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The Limits of Local Laws in Global Supply Chains: Extending Governance or Cutting Ties?*

Abstract

We exploit an information shock related to the German Supply Chain Due Diligence Act and use detailed customs data to analyze how smaller, non-listed firms respond when expecting accountability for externalities beyond their organizational boundaries. Product-level regressions reveal a substantial reduction in imports from high ESG-risk production sectors. Adjustments occur mainly at the extensive margin, indicating that firms cut ties with high-risk suppliers. The product-level results translate into meaningful changes in overall international procurement for firms with Big Four auditors. Our findings suggest potential limits to mandates requiring firms to integrate broad sustainability considerations into operational decisions.

Keywords: due diligence, firm boundaries, governance, responsible sourcing, supply chain

JEL classification: F14, F18, G38, M48

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I. Introduction

Policymakers have sought to foster corporate sustainability by enhancing the transparency of managerial decisions, grounded in the insight that well-informed shareholders and other stakeholders, such as creditors, employees, and customers, can play a decisive role in shaping firms' choices (Shleifer and Vishny, 1997; Tirole, 2001). More recently, however, regulatory approaches have moved beyond relying on market and stakeholder pressure to discipline firms. Companies can now face obligations to account for externalities beyond their organizational boundaries when making business decisions.

Mandatory supply chain due diligence regulations - such as the German Supply Chain Due Diligence Act (*Lieferkettensorgfaltspflichtengesetz*, LkSG), the French Duty of Vigilance Law (*Loi relative au devoir de vigilance*), and the European Corporate Sustainability Due Diligence Directive at the European level (CS3D) - expand corporate accountability beyond shareholders and traditional stakeholders to include working conditions, environmental impacts, and broader societal effects linked to the operations of suppliers. Yet, how firms respond to a mandatory requirement to integrate far-reaching sustainability considerations into their operational decisions remains an open empirical question.

To address this question, we exploit an information shock that occurred before the enactment of the German Supply Chain Due Diligence Act. In June 2020, a leaked government white paper revealed plans for the upcoming LkSG to apply to all firms with at least 500 employees in Germany. The law requires firms to conduct comprehensive due diligence on the environmental, social, and governance (ESG) practices of all their direct - and, to some extent, indirect - suppliers. It mandates socially responsible supply chain management, with a particular emphasis on preventing child labor and human rights violations. Companies must conduct risk assessments to identify potential breaches within their value chains and submit annual compliance reports to federal authorities. Authorities can impose fines of up to 2% of turnover for non-compliance and exclude firms from public procurement contracts.

We employ a difference-in-differences (DiD) strategy to identify how firms just above the 500-employee threshold (treatment group) adjust their international sourcing relative to those just below it (control group), providing the first comprehensive evidence on

how firms respond to an expansion of corporate accountability beyond their immediate organizational boundaries. Given the 500-employee applicability threshold, our study also offers broader insights into the corporate (social) governance of smaller, non-listed firms that remain notoriously under-researched despite their economic importance for large, open economies. In Germany, for instance, fewer than 500 of roughly 3.5 million firms are publicly traded (Statista, 2024), and non-listed firms account for more than 80% of employment and about 75% of total revenues (BvD Orbis, 2018-2020, own estimations).[1]

We hypothesize that firms can respond primarily in two ways in the short run.[2] First, they can engage with suppliers by voicing concerns, exerting influence, and "educating" their suppliers (Dai, Liang and Ng, 2021). Atkin, Khandelwal and Osman (2017) show that suppliers with foreign customers become more efficient through learning by exporting. Similarly, Alfaro-Urena, Manelici and Vasquez (2022) find that suppliers improve performance after entering relationships with multinational affiliates. When customer firms adopt responsible sourcing standards, wages for suppliers' employees increase (Alfaro-Ureña et al., 2022).

Alternatively, firms may terminate sourcing relationships that potentially expose them to risks beyond their direct control. Prior studies document that firms replace suppliers following ESG-related events like worker safety incidents (Koenig and Poncet, 2022; Bisetti, She and Zaldokas, 2024), exposure to climate-related risks (Pankratz and Schiller, 2024), or declines in corporate social responsibility (CSR) ratings (Darendeli et al., 2022). While these studies focus on realized risks, we hypothesize that firms may even preemptively sever supplier relationships if they expect to be held accountable for future incidents.

Our analysis draws on a unique, highly granular customs dataset of monthly firm-level import transactions by all German firms during 2019-2020. The data include the country of origin and product code for each transaction, allowing us to approximate firms' international sourcing patterns and their exposure to supply chain risks by matching products to sector- and country-specific risk scores from RepRisk. We augment this

[1] Schlingemann and Stulz (2022) estimate a similar employment share for non-listed firms in the United States.

[2] Other responses, such as vertical integration or shedding labor to avoid falling under the legislation, are less feasible for smaller firms and unlikely to occur immediately.

dataset with firm-level information on financial accounts, corporate structures, and the number of employees.

Product-level regressions reveal that the average import value of a product sourced by treated firms from countries where suppliers are linked to ESG-related risks declines by up to 23% in the six months following the information shock. In these regressions, we control for a rich set of fixed effects to isolate the impact of the shock from other potential confounders. Additional tests reveal that the adjustments happen at the extensive margin rather than the intensive margin. Treated firms sever ties with high-risk suppliers when they expect to fall within the scope of a supply chain due diligence mandate.

When zooming out to the firm level, we do not find statistically significant evidence that the adjustments we observe at the firm-product-country level translate into meaningful changes in overall international procurement behavior for the *average* firm in our sample, which might points towards substantial heterogeneity across firms.

Thus, we next investigate whether firms' responses vary with their previous reporting practices, which may relate to their sourcing strategies, to gain insight into which firms reduce high-risk imports most following the information shock. First, we manually collect the 2019 annual reports of sampled firms and apply natural language processing techniques to gauge the extent of ESG-related disclosure associate with their supply chains.[3] While voluntary disclosure may reflect awareness and understanding of supply networks and associated risks, consistent with findings by Heidinger and Gatzert (2018) on reputational risk in the banking sector, we do not find a statistically significant treatment effect for the subsample of firms that disclose the most.

Second, we investigate the role of external auditors and focus on firms with a Big Four auditor. We document a reduction in average high-risk imports of approximately 19% for treated firms after the information shock in this subsample. This finding suggests that Big Four auditors may enhance firms' capacity or willingness to quickly adjust sourcing strategies to mitigate ESG risks, possibly due to their specialized expertise

[3]Similarly, Lin et al. (2024) analyze ESG-related disclosure based on annual reports of public firms in 30 countries from 2001 to 2020. Ersahin, Giannetti and Huang (2024) create a proxy measure for supply chain risk based on information extracted from earnings call transcripts. Wu (2024) draws from discussion transcripts between managers and equity analysts on supply chain-related topics during firms' quarterly earnings calls to measure supply chain risk exposure.

and experience in ESG matters (Fernandez-Feijoo, Romero and Ruiz, 2016).

This paper relates to two main strands of the literature. First, we contribute to the literature on governance and the boundaries of the firm. Several recent papers empirically test firm boundary choices within the context of supply chains (Antràs and Chor, 2013; Alfaro et al., 2019; Atalay et al., 2019; Ersahin, Giannetti and Huang, 2024). For ESG-related risks specifically, Herkenhoff and Krautheim (2022) show that firms tend to outsource rather than integrate production when unethical practices offer cost advantages. Similarly, Duchin, Gao and Xu (2025) find that firms divest from polluting plants following environmental incidents, often selling them to suppliers or affiliated entities. These studies suggest that firms strategically use their supply chains to redefine their boundaries, seeking to minimize liability, mitigate reputational risk, and reduce overall costs. However, existing research has not examined how firms respond to an exogenous extension of corporate accountability beyond their organizational boundaries. We address this gap and show that firms preemptively sever ties with suppliers that may expose them to ESG-related risks when they perceive their firm boundaries as becoming more permeable.

Second, we contribute to the emerging literature on how ESG-related disclosure and due diligence requirements influence firms' sourcing strategies and supplier relationships.[4] Schiller (2018) finds that ESG reporting mandates can have spill-over effects on suppliers, and She (2022) shows that requiring standardized disclosure of supply chain due diligence reduces human rights abuses among suppliers. Yet, the Californian Transparency in Supply Chains Act that She (2022) analyzes only mandates disclosure, not performing due diligence. In contrast, we study the effects of a mandatory due diligence requirement. Exploiting a regulatory disclosure requirement related to conflict minerals, Kim and Davis (2016) highlight customers' limited capacity to monitor supplier practices. Baik et al. (2024) find that the regulation leads to increased reliance on third-party certified sources in subsequent years. While these studies are limited to the specific case of conflict minerals and describe medium-term adjustments, we examine the immediate effects of a broad-based due diligence mandate that spans across industries.

[4] Christensen, Hail and Leuz (2021) provides a general literature review on sustainability reporting.

II. Data and empirical strategy

A. *Granular product-level customs data*

Detailed information on supplier-customer relationships is typically limited to publicly listed firms, which are subject to stricter disclosure requirements and receive broader media coverage. In contrast, supplier networks of small, privately held firms remain notoriously opaque.

Our primary data source is the granular, product-level customs dataset AFiD AHS-Panel (2019-2020)[5], which the German Federal Statistical Office made available for research for the first time in 2023. Although customs data does not reveal the identity of foreign supplier firms, it does provide information on the country of origin for internationally sourced products. That allows us to approximate the international sourcing strategies of importing firms, even in the absence of firm-level supplier identifiers. Koenig and Poncet (2022) and Bisetti, She and Zaldokas (2024) also utilize customs data from France and the United States, respectively, to study changes in supply chains. However, the scope of their data is more limited: Koenig and Poncet (2022) examine only a limited sample of French clothing companies, while Bisetti, She and Zaldokas (2024) rely exclusively on maritime container shipment data.

In contrast, our dataset covers imports by all German firms with a substantially higher level of detail. The dataset provides transaction-level information on the monetary value and quantity (kilograms) of cross-border movements of goods, identified by their 8-digit product codes, linked to German firm identifiers and the country of origin. Data are available on a monthly basis.[6]

We perform several pre-processing steps to construct a sample that is suited for our analysis and to address potential concerns related to data sparsity. First, we restrict the analysis to imports involving a transfer of ownership, which account for approximately 87% of total imports.[7] Next, we extract the first six digits of the 8-digit product codes, which correspond to the Harmonized System (HS). We only distinguish products at the

[5] DOI: 10.21242/51911.2020.00.05.1.1.0.

[6] For extra-EU trade, the dataset comprises all transactions that exceed an import value of one thousand euros, which the Statistical Office collects directly from the Customs Authority. For intra-EU trade, the Statistical Office adds estimated values based on information collected for turnover taxation for firms that fall below a reporting threshold. Fauth, Jung and Kohler (2023) provide a detailed description of the dataset.

[7] We exclude transactions related to contract processing, returns and replacements, deliveries of foreign aid and gifts, and leasing.

6-digit level since products at the 8-digit level tend to be close substitutes. The 6-digit product code 180610, for example, corresponds to 'Cocoa Powder, Containing Added Sugar Or Other Sweetening Matter' with the additional 8-digit categories specifying the amount of added sugar. Moreover, classifications at the highest level of granularity (8-digit) are more susceptible to reporting errors since firms self-report product codes. We aggregate the data from the transaction level to both the firm-product-country level and the overall firm level. We measure import values in thousands of euros. Lastly, we further aggregate the data at a biannual (twice-yearly) frequency to account for the fact that firms often import a given product only a limited number of times per year due to per-shipment trade costs (Hornok and Koren, 2015). We ensure balance in our baseline sample by including zero values when a firm does not import a specific product from a given country in a particular six-month period.

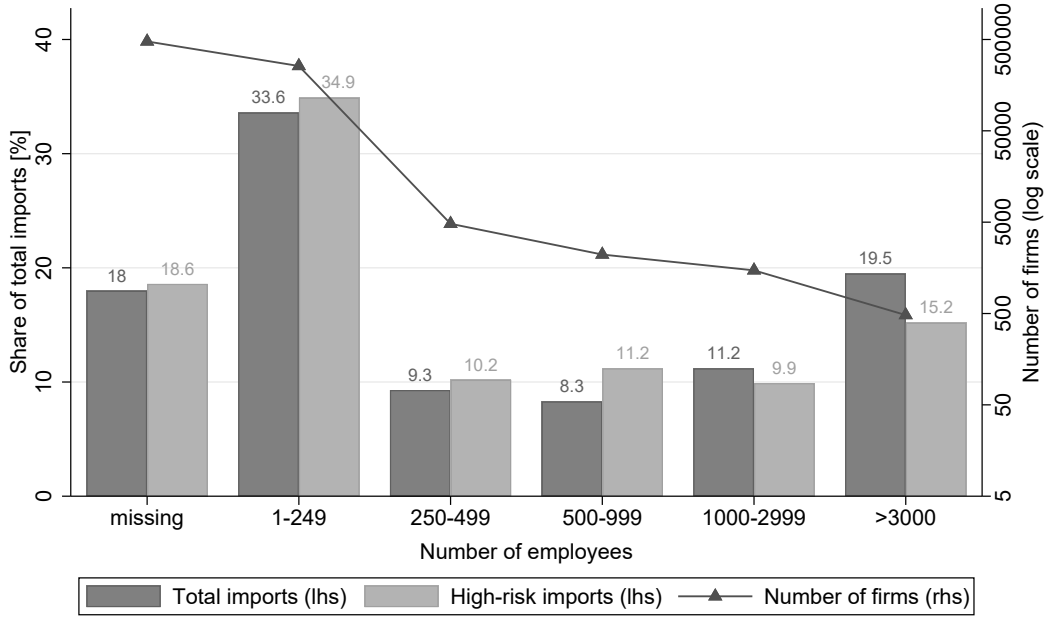
To identify transactions in which firms likely source products from suppliers associated with high environmental, social, or governance risks, we merge the AFiD AHS-Panel data with country-sector ESG risk indicators from RepRisk (2020). RepRisk is a leading provider of ESG-related risk data and specializes in identifying and quantifying ESG risks related to companies, sectors, and countries. Since we do not observe the identity of the foreign supplier in our data, we cannot directly link imports to suppliers and their risk scores. Instead, we rely on country-sector risk indicators, a measure also used by Cousins et al. (2020), to approximate the ESG risk associated with the origin of a given product.[8] We map all products based on their two- or four-digit codes to the 36 different sectors available in RepRisk. Thereby, we can link each import transaction to the ESG risk of the production sector in the country of origin. Country-sector risk scores range from 0 to 100. In line with the definitions RepRisk provides, we classify products sourced from country-sectors with an average rating of at least 50 in the first half of 2020 as *high-risk*.

That allows us to compute the distribution of both total and high-risk imports across firms of different sizes. Figure 1 shows that 481 German firms with more than 3,000

[8]We retrieve the country-sector ratings from the firm-level metrics that RepRisk provides. We note that a firm can belong to multiple sectors in RepRisk. Moreover, past foreign incidents can impact a country-sector rating. Therefore, we extract the country-sector ratings only from firms that belong to a single sector and that have not had a foreign incident in the past. For additional details on RepRisk's rating methodology, see https://www.reprisk.com/news-research/resources/methodology.

employees accounted for nearly 20% of total imports in 2019. This share aligns with previous findings that large firms tend to dominate international trade (e.g., Freund and Pierola, 2015). The figure also demonstrates that the majority of imports originate from smaller firms. Around one-third of import value attributes to firms with fewer than 250 employees. Another third originates from firms with 250 to 3,000 employees.[9]

FIGURE 1. DISTRIBUTION OF IMPORTS OVER FIRM SIZE



Note: This figure displays the distribution of imports across firms of different sizes, measured by the number of employees, in 2019. The gray bars represent the share of total and high-risk import value (lhs) attributable to firms within each employment bin. Rectangles indicate the number of firms (rhs). Source: Research Data Center of Destatis, AFiD-Panel AHS 2011-2019, own calculations.

Notably, firms with fewer than 1,000 employees account for larger shares of high-risk imports than of total imports. This pattern reverses for large firms. Smaller firms (<1,000 employees) procure, on average, 20% of their total imports from country-sectors, which we identify as high-risk. This high-risk-to-total imports ratio is 15% for firms with more than 1,000 employees.

Taken together, this descriptive evidence suggests that ESG-related risks in global supply chains might disproportionately affect smaller firms. Hence, performing supply chain due diligence could be especially critical for these firms. Yet, these imports are distributed among considerably more firms, which results in an average annual high-

[9]For about 18% of import value, we do not observe employment information for the importing firms. Employment data is missing more often for very small firms.

risk import value for firms with less than 1,000 employees of €375.000 compared to €22 million for the larger firms. This stylized fact raises doubts about whether small firms have sufficient leverage to influence supplier practices and implement reforms in response to risks identified through due diligence. For many of them, cutting ties with high-risk suppliers may be more expedient than engaging in governance efforts to improve production standards.

B. Information shock related to due diligence mandate

To study how smaller and mostly non-listed firms adjust their sourcing strategies in response to mandatory supply chain due diligence, we exploit the disclosure of leaked internal legislative plans. In June 2020, *Handelsblatt*, one of the leading German-language business newspapers, reported exclusively on a confidential white paper in which the responsible federal ministries outlined the main points of their legislative plan for the German Supply Chain Due Diligence Act (Specht, 2020). The reporting marks the first time that official plans for the due diligence requirement to apply to all companies with at least 500 employees in Germany became public.[10]

We argue that this information shock prompts firms above this threshold to reasonably expect they will become subject to a due diligence mandate, while firms with fewer than 500 employees do not. The assumption that firms react in anticipation of an ESG-related regulatory change aligns with previous research. Fiechter, Hitz and Lehmann (2022) find that the announcement of the Corporate Sustainability Reporting Directive (CSRD) led applicable firms to increase their CSR activities even before the directive came into force. That was particularly true for firms with limited CSR reporting and activities before the introduction of the directive. Fiechter, Hitz and Lehmann (2022) suggest anticipatory effects arise from internal learning from preparation for the mandate, increased public attention, and anticipation of potential adverse stakeholder reactions to the mandatory disclosure.

To study the impact of the information shock, we employ a difference-in-differences setting in which firms with 400-499 employees serve as the control group. The treatment group comprises companies with 500-600 employees.

[10]It was not until February 2021 that the Federal Minister for Economic Affairs announced to the press that they would raise the applicability threshold to 1,000 employees (Altmaier, 2021).

Gulyas, Seitz and Sinha (2023) adopt a similar strategy to distinguish between treated and control firms based on an employee threshold in their study of the Austrian transparency law's effect on the gender wage gap.[11] Restricting the sample to firms within a narrow employee range around the threshold alleviates concerns regarding the identification assumption, that is, that control and treatment firms would have continued to follow parallel trends in their sourcing strategies in the absence of the information shock. This setup is also well-suited to control for macroeconomic shocks and trends, such as the COVID-19 pandemic and associated supply chain disruptions, as these factors are likely to impact treated and control firms in our sample similarly.

We follow an approach similar to Coster, Mejean and di Giovanni (2024) and estimate the following model:

$$(1) \qquad y_{i,p,c,t} = \exp(\beta\,(Treat_i \times Post_t \times HR_{p,c}) + \gamma\,\mathbf{Z}_{i,p,c,t} + \delta\,\mathbf{X}_{i,t-1} + \epsilon_{i,p,c,t}),$$

where $y_{i,p,c,t}$ denotes the import value of product p measured in thousands of euros that firm i sources from country c in period t. The time period t corresponds to half-year intervals over the 2019-2020 sample period. $Treat_i$ is an indicator equal to one for firms with at least 500 employees in Germany as of 2019, while $Post_t$ marks the post-information shock period, that is, the second half of 2020. The dummy variable $HR_{p,c}$ indicates whether a product is sourced from a high-risk country-sector (see Section II.A for details).

We estimate the model using Poisson quasi–maximum likelihood estimation (QMLE) (Chen and Roth, 2024). This approach enables us to estimate the average proportional treatment effect on the treated for our entire balanced sample, which contains a large share of zero values in the outcome variable. The estimated β captures the percentage change in the average import value of products from high-risk country-sector pairs by treated firms following the information shock. If firms expecting to fall under the due diligence mandate decide to reduce their reliance on suppliers that could expose them to ESG-related risks, we would expect to observe a statistically significant negative effect.

Importantly, $\mathbf{Z}_{i,p,c,t}$ contains additional interaction terms and fixed effects. In partic-

[11] We do not use a regression discontinuity design because firms themselves must determine whether they fall within the scope of the due diligence mandate based on their employee count and proactively report on their compliance, which undermines the 'non-manipulation with precision' assumption.

ular, we include firm fixed effects to control for all time-invariant firm characteristics. These fixed effects ensure that we exploit within-firm variation in sourcing behavior over time for identification. In an alternative specification, we specify firm–product fixed effects instead of firm fixed effects to account for unobserved, time-invariant heterogeneity in firms' sourcing preferences and demand at the product level. To control for time-varying confounders at the product-country level, we include country-product-time fixed effects in all estimations. These absorb any shocks that simultaneously affect all firms importing a particular product from a given country and in a given period, such as fluctuations in international prices, tariffs or sanctions, and local disruptions. We also include a set of lagged firm-level controls ($\mathbf{X}_{i,t-1}$).[12]

To analyze whether firms adjust the volume of high-risk imports or stop importing a specific product from a given country altogether, we also estimate the effects at the intensive and extensive margins separately using the following specification:

$$y_{i,p,c,t} = \beta \left(Treat_i \times Post_t \times HR_{p,c}\right) + \gamma \, \mathbf{Z}_{i,p,c,t} + \delta \, \mathbf{X}_{i,t-1} + \epsilon_{i,p,c,t}, \tag{2}$$

where $y_{i,p,c,t}$ is the natural logarithm of non-zero import values (ln(imports)) of product p that firm i sources from country c in period t (intensive margin) or a binary indicator (D(import)) equal to one if firm i imports product p from country c in period t and zero otherwise (extensive margin). We estimate these models using ordinary least squares (OLS), with all other variables defined as previously described.

In a second set of analyses, we estimate the percentage change in average (high-risk) imports at the firm level. That enables us to assess whether adjustments at the firm–product–country level translate into meaningful changes in firms' overall international procurement behavior and to study heterogeneity across firms. We estimate the following model using Poisson QMLE:

$$y_{i,t} = \exp(\beta \left(Treat_i \times Post_t\right) + \delta \, \mathbf{X}_{i,t-1} + \alpha_i + \lambda_t + \epsilon_{i,t}), \tag{3}$$

where $y_{i,t}$ measures (high-risk) imports of firm i in t. We include lagged firm-level

[12] We use annual data from the previous reporting year because financial account information is not available at the biannual level.

controls ($\mathbf{X}_{i,t-1}$) as well as firm (α_i) and time (λ_t) fixed effects. We cluster standard errors at the firm level in all model specifications.

C. Sample and summary statistics

We restrict our sample to firms that record the import of a high-risk product at least once in 2019 and winsorize all continuous variables at the 1% level on both tails. Table 1 presents the summary statistics for the variables at the firm-product-country level and the firm level for the estimation samples, that is, the 2019-2020 period with biannual (twice-yearly) observations for firms with 400-600 employees.

TABLE 1—SUMMARY STATISTICS

	Mean	SD	P25	P50	P75	Obs
Firm-product-country level:						
imports	35.61	211.01	0.00	0.00	1.54	477,006
D(import)	0.51	0.50	0.00	1.00	1.00	477,006
ln(imports)	0.45	3.03	-1.71	0.35	2.56	220,592
Firm level:						
imports	16,904.75	36,713.18	1,244.21	5,103.07	15,288.36	2,392
high-risk imports	2,994.06	10,653.34	3.47	152.84	1,175.10	2,390
ln(assets) (lag)	18.40	0.95	17.79	18.32	18.87	2,392
leverage (lag)	0.61	0.25	0.43	0.62	0.80	2,392
ROA (lag)	0.04	0.10	0.01	0.04	0.08	2,392
sales growth (lag)	0.05	0.18	-0.04	0.03	0.09	2,392

Note: This table presents summary statistics for variables at the firm-product-country level and the firm level, based on the corresponding estimation samples. The sample covers the period 2019–2020 with biannual (twice-yearly) observations and firms with 400-600 employees that record high-risk imports in 2019. Source: Research Data Center of Destatis, AFiD-Panel AHS 2011-2019, own calculations.

We augment our micro-data on international procurements with firm-level information from BvD Orbis (2018-2020). The database provides comprehensive information on financial accounts, employment figures, and corporate structures. To improve coverage, we use Orbis historical files from 2020 and supplement the information with more recent downloads of Orbis. In processing and updating the firm dataset, we follow the methodology outlined in Kalemli-Özcan et al. (2024).

We prioritize unconsolidated over consolidated accounts because firms report import data at the level of the legal unit. We retrieve information on size (*ln*(assets)), leverage (liabilities-to-assets ratio), profitability (ROA), and sales growth, which we use as lagged control variables in our estimations. Table 1 provides summary statistics.

Moreover, we identify both domestic and global ultimate owners, which we define to be the entity that holds a majority stake in the firm. We compute the number of

employees in Germany at the group level to accurately classify group-affiliated (non-standalone) firms into treatment and control groups. For standalone firms, employment figures to assign treatment status are directly available.

We link the AFiD AHS Panel to Orbis data for almost 90% of firms using commercial registry information (register number, type, and location). The baseline sample comprises 330 treated and 299 control firms. The average sample firm holds €188 million in assets and generates €192 million in annual turnover. Foreign entities ultimately own around 55% of the firms. Most firms operate in manufacturing (60%). Another 25% are active in the trade sector.

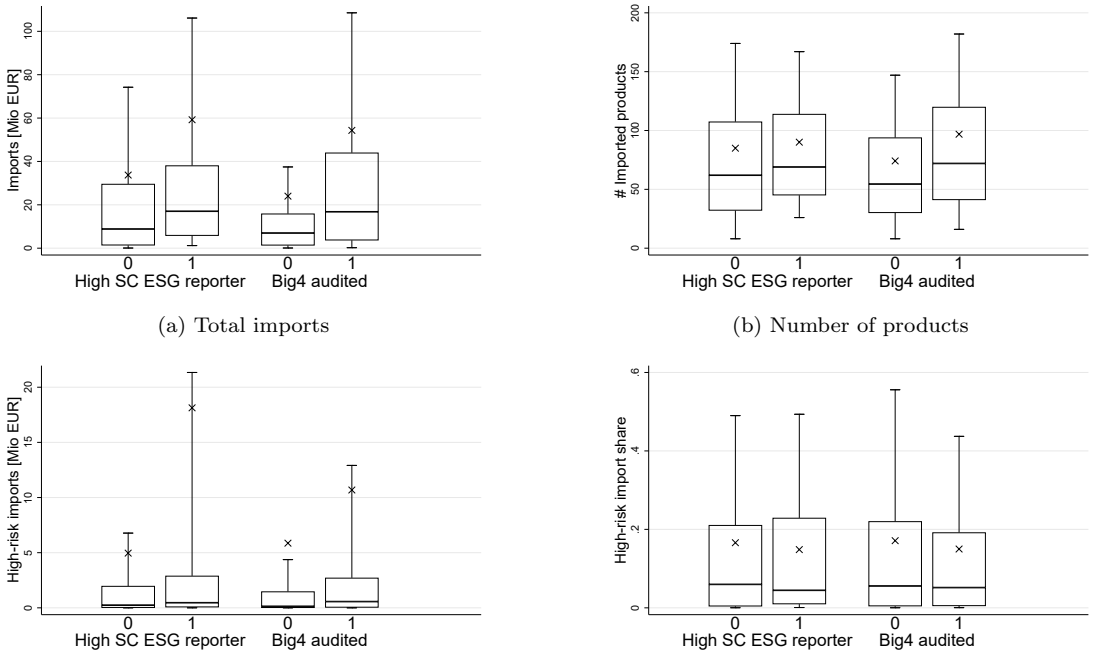
D. Additional data on reporting

We add firm-level information on voluntary disclosure and the firm's auditor to assess whether firms' responses to the information shock vary with reporting practices. We manually collect the 2019 annual reports of sample firms from the German Federal Gazette (2019) (*Bundesanzeiger*). While the vast majority of firms in our sample are not required to publish non-financial reports,[13] all firms must submit both financial and, crucially, management reports (*Lageberichte*) to the Federal Gazette. The latter are narrative sections which discuss business performance, strategy, risks, and future outlook.

We use natural language processing techniques to construct an indicator from annual reports that captures whether firms disclose ESG-related information about their supply chains. We begin by tokenizing the reports and identifying text passages related to the supply chain and sourcing process using a carefully curated and iteratively refined list of word tokens. Next, we compile a separate list of ESG-related terms. For each match with a supply chain token, we examine a 150-character window for the presence of any ESG term. We then calculate the ratio of ESG-related tokens appearing near supply chain tokens to the total number of tokens in the report. Based on this ratio, we create a dummy variable equal to one for firms in the top 20%, classifying them as high supply-chain ESG reporters.

[13] Only 3% of the firms in our estimation sample are listed and might, therefore, fall within the scope of the Non-Financial Reporting Directive (NFRD) as of 2019, which requires certain large public-interest companies in the EU, including listed companies, banks, and insurance companies, to disclose information on environmental, social, and governance matters as part of their annual reporting obligations.

FIGURE 2. IMPORT ACTIVITY BY REPORTING BEHAVIOR AND AUDITOR



(a) Total imports

(b) Number of products

(c) High-risk imports

(d) High-risk import share

Note: This figure illustrates differences in import activity across firms based on their reporting behavior (High SC ESG reporter) and auditor (Big 4 audited). The sample includes firms with 400–600 employees that record high-risk imports in 2019. Boxes represent the interquartile range, with the median shown by the center line; whiskers extend to the 10th and 90th percentiles, and the mean is indicated by a cross. Source: Research Data Center of Destatis, AFiD-Panel AHS 2011-2019, own calculations.

Figure 2 illustrates that the firms in our sample that report most extensively on ESG in their supply chains (High SC ESG reporter = 1) tend to have higher overall imports (panel (a)) and import a slightly larger number of distinct products (panel (b)). However, they do not source a larger share of their imports from high-risk suppliers (panel (d)). That suggests that the voluntary disclosure of ESG-related topics associated with their supply chain might reflect greater awareness or activities aimed at actual improvement efforts (Hummel and Schlick, 2016) rather than larger exposure to high-risk imports. Relatedly, Heidinger and Gatzert (2018) show that, in the context of reputational risk in the banking sector, disclosure can signal risk awareness and is associated with a higher likelihood that the reporting firm has already implemented sound risk management practices.

We also extract information on firms' auditors from the 2019 annual reports and create an indicator variable that equals one if the auditor is a Big Four accounting firm (Big4 audited), which applies to 61% of the sample. These companies exhibit higher

import values and procure a greater number of distinct products (panels (a) & (b)). In relative terms, however, firms with a Big Four auditor do not source a larger share of their imports from countries with high-risk production sectors (panel (d)).

III. Results

This section presents the results of our empirical analysis. We begin with estimates for the firm-product-country level, which allows us to fully exploit the granularity of our dataset and control for a rich set of fixed effects to isolate the impact of the information shock related to the due diligence mandate. We then turn to the firm level to examine aggregate responses and explore heterogeneity in treatment effects based on firms' past reporting practices.

A. Reduction of high-risk imports: Product-level evidence

Table 2 presents the estimation results at the firm-product-country level. All regressions include product-country-time fixed effects as well as lagged firm controls for size (ln(assets)), leverage (liabilities-to-assets ratio), profitability (ROA), and sales growth.

Columns (1) and (2) report the Poisson QMLE results for model (1) based on the balanced sample. The results show that firms expecting to become subject to the due diligence mandate, i.e., those with more than 500 employees in Germany, reduce the average import value of a product from a country where the corresponding production sector exhibits high ESG risks in the six months after the information shock. The effect is more pronounced both in size and statistical significance when controlling for firms' sourcing preferences and demand at the product level by including firm-product fixed effects (column (2)) compared to exploiting all within-firm variation by only controlling for firm fixed effects (column (1)). Our results suggest that the average import value of a high-risk product for treated firms declines by up to 23% over the post-treatment period.

We do not find evidence that treated firms reduce overall imports more than control firms in the post-treatment period ($Treat \times Post$). However, treated firms exhibit a significantly higher average import value for high-risk products compared to control firms ($Treat \times HR$).

Table 2—Reduction of high-risk imports: Product-level evidence

	(1)	(2)	(3)	(4)	(5)	(6)
	imports		*ln*(imports)		D(import)	
Treat × Post × HR	-0.1310*	-0.2360***	-0.1140	-0.1150	-0.0343**	-0.0329**
	(0.0695)	(0.0693)	(0.0894)	(0.0800)	(0.0156)	(0.0154)
Treat × Post	-0.0388	-0.0126	-0.0578	-0.0423	0.0016	0.0014
	(0.0360)	(0.0400)	(0.0365)	(0.0372)	(0.0120)	(0.0120)
Treat × HR	0.2290*	0.3630**	0.1680	0.1270	0.0054	-0.0000
	(0.1250)	(0.1670)	(0.1280)	(0.1470)	(0.0117)	(0.0158)
Firm FE	Yes	No	Yes	No	Yes	No
Firm-product FE	No	Yes	No	Yes	No	Yes
Product-country-time FE	Yes	Yes	Yes	Yes	Yes	Yes
# countries	91	91	85	83	92	92
# firms	629	629	626	608	629	629
# treated firms	330	330	328	319	330	330
# products	3,036	2,932	2,790	2,116	3,046	3,046
# firm-product	60,920	59,943	57,114	31,736	60,920	60,920
Observations	450,717	446,152	220,592	191,082	477,006	477,006
Adj. R2	n/a	n/a	0.28	0.54	0.07	0.11

Note: This table presents the estimation results of the impact of the information shock related to the due diligence mandate on firms' import behavior at the firm-product-country level. Columns (1)–(2) report Poisson QMLE estimates for model (1), while columns (3)–(6) report OLS estimates for model (2). The dependent variable is the value of imports in columns (1)–(2), the natural logarithm of import values in columns (3)–(4), and a binary indicator equal to one if a firm imports a given product from a specific country in a given period in columns (5)–(6). The sample covers the period 2019–2020 with biannual (twice-yearly) observations and firms with 400-600 employees that record high-risk imports in 2019. The sample is balanced in columns (1)-(2) & (5)-(6), whereas we drop observations with zero import value in a given period from the sample for the estimations in columns (3)-(4). All regressions include either firm or firm-product fixed effects as well as product-country-time fixed effects and lagged firm-level controls for size (*ln*(assets)), leverage (liabilities-to-assets ratio), profitability (ROA), and sales growth. We cluster standard errors at the firm level. ***, ** and * denote significance at the 1%, 5% and 10% level. Source: Research Data Center of Destatis, AFiD-Panel AHS 2011-2019, own calculations.

Next, we examine whether the decline in high-risk imports occurs along the intensive or extensive margin. Columns (3) and (4) report the OLS estimates for model (2), where the outcome is the natural logarithm of imports. To approximate the intensive margin, we exclude observations with zero imports for a given firm-product-country combination in a given period. The triple interaction is no longer statistically significant. We also no longer observe a difference in the average import value of high-risk products between treated and control firms ($Treat \times HR$).

In columns (5) and (6), we re-estimate the model from equation (2) using a binary dependent variable that equals one if a firm imports a product from a given country in a period, and zero otherwise (D(import)). This specification allows us to analyze adjustments along the extensive margin. The estimates show a statistically significant reduction of almost 3.5 percentage points in the likelihood that a firm imports a product from a country in which the production sector exhibits high ESG-related risks. Our results are robust to two-way clustering at the firm-country level.

Lastly, we run additional tests to account for potential estimation bias resulting from firms near the 500-employee threshold being uncertain about whether the due diligence mandate applies to them. When excluding firms around the cutoff and redefining the treatment group as firms with 550–650 employees and the control group as those with 350–450 employees, we find similar effects.

Overall, the results reveal that firms reduce imports of products sourced from countries where suppliers are likely exposed to ESG-related risks when they expect to be subject to a supply chain due diligence requirement. More specifically, we find firms adjust at the extensive margin rather than the intensive margin, which implies they primarily sever ties with high-risk suppliers in response to the information shock.

B. The role of reporting practices: Firm-level heterogeneity

We now zoom out and estimate the treatment effect at the firm level to assess whether micro-level adjustments observed at the firm-product-country level translate into meaningful changes in firms' aggregate international procurement behavior. To that end, we estimate the firm-level model specified in equation (3) using Poisson QMLE. Table 3 reports the results. All regressions include firm and year fixed effects, as well as lagged firm-level controls for size (ln(assets)), leverage (liabilities-to-assets ratio), profitability (ROA), and sales growth.

Column (1) reports the regression results for total imports as the dependent variable. The coefficient estimate is negative but not statistically distinguishable from zero, which indicates that treated firms do not systematically reduce their overall international sourcing in response to the information shock.

In column (2), we estimate the effect on imports of products linked to elevated ESG risks at the supplier level. The coefficient remains negative and increases in magnitude, but is also not statistically significant. That suggests that the pronounced effects we observe at the product level do not translate into meaningful adjustments for the *average* firm in our sample. At the same time, the difference between product- and firm-level results may indicate substantial heterogeneity across firms.

Therefore, we next examine whether firms' prior reporting practices matter for their responsiveness to the information shock. Previous research links firms' approach to

disclosure to how they respond to the announcement of sustainability reporting requirements (Fiechter, Hitz and Lehmann, 2022).

Column (3) presents results for the top 20% of firms disclosing the most on ESG-related aspects of their supply chains (see Section II.C for details on how we identify these firms). For this subsample, the parameter estimate remains negative and increases in magnitude compared to the full sample. That may suggest that firms with greater ESG-related disclosure have better visibility into and understanding of their supplier networks, enabling or motivating them to respond more decisively to the upcoming due diligence mandate by severing ties. Yet, the estimate remains statistically insignificant, possibly due to the considerable reduction in sample size.

Table 3—The role of voluntary disclosure and auditors: Firm-level heterogeneity

	(1)	(2)	(3)	(4)
	imports	high-risk imports		
Treat × Post	-0.070	-0.089	-0.130	-0.188*
	(0.052)	(0.074)	(0.098)	(0.101)
Subsample	n/a	n/a	SC ESG rep	Big4
# firms	626	625	120	331
# treated firms	329	329	58	162
Observations	2,392	2,390	464	1,280

Note: This table presents the estimation results of the impact of the information shock regarding the due diligence mandate on firms' import behavior at the firm level, based on model (3) using Poisson QMLE. The dependent variable in column (1) is the total value of imports, while we use the outcome *high-risk imports* in columns (2)-(4). The sample covers the period 2019–2020 with biannual (twice-yearly) observations and firms with 400-600 employees that record high-risk imports in 2019. In column (3), we focus on the 20% of firms that disclose the most on ESG-related aspects of their supply chains in 2019. In column (4), we restrict the sample to firms audited by a Big Four auditor in 2019. All regressions include firm and time fixed effects as well as lagged firm-level controls for size (ln(assets)), leverage (liabilities-to-assets ratio), profitability (ROA), and sales growth. We cluster standard errors at the firm level. ***, ** and * denote significance at the 1%, 5% and 10% level. Source: Research Data Center of Destatis, AFiD-Panel AHS 2011-2019, own calculations.

Lastly, we investigate whether the responses of firms to the information shock differ based on the type of their external auditor. Focusing on treated and control firms audited by a Big Four firm in 2019, column (4) shows a substantially larger treatment effect that is statistically significant at the 10% level. The estimated reduction in average high-risk imports is approximately 19% for the treated firms after the information shock.

This finding supports the notion that the micro-level sourcing changes documented in the previous analyses are sufficiently substantial to generate observable firm-level effects for this subset of firms. The stronger response among Big Four-audited firms is unlikely to stem from differences in their initial exposure to high-risk imports, given

that panel (d) of Figure 2 illustrates that Big Four-audited firm have a high-risk import share very similar to firms with smaller auditors. Instead, the result might indicate that firms audited by one of the Big Four are more capable or willing to adjust their sourcing strategies quickly in ways that reduce ESG-related supply chain risks. An important mechanism here could be auditor expertise spillover. Over the past decade, large audit firms have developed significant expertise and established a dominant position in the CSR assurance market, offering third-party verification of the ESG disclosures and practices of large firms (Fernandez-Feijoo, Romero and Ruiz, 2016). That might be particularly relevant in Germany, where an industry survey by the International Federation of Accountants (2023) found that 95% of the largest companies seeking assurance for their ESG reports in 2021 relied on their financial auditor rather than an independent assurance provider. This expertise might translate into enhanced advisory capabilities and risk management insights that customers can leverage even without directly relying on an auditor's assurance services. Our finding complements previous studies that provide evidence of a positive link between Big Four auditors and firms' overall CSR and ESG performance (e.g., Du, Xu and Yu, 2020).

IV. Conclusion

We provide novel empirical evidence on how smaller, privately held firms respond to an expansion of corporate accountability beyond their firm boundaries, exploiting an information shock related to the German Supply Chain Due Diligence Act. We find that firms substantially reduce the import value of a product sourced from a country in which the respective production sector is associated with high ESG risks when expecting to fall within the scope of a supply chain due diligence mandate. These product-level adjustments come through the extensive margin and translate into meaningful changes at the aggregate level for firms with Big Four auditors, possibly reflecting expertise spillovers.

Our results speak to the challenges and limits of extending corporate accountability beyond organizational boundaries, particularly for smaller firms. Contrary to the policy goals of supply chain due diligence regulations, firms choose to cut ties with high-risk supplier, which might undermine capacity building in production countries. However, we

cannot rule out that some firms also engage with their suppliers. Moreover, our analysis does not capture the potentially different responses of large multinational corporations, which face additional pressures such as shareholder demands and consumer expectations. Promising avenues for future research include investigating whether the initial sourcing adjustments are persistent and how other corporate governance mechanisms interact with supply chain due diligence mandates.

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