chain composition change depending on the strength of legal enforcement. The dependent variables are the natural logarithm of new suppliers from the same country or from countries with/without mandatory ESG disclosure. *Mandatory Disclosure* is a dummy variable that equals one if a mandated disclosure policy has been introduced. *Rule of Law Index* is a worldwide governance indicator capturing the extent to which agents have confidence in and abide by the rules of society. Controls include *Total* Assets, *Leverage*, *ROA*, *Market-to-Book* ratio, *Tangibility*, *Liquidity*, *Sales Growth*, and *Market Share*. The reported coefficients are multiplied by 100 for ease of readability. All variables are defined in Appendix C. Firm fixed effects and year fixed effects are controlled in all columns. The standard errors clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

	(1) Log(# New Domestic Suppliers)	(2) Log(# New Foreign Opaque Suppliers)	(3) Log(# New Foreign Transparent Suppliers)
Mandatory Disclosure * Rule of Law Index	4.574	3.108**	4.857
	(5.172)	(1.377)	(3.306)
Mandatory Disclosure	-17.30**	2.312	-6.621
	(8.268)	(1.701)	(5.184)
Rule of Law Index	-13.13*	-4.934	-21.21**
	(7.905)	(3.553)	(8.786)
Total Assets	6.772***	3.271***	4.017***
	(2.379)	(0.560)	(0.945)
Leverage	-0.104***	-0.0283*	0.0410**
	(0.029)	(0.016)	(0.019)
ROA	-0.0521	-0.0249**	0.00845
	(0.046)	(0.012)	(0.022)
Market-to-Book Ratio	1.320***	0.276	0.271
	(0.246)	(0.206)	(0.218)
Tangibility	0.0192	-0.0345	-0.0655
	(0.050)	(0.021)	(0.040)
Liquidity	-0.174	-0.0487	0.171
	(0.173)	(0.083)	(0.107)
Sales Growth	0.0110	0.0134***	0.00607
	(0.007)	(0.005)	(0.004)
Market Share	0.102	0.187**	0.200
	(0.071)	(0.094)	(0.140)
Constant	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes
Cluster at Country Level	Yes	Yes	Yes
Observations	100,320	100,320	100,320
R-squared	0.588	0.572	0.616

Table 6: Heterogeneous Treatment Effect by Analyst Coverage

This table reports the heterogeneous effect of introducing mandated ESG disclosure policies on firms' supply chain composition change depending on the extent of firms' analyst coverage. *Residual Analyst Coverage* is the residual from the regression following Yu (2008). The dependent variables are the natural logarithm of new suppliers from the same country or from countries with/without mandatory ESG disclosure. *Mandatory Disclosure* is a dummy variable that equals one if a mandated disclosure policy has been introduced. Controls include *Total* Assets, *Leverage*, *ROA*, *Market-to-Book* ratio, *Tangibility*, *Liquidity*, *Sales Growth*, and *Market Share*. The reported coefficients are multiplied by 100 for ease of readability. All variables are defined in Appendix C. Firm fixed effects and year fixed effects are controlled in all columns. The standard errors clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

	(1) Log(# New Domestic Suppliers)	(2) Log(# New Foreign Opaque Suppliers)	(3) Log(# New Foreign Transparent Suppliers)
Mandatory Disclosure * Residual Coverage	0.539*	-0.434**	0.0815
	(0.304)	(0.219)	(0.419)
Mandatory Disclosure	-11.82***	4.966***	-1.140
	(3.614)	(1.797)	(3.769)
Residual Coverage	0.526	0.377**	0.468
	(0.388)	(0.167)	(0.585)
Total Assets	6.775**	3.206***	3.700***
	(2.688)	(0.590)	(1.230)
Leverage	-0.101***	-0.0215	0.0675***
	(0.030)	(0.018)	(0.024)
ROA	-0.0596	-0.0398***	0.00646
	(0.050)	(0.014)	(0.023)
Market-to-Book Ratio	1.179***	0.189	-0.0368
	(0.206)	(0.182)	(0.281)
Tangibility	0.0230	-0.0399**	-0.0753*
	(0.052)	(0.019)	(0.045)
Liquidity	-0.274	-0.0337	0.155
	(0.212)	(0.087)	(0.132)
Sales Growth	0.00685	0.0148***	0.00517
	(0.006)	(0.006)	(0.004)
Market Share	0.103	0.165*	0.228
	(0.075)	(0.093)	(0.153)
Constant	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes
Cluster at Country Level	Yes	Yes	Yes
Observations	90,800	90,800	90,800
R-squared	0.581	0.564	0.611

Table 7: Heterogeneous Treatment Effect by Institutional Ownership

This table reports the heterogeneous effect of introducing mandated ESG disclosure policies on firms' supply chain composition change depending on the extent of firms' institutional ownership. The dependent variables are the natural logarithm of new suppliers from the same country or from countries with/without mandatory ESG disclosure. *Mandatory Disclosure* is a dummy variable that equals one if a mandated disclosure policy has been introduced. *Institutional Ownership* is a firm-year variable indicating shares held by institutional investors in percentage. Controls include *Total* Assets, *Leverage*, *ROA*, *Market-to-Book* ratio, *Tangibility*, *Liquidity*, *Sales Growth*, and *Market Share*. The reported coefficients are multiplied by 100 for ease of readability. All variables are defined in Appendix C. Firm fixed effects and year fixed effects are controlled in all columns. The standard errors clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

	(1) Log(# New Domestic Suppliers)	(2) Log(# New Foreign Opaque Suppliers)	(3) Log(# New Foreign Transparent Suppliers)
Mandatory Disclosure * Institutional Ownership	0.168*	-0.286*	0.380***
	(0.097)	(0.168)	(0.129)
Mandatory Disclosure	-11.85***	11.04***	-4.469
	(4.492)	(2.851)	(5.033)
Institutional Ownership	0.0223	-0.0196	-0.310**
	(0.096)	(0.032)	(0.135)
Total Assets	5.050	3.920***	4.006
	(3.406)	(0.772)	(2.539)
Leverage	-0.0865**	-0.0304	0.0907*
	(0.043)	(0.020)	(0.051)
ROA	-0.0349	-0.0493**	0.0232
	(0.052)	(0.020)	(0.023)
Market-to-Book Ratio	1.119**	0.0714	0.177
	(0.555)	(0.349)	(0.357)
Tangibility	0.00649	-0.0621***	-0.0925
	(0.060)	(0.023)	(0.069)
Liquidity	-0.280	-0.106	0.0578
	(0.231)	(0.142)	(0.279)
Sales Growth	0.00737	0.0183**	0.00274
	(0.007)	(0.007)	(0.010)
Market Share	0.186*	0.195*	0.312*
	(0.100)	(0.105)	(0.168)
Constant	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes
Cluster at Country Level	Yes	Yes	Yes
Observations	67,654	67,654	67,654
R-squared	0.598	0.597	0.639

Table 8: Heterogeneous Treatment Effect by Financial Constraints

This table reports the heterogeneous effect of introducing mandated ESG disclosure policies on firms' supply chain composition change depending on the extent of firms' financial constraint. The dependent variables are the natural logarithm of new suppliers from the same country or from countries with/without mandatory ESG disclosure. *Mandatory Disclosure* is a dummy variable that equals one if a mandated disclosure policy has been introduced. *SA Index* is based on the Hadlock and Pierce (2010) paper on financing constraints. Controls include *Total Assets*, *Leverage*, *ROA*, *Market-to-Book* ratio, *Tangibility*, *Liquidity*, *Sales Growth*, and *Market Share*. The reported coefficients are multiplied by 100 for ease of readability. All variables are defined in Appendix C. Firm fixed effects and year fixed effects are controlled in all columns. The standard errors clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

	(1) Log(# New Domestic Suppliers)	(2) Log(# New Foreign Opaque Suppliers)	(3) Log(# New Foreign Transparent Suppliers)
Mandatory Disclosure * SA Index	-3.430*	1.615**	3.493
	(1.963)	(0.801)	(2.236)
Mandatory Disclosure	-4.439	2.607	-9.063
	(5.425)	(2.185)	(5.679)
SA Index	-1.422*	-0.897	-4.752***
	(0.776)	(0.609)	(0.513)
Total Assets	7.943***	3.361***	5.083***
	(2.298)	(0.549)	(1.288)
Leverage	-0.0970***	-0.0251	0.0622***
	(0.030)	(0.015)	(0.023)
ROA	-0.0518	-0.0302***	0.00741
	(0.044)	(0.011)	(0.020)
Market-to-Book Ratio	1.395***	0.330*	0.425**
	(0.185)	(0.180)	(0.188)
Tangibility	0.0244	-0.0237	-0.0618
	(0.051)	(0.018)	(0.044)
Liquidity	-0.174	-0.0294	0.180
	(0.187)	(0.084)	(0.143)
Sales Growth	0.0110	0.0142***	0.00486
	(0.007)	(0.005)	(0.003)
Market Share	0.100	0.175*	0.222*
	(0.070)	(0.094)	(0.134)
Constant	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes
Cluster at Country Level	Yes	Yes	Yes
Observations	99,622	99,622	99,622
R-squared	0.593	0.575	0.622

Table 9: Mandatory ESG Disclosure and ESG Incidents

This table reports the effect of introducing mandated ESG disclosure policies on firms' reported ESG incidents from RepRisk. The dependent variables are *Log(# ESG incidents)* and *Log(# Onsite ESG incidents)* associated with the customers. *Migration to Countries without Mandatory ESG Disclosure* is a dummy variable that equals one if the percentage of suppliers in countries that have not yet passed mandatory disclosure increases within three years after the introduction. Controls include *Total Assets*, *Leverage*, *ROA*, *Market-to-Book ratio*, *Tangibility*, *Liquidity*, *Sales Growth*, and *Market Share*. The reported coefficients are multiplied by 100 for ease of readability. All variables are defined in Appendix C. Firm fixed effects and year fixed effects are controlled in all columns. The standard errors clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)
	Log(# ESG Incidents)		Log(# Onsite ESG Incidents)	
Mandatory Disclosure	-9.711**	-5.074	-9.101**	-4.636
	(4.837)	(5.368)	(4.544)	(4.944)
Mandatory Disclosure * Migration to		-13.09**		-12.60**
Countries without Mandatory ESG Disclosure		(6.517)		(5.889)
Total Assets	7.419***	7.469***	7.165***	7.213***
	(2.674)	(2.696)	(2.304)	(2.325)
Leverage	0.00741	0.00776	0.00973	0.0101
	(0.025)	(0.025)	(0.024)	(0.024)
ROA	-0.123***	-0.122***	-0.122***	-0.121***
	(0.030)	(0.030)	(0.028)	(0.028)
Market-to-Book Ratio	0.850*	0.871**	0.844*	0.864*
	(0.432)	(0.436)	(0.440)	(0.446)
Tangibility	0.00438	0.00146	0.0168	0.0140
	(0.055)	(0.055)	(0.061)	(0.062)
Liquidity	0.535**	0.530**	0.529*	0.524*
	(0.258)	(0.260)	(0.269)	(0.271)
Sales Growth	-0.0171*	-0.0170*	-0.0195**	-0.0194**
	(0.010)	(0.010)	(0.009)	(0.009)
Market Share	0.372	0.375	0.380	0.383
	(0.294)	(0.293)	(0.281)	(0.281)
Constant	Yes	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes
Cluster at Country Level	Yes	Yes	Yes	Yes
Observations	42,207	42,207	42,207	42,207
R-squared	0.703	0.704	0.702	0.702

Table 10: Mandatory ESG Disclosure and Greenhouse Gas Emission

This table reports the effect of introducing mandated ESG disclosure policies on firms' Scope 1 greenhouse gas (GHG) emissions from Trucost. In columns 1 and 2, the dependent variable is the natural logarithm of GHG emissions. In columns 3 and 4, the dependent variable is GHG Intensity which is calculated as firms' GHG emission divided by the firms' revenue. *Mandatory Disclosure (Environmental)* is a dummy variable that equals one if a mandated ESG disclosure policy explicitly mentions environment related considerations. The control variables include *Total Assets, Leverage, ROA, Market-to-Book Ratio, Tangibility, Liquidity, Sales Growth*, and *Market Share*. All variables are defined in Appendix C. Firm fixed effects and year fixed effects are controlled in all columns. The standard errors clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)
	GHG Emissions		GHG Intensity	
Mandatory Disclosure (Environmental)	-0.109**	-0.0402	-28.80*	-7.981
	(0.045)	(0.041)	(17.277)	(20.979)
Mandatory Disclosure (Environmental) * Migration to Countries without Mandatory ESG Disclosure		-0.146**		-44.04**
		(0.061)		(19.376)
Total Assets	0.502***	0.502***	-8.350	-8.240
	(0.056)	(0.056)	(9.758)	(9.777)
Leverage	0.000529	0.000556	0.836***	0.844***
	(0.001)	(0.001)	(0.180)	(0.179)
ROA	0.00191**	0.00190**	-0.0235	-0.0244
	(0.001)	(0.001)	(0.210)	(0.210)
Market-to-Book Ratio	0.0359***	0.0359***	-3.848**	-3.835**
	(0.013)	(0.013)	(1.621)	(1.627)
Tangibility	0.00404***	0.00402***	-0.939	-0.946
	(0.001)	(0.001)	(0.701)	(0.699)
Liquidity	-0.0423***	-0.0422***	0.947	0.962
	(0.010)	(0.010)	(1.492)	(1.498)
Sales Growth	0.00113***	0.00113***	-0.121**	-0.121**
	(0.000)	(0.000)	(0.057)	(0.057)
Market Share	0.00383**	0.00385**	-0.740	-0.734
	(0.002)	(0.002)	(0.553)	(0.554)
Constant	Yes	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes
Cluster at Country Level	Yes	Yes	Yes	Yes
Observations	41,724	41,724	41,724	41,724
R-squared	0.969	0.969	0.958	0.958

Table 11: Mandatory ESG Disclosure and Cost Structure

This table reports the effect of introducing mandated ESG disclosure policies on firms' cost structures. The dependent variables are *Cost of Goods Sold* and *Selling, General & Administrative Expense* divided by sales revenue. *Migration to Countries without Mandatory ESG Disclosure* is a dummy variable that equals one if the percentage of suppliers in countries that have not yet passed mandatory disclosure increases within three years after the introduction. The control variables include *Total Assets, Leverage, ROA, Market-to-Book Ratio, Tangibility, Liquidity, Sales Growth*, and *Market Share*. The reported coefficients are multiplied by 100 for ease of readability. All variables are defined in Appendix C. Firm fixed effects and year fixed effects are controlled in all columns. The standard errors clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)
	Cost of Goods Sold / Sales		Selling, General & Administrative Expense / Sales	
Mandatory Disclosure	1.055*	0.882	-1.307	-0.673
	(0.566)	(0.591)	(1.009)	(1.277)
Mandatory Disclosure * Migration to Countries without Mandatory ESG Disclosure		0.414		-1.465
		(0.461)		(2.159)
Total Assets	0.125	0.124	-5.196***	-5.193***
	(0.295)	(0.295)	(1.707)	(1.708)
Leverage	-0.0256***	-0.0256***	-0.0696	-0.0696
	(0.006)	(0.006)	(0.048)	(0.048)
ROA	-0.0542***	-0.0542***	-0.247***	-0.247***
	(0.007)	(0.007)	(0.037)	(0.037)
Market-to-Book Ratio	-0.750***	-0.750***	-0.211	-0.210
	(0.055)	(0.055)	(0.697)	(0.696)
Tangibility	-0.0404**	-0.0404**	-0.111**	-0.111**
	(0.017)	(0.017)	(0.053)	(0.053)
Liquidity	0.104	0.104	4.680***	4.681***
	(0.066)	(0.066)	(0.900)	(0.900)
Sales Growth	-0.00267	-0.00267	-0.116***	-0.116***
	(0.002)	(0.002)	(0.018)	(0.018)
Market Share	0.00725	0.00719	0.142	0.142
	(0.019)	(0.019)	(0.090)	(0.090)
Constant	Yes	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes
Cluster at Country Level	Yes	Yes	Yes	Yes
Observations	95,639	95,639	89,606	89,606
R-squared	0.905	0.905	0.817	0.817

Online Appendix to

"Migration of Global Supply Chains: A Real Effect of Mandatory ESG Disclosure"

Table OA1: Timing of Adopting Mandatory ESG Disclosure Regulations

This table estimates a Weibull hazard model where the "failure" event is the adoption of mandatory ESG disclosure regulations in a given country. The sample consists of all countries over our sample period with treated countries dropped from the sample once they adopted mandatory ESG disclosure regulations. *# Average Domestic Suppliers*, *# Average Foreign Opaque Suppliers*, and *# Average Foreign Transparent Suppliers* represent the average number of suppliers located in the same country as the focal firm, suppliers located in countries without mandatory ESG disclosures, and suppliers located in countries with mandatory ESG disclosures, respectively. Additionally, we incorporate several country-level variables into our analysis, including *Log(GDP)*, *Log(GDP per capita)*, *GDP Growth*, *Stocks Turnover*, *Stocks Traded/GDP*, *Market Capitalization/GDP*, *Tax Revenue/GDP*, and *Inflation*. All independent variables are at the country level. The standard errors clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)
	Mandatory ESG Disclosure Event			
# Average Domestic Suppliers	-0.472			-0.307
	(0.24)			(0.45)
# Average Foreign Opaque Suppliers		-0.346		-0.322
		(0.19)		(0.22)
# Average Foreign Transparent Suppliers			-0.196	0.0851
			(0.25)	(0.40)
Log (GDP)	0.605**	0.398**	0.369**	0.554**
	(0.02)	(0.02)	(0.02)	(0.03)
Log (GDP per capita)	-0.105	0.164	0.120	0.0631
	(0.55)	(0.40)	(0.52)	(0.76)
GDP Growth	0.00713	0.0105	0.00378	0.0219
	(0.92)	(0.90)	(0.96)	(0.78)
Stocks Turnover	0.00651	0.00940**	0.00966**	0.00721
	(0.20)	(0.03)	(0.02)	(0.14)
Stocks Traded / GDP	-0.0220**	-0.0288***	-0.0254***	-0.0272***
	(0.02)	(0.00)	(0.00)	(0.00)
Market Capitalization / GDP	0.00578	0.00726	0.00576	0.00710
	(0.16)	(0.11)	(0.13)	(0.12)
Tax Revenue / GDP	0.0119	0.00570	0.00281	0.0106
	(0.29)	(0.55)	(0.73)	(0.33)
Inflation	-0.0615	-0.0955	-0.0864	-0.0813
	(0.44)	(0.16)	(0.21)	(0.32)
Constant	Yes	Yes	Yes	Yes
Cluster at Country Level	Yes	Yes	Yes	Yes
Observations	573	573	573	573

Table OA2: Poisson Regressions

This table replicates the main results by employing Poisson regressions to account for the dependent variables to be censored at zero. In Columns 1-3, the dependent variables are the number of new suppliers from the same country or from countries with/without mandatory ESG disclosure. In Columns 4-6, the dependent variables are the fraction of suppliers in each of the different types of countries over the total number of suppliers. The independent variable of interest is *Mandatory Disclosure*, which equals one in the years after the implementation of mandatory ESG disclosure and zero otherwise. The control variables include *Total Assets, Leverage, ROA, Market-to-Book Ratio, Tangibility, Liquidity, Sales Growth,* and *Market Share*. The reported coefficients are multiplied by 100 for ease of readability. All variables are defined in Appendix C. Firm fixed effects and year fixed effects are controlled in all columns. The standard errors clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

	(1) # New Domestic Suppliers	(2) # New Foreign Opaque Suppliers	(3) # New Foreign Transparent Suppliers	(4) Percentage of Domestic Suppliers	(5) Percentage of Foreign Opaque Suppliers	(6) Percentage of Foreign Transparent Suppliers
Mandatory Disclosure	-28.57**	23.05***	-0.851	-22.63**	34.63***	-1.971
	(12.811)	(5.458)	(5.970)	(9.350)	(4.955)	(6.722)
Total Assets	25.11***	16.77***	20.79***	-3.119*	5.363**	1.472
	(3.493)	(4.257)	(3.390)	(1.750)	(2.241)	(1.467)
Leverage	-0.400***	-0.176	0.0308	-0.0879**	0.0653	0.135***
	(0.137)	(0.153)	(0.076)	(0.039)	(0.068)	(0.036)
ROA	-0.253**	-0.123	0.214**	0.0102	-0.101**	0.0773**
	(0.117)	(0.109)	(0.090)	(0.013)	(0.041)	(0.033)
Market-to-Book Ratio	4.534***	0.354	2.685	-0.282	-0.0899	0.541
	(0.726)	(3.207)	(1.863)	(0.343)	(1.138)	(0.382)
Tangibility	0.221**	-0.190	-0.0710	0.0343	-0.213**	-0.0378
	(0.110)	(0.158)	(0.136)	(0.029)	(0.093)	(0.099)
Liquidity	-0.170	0.0422	0.853	-0.142**	-0.238	0.312
	(0.530)	(0.638)	(0.658)	(0.064)	(0.241)	(0.236)
Sales Growth	0.0355*	0.0679**	0.0426	0.00833	0.00146	-0.0166**
	(0.021)	(0.033)	(0.035)	(0.006)	(0.011)	(0.008)
Market Share	0.373	0.629*	0.178	-0.342**	0.168	0.0126
	(0.280)	(0.379)	(0.200)	(0.135)	(0.131)	(0.090)
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Cluster at Country Level	Yes	Yes	Yes	Yes	Yes	Yes
Observations	100,478	100,478	100,478	100,478	100,478	100,478
Pseudo R-squared	0.549	0.556	0.646	0.198	0.338	0.290

Table OA3: Regressions with Industry-Year Fixed Effects

This table replicates the main results by incorporating industry-year fixed effects to account for industry structural changes. In Columns 1-3, the dependent variables are the number of new suppliers from the same country or from countries with/without mandatory ESG disclosure. In Columns 4-6, the dependent variables are the fraction of suppliers in each of the different types of countries over the total number of suppliers. The independent variable of interest is *Mandatory Disclosure*, which equals one in the years after the implementation of mandatory ESG disclosure and zero otherwise. The control variables include *Total Assets, Leverage, ROA, Market-to-Book Ratio, Tangibility, Liquidity, Sales Growth,* and *Market Share*. The reported coefficients are multiplied by 100 for ease of readability. All variables are defined in Appendix C. Firm fixed effects and year fixed effects are controlled in all columns. The standard errors clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

	(1) Log(# New Domestic Suppliers)	(2) Log(# New Foreign Opaque Suppliers)	(3) Log(# New Foreign Transparent Suppliers)	(4) Percentage of Domestic Suppliers	(5) Percentage of Foreign Opaque Suppliers	(6) Percentage of Foreign Transparent Suppliers
Mandatory Disclosure	-11.43***	6.270***	0.156	-7.773**	6.223***	1.551
	(3.687)	(1.909)	(3.901)	(3.556)	(2.341)	(2.020)
Total Assets	6.760***	2.872***	4.295***	-1.927***	1.616**	0.311
	(2.446)	(0.521)	(1.011)	(0.628)	(0.754)	(0.391)
Leverage	-0.0873**	-0.0245*	0.0555**	-0.0547***	0.0268*	0.0279***
	(0.035)	(0.014)	(0.022)	(0.018)	(0.015)	(0.009)
ROA	-0.0327	-0.0122	0.0155	0.00645	-0.0132	0.00673
	(0.038)	(0.010)	(0.021)	(0.007)	(0.010)	(0.009)
Market-to-Book Ratio	1.429***	0.199	0.392*	-0.151	0.0950	0.0562
	(0.235)	(0.192)	(0.224)	(0.244)	(0.193)	(0.086)
Tangibility	0.00467	-0.0360*	-0.0639	0.0163	-0.0216	0.00534
	(0.054)	(0.021)	(0.039)	(0.016)	(0.020)	(0.019)
Liquidity	-0.296	-0.0997	0.128	-0.101***	-0.0437	0.145***
	(0.212)	(0.092)	(0.109)	(0.033)	(0.035)	(0.042)
Sales Growth	0.00981*	0.0130***	0.00571	0.00420	-0.000749	-0.00345**
	(0.006)	(0.005)	(0.004)	(0.003)	(0.003)	(0.002)
Market Share	0.139**	0.223**	0.257*	-0.0722*	0.0440	0.0283
	(0.067)	(0.100)	(0.149)	(0.041)	(0.044)	(0.036)
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Cluster at Country Level	Yes	Yes	Yes	Yes	Yes	Yes
Observations	100,478	100,478	100,478	100,478	100,478	100,478
R-squared	0.588	0.571	0.615	0.816	0.740	0.756

Table OA4: Subsample Analysis – Countries with Mandatory ESG Disclosure Regulations

This table replicates the main results by limiting the sample to "ever-treated" countries – i.e., countries that have adopted mandatory ESG disclosure regulations during our sample period. In Columns 1-3, the dependent variables are the natural logarithm of new suppliers from the same country or from countries with/without mandatory ESG disclosure. In Columns 4-6, the dependent variables are the fraction of suppliers in each of the different types of countries over the total number of suppliers. The independent variable of interest is *Mandatory Disclosure*, which equals one in the years after the implementation of mandatory ESG disclosure and zero otherwise. The control variables include *Total Assets, Leverage, ROA, Market-to-Book Ratio, Tangibility, Liquidity, Sales Growth,* and *Market Share*. The reported coefficients are multiplied by 100 for ease of readability. All variables are defined in Appendix C. Firm fixed effects and year fixed effects are controlled in all columns. The standard errors clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

	(1) Log(# New Domestic Suppliers)	(2) Log(# New Foreign Opaque Suppliers)	(3) Log(# New Foreign Transparent Suppliers)	(4) Percentage of Domestic Suppliers	(5) Percentage of Foreign Opaque Suppliers	(6) Percentage of Foreign Transparent Suppliers
Mandatory Disclosure	-10.38***	6.289***	3.274	-11.20***	9.232***	1.964
	(3.593)	(1.882)	(4.390)	(2.264)	(1.958)	(2.053)
Total Assets	1.177	3.470**	2.179	-1.956**	2.977***	-1.020*
	(1.048)	(1.327)	(1.886)	(0.720)	(0.852)	(0.511)
Leverage	-0.0936***	-0.0357	-0.0145	-0.00943	-0.0126	0.0221
	(0.032)	(0.047)	(0.037)	(0.016)	(0.025)	(0.022)
ROA	0.0412	-0.0165	0.0601*	0.0113	-0.0447**	0.0334***
	(0.026)	(0.032)	(0.035)	(0.022)	(0.021)	(0.011)
Market-to-Book Ratio	0.412	0.136	-0.120	0.418	-0.309	-0.109
	(0.389)	(0.440)	(0.657)	(0.282)	(0.247)	(0.169)
Tangibility	0.0647	-0.0707**	-0.0312	0.0224	-0.0508*	0.0285
	(0.056)	(0.034)	(0.049)	(0.021)	(0.027)	(0.029)
Liquidity	0.193	-0.105	0.103	-0.0440	-0.0934	0.137
	(0.214)	(0.181)	(0.205)	(0.062)	(0.087)	(0.089)
Sales Growth	-0.00514	0.0183***	0.00461	-0.000227	0.00228	-0.00205
	(0.007)	(0.006)	(0.007)	(0.003)	(0.004)	(0.003)
Market Share	0.0633	0.267**	0.184**	-0.0456	-0.00625	0.0518
	(0.051)	(0.109)	(0.084)	(0.042)	(0.049)	(0.042)
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Cluster at Country Level	Yes	Yes	Yes	Yes	Yes	Yes
Observations	43,646	43,646	43,646	43,646	43,646	43,646
R-squared	0.499	0.591	0.629	0.838	0.754	0.783

Table OA5: Subsample Analysis – EU and Non-EU Countries

This table replicates the main results by splitting the sample to EU countries and Non-EU countries. The dependent variables are the natural logarithm of new suppliers from the same country or from countries with/without mandatory ESG disclosure. The independent variable of interest is *Mandatory Disclosure*, which equals one in the years after the implementation of mandatory ESG disclosure and zero otherwise. The control variables include *Total Assets, Leverage, ROA, Market-to-Book Ratio, Tangibility, Liquidity, Sales Growth,* and *Market Share*. The reported coefficients are multiplied by 100 for ease of readability. All variables are defined in Appendix C. Firm fixed effects and year fixed effects are controlled in all columns. The standard errors clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
		EU Countries			**Non-EU Countries**	
	Log(# New Domestic Suppliers)	Log(# New Foreign Opaque Suppliers)	Log(# New Foreign Transparent Suppliers)	Log(# New Domestic Suppliers)	Log(# New Foreign Opaque Suppliers)	Log(# New Foreign Transparent Suppliers)
Mandatory Disclosure	-7.230**	6.462**	1.614	-13.12**	5.912**	-5.573
	(3.381)	(2.800)	(2.829)	(5.821)	(2.751)	(4.508)
Total Assets	1.530	5.753***	6.616***	7.061***	3.148***	3.969***
	(1.799)	(1.584)	(2.155)	(2.448)	(0.563)	(1.078)
Leverage	-0.0955	-0.0213	-0.0343	-0.102***	-0.0251	0.0600***
	(0.072)	(0.046)	(0.080)	(0.034)	(0.017)	(0.016)
ROA	-0.00862	-0.0912**	0.0250	-0.0553	-0.0169	0.00862
	(0.036)	(0.043)	(0.045)	(0.049)	(0.013)	(0.023)
Market-to-Book Ratio	0.223	-0.225	0.0353	1.437***	0.363*	0.336*
	(0.410)	(0.855)	(0.882)	(0.182)	(0.192)	(0.190)
Tangibility	0.106	-0.186***	-0.136	0.0124	-0.0206	-0.0540
	(0.072)	(0.068)	(0.105)	(0.054)	(0.021)	(0.041)
Liquidity	0.0808	0.202	-0.277	-0.208	-0.0716	0.192*
	(0.209)	(0.444)	(0.478)	(0.184)	(0.076)	(0.111)
Sales Growth	0.00745	0.0242*	-0.0106	0.0110	0.0114**	0.00668*
	(0.015)	(0.014)	(0.013)	(0.008)	(0.004)	(0.004)
Market Share	-0.0316	0.111	-0.00778	0.214**	0.244*	0.347
	(0.059)	(0.104)	(0.109)	(0.102)	(0.137)	(0.219)
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Cluster at Country Level	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,222	14,222	14,222	86,251	86,251	86,251
R-squared	0.567	0.647	0.701	0.586	0.531	0.581

Table OA6: Voluntary ESG Disclosure

This table uses *Voluntary Disclosure* as independent variable of interests, which equals one in the years after the implementation of voluntary ESG disclosure and zero otherwise. The In Columns 1-3, the dependent variables are the natural logarithm of new suppliers from the same country or from countries with/without mandatory ESG disclosure. In Columns 4-6, the dependent variables are the fraction of suppliers in each of the different types of countries over the total number of suppliers. The control variables include *Total Assets, Leverage, ROA, Market-to-Book Ratio, Tangibility, Liquidity, Sales Growth,* and *Market Share*. The reported coefficients are multiplied by 100 for ease of readability. All variables are defined in Appendix C. Firm fixed effects and year fixed effects are controlled in all columns. The standard errors clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

	(1) Log(# New Domestic Suppliers)	(2) Log(# New Foreign Opaque Suppliers)	(3) Log(# New Foreign Transparent Suppliers)	(4) Percentage of Domestic Suppliers	(5) Percentage of Foreign Opaque Suppliers	(6) Percentage of Foreign Transparent Suppliers
Voluntary Disclosure	0.718	4.347*	4.448	-1.919	0.0507	1.868
	(2.801)	(2.227)	(3.185)	(3.512)	(2.901)	(1.679)
Total Assets	6.915***	3.235***	3.968***	-1.806***	1.669**	0.138
	(2.454)	(0.581)	(1.092)	(0.646)	(0.731)	(0.359)
Leverage	-0.0962***	-0.0276*	0.0497**	-0.0558***	0.0294*	0.0264***
	(0.031)	(0.016)	(0.021)	(0.019)	(0.016)	(0.009)
ROA	-0.0493	-0.0246**	0.0119	0.00468	-0.0170	0.0123
	(0.046)	(0.012)	(0.023)	(0.007)	(0.011)	(0.010)
Market-to-Book Ratio	1.345***	0.305	0.306	-0.190	0.166	0.0235
	(0.256)	(0.205)	(0.202)	(0.244)	(0.222)	(0.072)
Tangibility	0.0182	-0.0356*	-0.0633	0.0243	-0.0286	0.00431
	(0.049)	(0.021)	(0.039)	(0.016)	(0.021)	(0.023)
Liquidity	-0.198	-0.0394	0.167	-0.0810**	-0.0468	0.128***
	(0.174)	(0.086)	(0.114)	(0.036)	(0.040)	(0.042)
Sales Growth	0.0104	0.0131***	0.00586	0.00369	-0.000299	-0.00340**
	(0.007)	(0.005)	(0.004)	(0.003)	(0.003)	(0.002)
Market Share	0.0930	0.203**	0.229	-0.0797**	0.0521	0.0276
	(0.069)	(0.094)	(0.140)	(0.039)	(0.046)	(0.037)
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Cluster at Country Level	Yes	Yes	Yes	Yes	Yes	Yes
Observations	100,478	100,478	100,478	100,478	100,478	100,478
R-squared	0.587	0.571	0.615	0.816	0.739	0.756

Table OA7: Callaway and Sant'Anna Estimator

This table reports robustness tests of the effect of introducing mandated ESG disclosure policies on firms' supply chain composition change using the Callaway and Sant'Anna (2021) estimator. In Columns 1-3, the dependent variables are the natural logarithm of new suppliers from the same country or from countries with/without mandatory ESG disclosure. In Columns 4-6, the dependent variables are the fraction of suppliers in each of the different types of countries over the total number of suppliers. The control variables include *Total Assets, Leverage, ROA, Market-to-Book Ratio, Tangibility, Liquidity, Sales Growth,* and *Market Share*. The reported coefficients are multiplied by 100 for ease of readability. All variables are defined in Appendix C. Firm fixed effects and year fixed effects are controlled in all columns. The standard errors clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Log(# New Domestic Suppliers)	Log(# New Foreign Opaque Suppliers)	Log(# New Foreign Transparent Suppliers)	Percentage of Domestic Suppliers	Percentage of Foreign Opaque Suppliers	Percentage of Foreign Transparent Suppliers
ATT (Mandatory Disclosure)	-6.084**	5.778***	-2.158	-5.926**	6.559***	-0.633
	(3.070)	(2.154)	(2.700)	(2.582)	(1.644)	(1.706)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Cluster at Country Level	Yes	Yes	Yes	Yes	Yes	Yes
Observations	67,345	67,345	67,345	67,345	67,345	67,345

Table OA8: Heterogeneity in Mandatory ESG Disclosure Regulations

This table reports the heterogeneous effect of introducing mandated ESG disclosure policies on firms' supply chain composition change depending on the regulations. The dependent variables are the natural logarithm of new suppliers from the same country or from countries with/without mandatory ESG disclosure. *Mandatory Disclosure* is a dummy variable that equals one if a mandated disclosure policy has been introduced. *Stand-Alone Sustainability Report* is a dummy variable that equals to one if firms are required to issue a stand-alone report containing ESG-related information, and zero if the information is required as part of their annual reports. *Government* is a dummy variable that equals to one if it is the government and zero if it is a stock exchange. *Apply to All Firms* is a dummy variable that equals to one if all firms are subject to the regulation and zero if only listed/large firms are subject to the regulation. Controls include *Total* Assets, *Leverage*, *ROA*, *Market-to-Book* ratio, *Tangibility*, *Liquidity*, *Sales Growth*, and *Market Share*. The reported coefficients are multiplied by 100 for ease of readability. All variables are defined in Appendix C. Firm fixed effects and year fixed effects are controlled in all columns. The standard errors clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Disclosure Venue			**Implementing Authority**			**Applicability Scope**		
	Log(# New Domestic Suppliers)	Log(# New Foreign Opaque Suppliers)	Log(# New Foreign Transparent Suppliers)	Log(# New Domestic Suppliers)	Log(# New Foreign Opaque Suppliers)	Log(# New Foreign Transparent Suppliers)	Log(# New Domestic Suppliers)	Log(# New Foreign Opaque Suppliers)	Log(# New Foreign Transparent Suppliers)
Mandatory Disclosure * Stand-Alone Sustainability Report	6.482	20.55*	4.697						
	(8.239)	(12.092)	(9.754)						
Mandatory Disclosure * Government				-3.769	0.973	8.976			
				(7.839)	(4.116)	(6.445)			
Mandatory Disclosure * Apply to All Firms							-25.34*	-8.328	-3.084
							(14.404)	(5.622)	(10.428)
Mandatory Disclosure	-16.00*	-8.310	-3.162	-9.122	5.799*	-5.143	-3.162	9.074**	1.194
	(8.353)	(9.972)	(9.749)	(5.827)	(3.251)	(3.703)	(7.098)	(3.663)	(5.108)
Total Assets	6.664***	3.208***	3.884***	6.666***	3.294***	3.958***	6.592**	3.256***	3.891***
	(2.499)	(0.554)	(1.073)	(2.505)	(0.571)	(1.074)	(2.531)	(0.561)	(1.065)
Leverage	-0.100***	-0.0285*	0.0493**	-0.0993***	-0.0258	0.0500**	-0.101***	-0.0265*	0.0496**
	(0.030)	(0.016)	(0.020)	(0.030)	(0.016)	(0.020)	(0.030)	(0.016)	(0.020)
ROA	-0.0495	-0.0246**	0.0120	-0.0492	-0.0245**	0.0114	-0.0488	-0.0242**	0.0121
	(0.047)	(0.012)	(0.023)	(0.047)	(0.012)	(0.023)	(0.047)	(0.012)	(0.023)

Market-to-Book Ratio	1.331***	0.294	0.289	1.329***	0.295	0.294	1.351***	0.301	0.291
	(0.252)	(0.208)	(0.200)	(0.253)	(0.207)	(0.199)	(0.241)	(0.204)	(0.200)
Tangibility	0.0201	-0.0346*	-0.0628	0.0202	-0.0364*	-0.0646	0.0236	-0.0349*	-0.0627
	(0.050)	(0.020)	(0.040)	(0.050)	(0.021)	(0.039)	(0.050)	(0.020)	(0.039)
Liquidity	-0.180	-0.0462	0.168	-0.180	-0.0483	0.165	-0.173	-0.0453	0.169
	(0.177)	(0.084)	(0.113)	(0.178)	(0.084)	(0.113)	(0.180)	(0.085)	(0.113)
Sales Growth	0.0108	0.0134***	0.00602	0.0108	0.0131***	0.00560	0.0113*	0.0133***	0.00603
	(0.007)	(0.005)	(0.004)	(0.007)	(0.005)	(0.004)	(0.007)	(0.005)	(0.004)
Market Share	0.105	0.193**	0.229	0.108	0.197**	0.225	0.109	0.198**	0.231
	(0.068)	(0.094)	(0.141)	(0.068)	(0.095)	(0.142)	(0.068)	(0.095)	(0.141)
Firm Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster at Country Level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	100,478	100,478	100,478	100,478	100,478	100,478	100,478	100,478	100,478
R-squared	0.588	0.572	0.615	0.588	0.571	0.615	0.589	0.571	0.615