

ESG Shocks in Global Supply Chains*

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Abstract

We show that U.S. firms cut imports by 11.1% and are 4.2% more likely to terminate a trade relationship when their international suppliers are hit by environmental and social (E&S) scandals. These trade cuts are larger for publicly-listed U.S. importers facing high E&S investor pressure and lead to cross-country supplier reallocation, suggesting that E&S preferences in capital markets can have real effects in far-flung economies. Larger trade cuts around the scandal result in higher supplier E&S scores in subsequent years, and in the eventual resumption of trade. Our results highlight the role of customers' exit in ensuring suppliers' E&S compliance along global supply chains.

Keywords: ESG; environmental scandals; global supply chains; regulatory outsourcing; shareholder pressure

JEL Classifications: F14, F18, G34, G38

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1 Introduction

Corporations are facing increasing pressure by customers, workers, shareholders, and regulators to monitor and manage environmental and social (E&S) activities along their supply chains. In November 2021 and 2022, Amazon was subject to worldwide strikes against poor working conditions in its network of downstream distributors and upstream suppliers.¹ In January 2022, Costco’s shareholders voted for tougher measures to be implemented on the company’s indirect greenhouse gas emissions along the supply chain (so-called “Scope 3 Emissions”) for the first time.² In fact, the U.S. Securities and Exchange Commission (SEC) is currently considering mandatory disclosure rules for publicly-listed U.S. companies’ Scope 3 Emissions.³ These recent anecdotes and policy discussions bear the question as to how firms manage E&S adherence along widespread and complex supply chain structures.

Firms have been primarily shown to engage with their suppliers to ensure their adherence to the E&S standards (see, e.g., Schiller, 2018 and Dai, Duan, Liang, and Ng, 2021a; Dai, Liang, and Ng, 2021b). In addition to such *governance by engagement*, anecdotal evidence suggests that importers often cut their trade relationships when the suppliers do not abide to these standards.⁴ However, we lack economic estimates of these trade cuts in a broad sample of firms, and an understanding whether such *governance by exit* is an effective mechanism in improving E&S standards’ adherence.

In this paper, we study how U.S. customers change trade relationships after their international suppliers are involved in E&S-related controversies. For this purpose, we use trade data between foreign suppliers and U.S. customers over the 2007-20 period,

¹<https://www.businessinsider.com/make-amazon-pay-warehouse-strike-protest-black-friday-2022-11>.

²<https://www.wsj.com/articles/costco-shareholder-vote-signals-focus-on-supply-chain-emissions-11643194803>.

³See, e.g., The Economist, 2022.

⁴For example, the collapse of Dhaka’s Rana Plaza building in 2013 led to trade cuts with Bangladeshi retailers by French importers (Koenig and Poncet, 2022). Similarly, in September 2018 Nestlè and PepsiCo closed their joint ventures with Indofood Group, Indonesia’s palm oil giant, citing environmental concerns, and multiple international retailers ended their business relationship with Cambodian Hulu Garment Co. failed to pay its workers during the Covid-19 pandemic.

sourced by S&P Global Panjiva from cargo declarations to U.S. Customs and Border Protection (CBP). This data, available at the shipment-level, captures the universe of direct maritime trade relationships between U.S. firms and their foreign suppliers, beyond those that are disclosed in their regulatory filings or in public communications.

We study how imports by U.S. customers respond when their international suppliers (including small, privately-held ones) are associated with negative E&S events in RepRisk, a dataset of ESG-related events sourced from media as well as regulatory and commercial documents.⁵ We focus on *environmental incidents* such as those related to pollution, overuse and wasting of resources, and animal mistreatment, as well as *social incidents* such as those related to human rights abuses, forced or child labor, and occupational health and safety.

Our granular cargo declaration and E&S scandal data allow us to get precise economic estimates of U.S. customers' supply chain adjustments after negative E&S incidents, and to explore the drivers of response heterogeneity. Our main sample consists of 1,038 supplier-year pairs and 1,301 relationship-year pairs hit by an E&S scandal over the period 2010-18. We first show that supplier scandals trigger negative stock price reactions for U.S. customers. U.S. customers experience an average -10 basis points cumulative abnormal return (CARs) in a [-1;+1] day window around the supplier incident, suggesting a material downstream economic impact.

In our main tests, we follow a "stacked" difference-in-differences regression approach (e.g., Gormley and Matsa, 2011) to study the effect of supplier E&S incidents on the imports by U.S. customer firms. For each E&S incident, we build separate time cohorts that include the trade relationships between a E&S incident-stricken supplier and its U.S. customers ("treated" relationships), as well as relationships between the same U.S. customers and their other suppliers, and relationships between unaffected suppliers and customers ("control" relationships) three years before and three years after the event.

⁵We also refer to these negative E&S events as "incidents" or "scandals."

Our estimates capture the change in trade between U.S. customers and their incident-stricken international suppliers three years before and three years after the incident, relative to the change in trade between other U.S. customer-international supplier relationships during the same time period. In our main specifications, we measure trade intensity by the number of containers shipped by the international supplier during the year. As most customers have multiple suppliers at the same time, our specifications allow us to control for time-varying customer demand for foreign suppliers (driven, for example, by the customer's economic conditions).

Our baseline findings show that over the three years following the supplier's incident, the annual number of containers imported by U.S. customers from that supplier decreases by 11.1%. Such drop appears in the first year following the scandal and persists for more than three years, on average.

We then break down the relationship readjustments into the extensive margin (i.e., a complete disappearance of the trade relationship) and the intensive margin (i.e., a decrease in the container quantities traded). We find that a relationship is 4.2% more likely to be terminated after the supplier is hit with the E&S scandal—a 50% increase relative to the baseline probability of a trade relationship termination. Conditional on trade continuation, container shipments drop by 9.5% on average, suggesting that even when customers continue trading with the incident-stricken supplier, they severely reduce their reliance on that supplier in subsequent periods.

To the best of our knowledge, our results are the first to document *partial* trade adjustments in response to E&S shocks. One possible explanation for these novel effects is U.S. customers' inability to fully switch out of the relationship, perhaps due to input specificity (e.g., Barrot and Sauvagnat, 2016) or the unavailability of competitive alternatives. A related explanation is that U.S. customers may be looking to diversify their supply chain risk, and to reduce their exposure to potential future E&S scandals from

the original supplier.⁶ With this, customers may also use trade cuts to send a costly governance threat in order to improve the supplier's E&S performance.

To test whether partial trade cuts are used as a governance tool by U.S. customers, we ask whether these cuts are correlated with the incident-stricken supplier's future E&S performance. First, we find that larger trade cuts after the incident are associated with larger subsequent improvements in suppliers' RepRisk E&S performance ratings. On the other hand, no such improvements in E&S performance are observable among suppliers that do not experience a drop in trade after the incident. Second, we study how the interaction between initial trade cut and subsequent change in the supplier's RepRisk E&S rating is associated with the resumption of trade within the same customer-supplier pair. We document that joint trade cuts and rating increases are associated with trade reversal between the same customer-supplier pair. This result provides suggestive evidence of a customer governance by exit mechanism, whereby a temporary trade reduction may improve the environmental and social performance of smaller international suppliers.

The granularity of our data allows us to estimate additional cross-sectional tests and tease out the forces underlying the documented trade adjustments. We first validate our estimation methodology as well as import and E&S scandal measures by showing that our main results are stronger in sub-samples of the data where one would expect stronger results. In particular, we find larger effects for more severe scandals, after the 2015 Paris Agreement, for products in more competitive global industries where switching costs are lower, and for privately-held suppliers less likely to face pressure from their own capital markets.⁷ We also see slightly larger effects for social incidents as compared to environmental incidents, although the effect is the largest for incidents carrying *both* environmental and social implications.

Next, we perform additional heterogeneity tests to tease out possible sources of pres-

⁶See, e.g., https://www.ey.com/en_nl/supply-chain/how-diverse-sourcing-can-create-more-resilient-supply-chains.

⁷This result also suggests that the supply chain relationship databases that only contain relationships between publicly-listed suppliers and publicly-listed customers are likely to underestimate the effects.

sure triggering the trade adjustments. In particular, U.S. customers' trade cuts could be driven by the preferences of their ESG-minded institutional investors. Alternatively, the trade cuts could result from U.S. customers' end-consumer preferences and pressure. To test these hypotheses, we perform a within-supplier analysis where we measure differential trade changes between the same supplier involved in the E&S scandal and its U.S. customers with different characteristics.

We show that, for the same supplier scandal, trade cuts are larger for those U.S. customers that are more likely subject to E&S investor pressure as compared to U.S. customers with lower E&S investor pressure. First, publicly listed U.S. customers are more likely to cut trade with their international suppliers than privately-held customers. Second, in the sample of publicly-listed customers, trade cuts are increasing in the customer's ESG rating. A high customer ESG rating partly reflects the customer's capability to manage financially-relevant ESG risks, and high-ESG customers could be more conscious in keeping only the relationships with high-E&S-performance suppliers. Third, trade cuts by publicly-listed U.S. customers are increasing in the proportion of their shares held by E&S-conscious investors. These investors might impose E&S pressure on firms via investor meetings, shareholder proposals, or voting, thus influencing the customer's supply chain structure. Fourth, trade cuts by listed customers are larger after these customers receive shareholder proposals related to E&S issues—our most direct proxy for investors' engagement in E&S activities.

Our within-supplier results thus suggest that investor E&S pressure plays an important role in driving the transmission of E&S shocks along the supply chain network. Additionally, these results suggest that our main findings are unlikely driven by revised customer expectations about supplier product quality or financial position, as long as these expectations are independent of the customers' E&S preferences. As an alternative explanation, we ask whether customers react to potential pressure from their own end consumers (which may be implemented, for example, through product boycotts) using

multiple proxies of industry end-consumer exposure. However, we do not find statistically significant differences in the estimated effects between the industries with high and low exposure to end consumers.

Our final analysis studies how U.S. customers readjust their supply chain relationships following a supplier scandal. Specifically, we ask whether U.S. customers switch to the other international suppliers and, if so, whether the new suppliers are located in a different country than the original supplier. We find evidence of cross-country reallocations, suggesting that within-country reputational spillovers motivate customers to search new partners in other countries to further diversify their E&S risks.

Our results contribute to the literature on how environmental and social considerations shape the structure of global supply chains. Dai, Liang, and Ng (2021b) documents positive assortative matching between customers and suppliers in terms of corporate social responsibility (CSR) ratings. Similarly, Schiller (2018) finds that E&S policies, as measured by the components of ESG ratings, propagate from customers to suppliers. Ben-David, Jang, Kleimeier, and Viehs (2021) and Dai, Duan, Liang, and Ng (2021a) show that U.S. firms outsource part of their carbon emissions to foreign suppliers, and that this decision can be linked to the investor, customer, and government pressure. We contribute to this literature by conducting the first large-sample study of trade cuts following supplier E&S incidents, and by documenting a *governance by exit* effect whereby customers' trade cuts can discipline suppliers' adherence to ESG standards.

In a related study, Koenig and Poncet (2022) documents a drop in affected Bangladeshi retailers' exports to France following the 2013 collapse of Dhaka's Rana Plaza building. Our paper generalizes this event study to a broader sample of E&S incidents, and establishes investor pressure as the main driver of the observed trade cuts. In another related study, Pankratz and Schiller (2021) documents customer responses and permanent relationship terminations following perceived changes in suppliers' climate-risk exposure. Different from this paper, our paper focuses on actual E&S scandals rather

than on perceived supplier risk. Additionally, we are able to study intensive-margin trade reductions not possible using other datasets.⁸ Different from both studies, our paper establishes investor-induced customer exit as a disciplining threat for international suppliers.

Our paper also contributes to the literature on institutional investors' role in monitoring firms' E&S activities (e.g., Krueger, Sautner, and Starks, 2020; Atta-Darkua, Glossner, Krueger, and Matos, 2022, and Azar, Duro, Kadach, and Ormazabal, 2021). To the best of our knowledge, our paper is the first to study how institutional investors E&S preferences affect trade activity with suppliers and the structure of international supply chains. Our paper complements Gantchev, Giannetti, and Li (2022), which shows that E&S incidents are followed by (limited) investor divestitures and large greenhouse emission reductions when firms are owned by E&S-conscious investors. Rather than focusing on the direct disciplining role of exit by E&S-conscious investors, we document an indirect disciplining role of trade relationship exit by customers owned by these investors.

More broadly, our paper shows how E&S-minded institutional investors can exert pressure on privately-held firms outside of their country and, possibly, their investment universe. In 2019, private firms' GHG (CO₂-equivalent) emissions contributed to 59% of global corporate fossil fuel emissions (Atta-Darkua, Glossner, Krueger, and Matos, 2022).⁹ Our results suggest that holding stakes in U.S. publicly-listed firms with a wide global supplier network can act as conduit to monitor and discipline private suppliers in far-flung countries.

⁸For example, an the often-used FactSet Supply Chain Relationships (formerly, Revere) dataset only provides sales data for less than 10% of the sample (Pankratz and Schiller, 2021). Therefore, it is only possible to study the extensive margin of supply chain relationships using this data.

⁹On the other hand, Shive and Forster (2020) finds that U.S. privately held firms have lower greenhouse gas emissions, as compared to similar U.S. publicly listed firms.

2 Empirical Setting

2.1 Data Sources and Matching

In this section, we provide a description of our data sources on cross-border shipments and supplier E&S scandals, and how we use these sources to construct our main matched sample. In Appendix Table A1, we provide definitions for all the variables used in the paper.

2.1.1 Cross-border Shipments

We obtain shipment-level data on transactions between foreign suppliers and U.S. customers over the 2007-20 period from the S&P Global Panjiva database. Title 19 of the United States Code of Federal Regulation (CFR) requires U.S. firms to report shipment details in cargo declarations to the U.S. Customs and Border Protection (CBP). For each shipment transaction, Panjiva provides information about the sender, the consignee, the origin and the destination of the shipment, the product codes and descriptions of the items contained in the shipment, and the shipment container specifications.

We link U.S. consignees in Panjiva to their ultimate holder in Compustat, and then aggregate the Panjiva data to the Panjiva supplier-Compustat customer-year level.¹⁰ In order to track within-relationship variation over time, we require the supplier-customer relationship to appear in at least two distinct years during our sample period. In building the panel, we also add two years before the first year in which a given supplier-customer relationship appears in our sample to account for relationships ramp-up over time (Intintoli, Serfling, and Shaikh, 2017). Similarly, we extend the panel by two years after the last year in which the relationship is observed in the data to account for relationship deterioration. All transaction values are set to zero for these extended periods, as well

¹⁰Compustat assigns identifiers to some privately-held U.S. companies. As a result, our sample includes both publicly-traded and privately-held companies, as long as they are assigned a Compustat identifier.

as for all the years in which transaction values are missing between the first and the last relationship years.¹¹ Our empirical results are robust to these sample construction choices.

2.1.2 E&S Incidents

We gather the universe of negative ESG-related incidents for the period 2007-2021 from RepRisk, a leading business research provider which screens daily over 80,000 media, regulatory, and commercial documents searching for companies' ESG-related incidents (Gantchev et al., 2022).¹² RepRisk classifies each incident into three environmental ("E"), social ("S"), and governance ("G") categories. Environmental incidents are incidents related to pollution, ecosystems and landscapes, overuse and wasting of resources, and animal mistreatment. Social incidents involve community relations (such as human rights abuses and social discrimination) and employee relations (such as forced or child labor and occupational health and safety). Governance incidents include corruption, bribery, extortion, money laundering, executive compensation issues, misleading communication, fraud, tax evasion, tax optimization, and anti-competitive practices.

In this paper, we focus on incidents such as waste management and human rights abuses that reveal negative externalities for local communities and carry downstream reputational effects above and beyond pure business risk. While some governance-related incidents (such as, e.g., bribery and extortion) resemble environmental and social incidents in this respect, a vast literature has shown that some other governance-related incidents (such as corporate fraud and misconduct) are a direct reflection on the supplier's ability to do business, which may act as a confounding effect.¹³ As a result,

¹¹Appendix Table A2 provides a detailed description of sample selection process for the Panjiva data.

¹²According to RepRisk, a team of analysts manually verifies that each incident is indeed ESG-related, and records the incident location and the firms involved in it.

¹³For example, Karpoff, Lee, and Martin (2008) argue that accounting misconduct can reveal suppliers' inability to fulfil orders or support warranties, and Johnson, Xie, and Yi (2014) show that frauds increase customers' wariness in dealing with dishonest management, thus reducing product market interactions. Indeed, Healy and Palepu (2003) partly attribute Enron's demise after October 2001 to the rapid with-

in what follows we focus on environmental and social (“E&S”) incidents, and exclude governance related-incidents from the RepRisk sample.

2.1.3 Matching

We use a fuzzy name algorithm to link Panjiva foreign suppliers (both privately-held and publicly-listed) to their RepRisk E&S scandals. To ensure at least three years of cross-border shipment data before and after an incident, we focus on incidents occurring between 2010 and 2018. Panel A of Table 1 provides a description of our matched sample, which consists of 1,038 supplier-years and 1,301 relationship-years hit by an E&S scandal.¹⁴ We find that 158 events relate only to “E” issues, 629 to “S” issues, and 273 to both “E” and “S” issues. In Panel B of Table 1, we provide a breakdown of supplier incidents by the Fama-French 48 industry of the U.S. customer. Panel B shows that industries that heavily rely on intermediate goods such as Retail, Apparel, and Machinery have the highest number of cases in our sample period (231, 100, and 96, respectively). However, the distribution of supplier incidents is spread out across many industries: 42 out of the 48 Fama-French industries experience at least one E&S incident in our sample, and 25 industries experience more than 10 incidents.

2.1.4 International Suppliers’ E&S Incidents and U.S. Customers’ Value

Before moving to our main estimation exercises, we establish the economic relevance of supplier E&S incidents for U.S. importers by documenting customers’ stock price reactions around supplier incidents’ announcements. We start with all E&S incidents recorded by RepRisk, and remove incident observations with any confounding events in the week before the incident. We then compute cumulative abnormal returns (CARs)

drawal of customers, suppliers, and investors concerned about the firm’s credibility.

¹⁴We start with 4,975 supplier-year E&S scandals over 2010-2018 period, which corresponds to 6,565 supplier-customer-years, and 2,288 unique customer-years. After removing events with confounding events in the three years before the incident and three years after the incident, we are left with 1,060 supplier-year affecting 1,316 supplier-customer-years, and unique 838 customer-years.

in a $[-1, +1]$ day window around the supplier incident for publicly-listed customers that had a trade relationship with the affected supplier in the year before the incident.

Table 2 presents our CAR estimation results. The first row documents an average -10 basis point CAR for customer stocks around the announcement of supplier incidents, significant at the 1% confidence level. The second and third rows show that the results are statistically similar and economically larger when we increase the CAR estimation window to $[-3, +3]$ and $[-5, +5]$ days around the supplier incident announcement. Overall, the results of this event study analysis confirm that supplier incidents trigger negative customer stock price reactions, and are thus likely to have a material impact on customers.

2.2 Panel Structure and Estimation Strategy

In our main analysis, we use a “stacked” difference in differences regression approach (see, e.g., Cengiz, Dube, Lindner, and Zipperer, 2019) to study how the imports of U.S. customers change around foreign suppliers’ E&S incidents. For each supplier incident in our sample, we denote by t the year of the incident, and we construct cohorts of treated and control trade relationships in an interval of $[t - 3, t + 3]$ years around the incident. The treated sample in any given cohort consists of supplier-customer relationships in which the suppliers experience an E&S incident in year t . The control sample consists of i) relationships between affected customers (i.e., U.S. firms with at least one supplier experiencing an incident at time t) and their other suppliers not experiencing any incident in the same $[t - 3, t + 3]$ window; and ii) relationships in which none of the suppliers experience any E&S incident in the $[t - 3, t + 3]$ window.¹⁵ To mitigate potential concerns arising from repeated treatment over time (Baker, Larcker, and Wang, 2022), we also exclude any supplier E&S incident that follows or is followed by another incident

¹⁵Since some of the customer firms in our sample are privately held and have limited financial data, our main specifications do not match on firm characteristics. In robustness tests, we show that our main results hold in samples of publicly-listed firms matched by industry and size.

involving the same supplier in the $[t - 3, t + 3]$ estimation window.

Our main stacked panel contains trade observations at the customer-supplier-cohort-year level. In this stacked panel, we estimate our main regression model:

$$Y_{i,j,c,t} = \beta_1 \text{Treat Supp}_{j,c} \times \text{Post}_{c,t} + \beta_2 X_{i,t-1} + \gamma_{i,j,c} + \tau_{c,t} + \epsilon_{i,j,c,t}, \quad (1)$$

where i , j , c , and t denote customers, suppliers, cohorts, and years, respectively; $Y_{i,j,c,t}$ is a measure of trade between customer i and supplier j in year t ; $\text{Treat Supp}_{j,c}$ indicates suppliers with an E&S scandal in cohort c ; $\text{Post}_{c,t}$ indicates years following the event year t in cohort c ; $X_{i,t-1}$ is a matrix of customer-specific lagged characteristics; $\gamma_{i,j,c}$ is a relationship-cohort fixed effect, which allows us to identify trade variation between the same supplier and the same customer over time; and $\tau_{c,t}$ is a cohort-time fixed effects, which allows us to identify cross-sectional variation between treated and control groups in the same cohort. In our most stringent specifications, we also control for customer firm-cohort-year fixed effect to capture time-varying firm characteristics such as demand shocks, as well as to study supplier reallocation by the customer. In all our specifications, we cluster standard errors at the supplier-cohort level.

In our main specifications, we measure $Y_{i,j,c,t}$ as the natural logarithm of the number of containers imported by customer i from supplier j in year t .¹⁶ In these regressions, the main coefficient of interest is β_1 , pinning down the percentage change in the number of containers imported by U.S. customers from treated suppliers after the incident, relative to those imported by either the same customers or by other customers from suppliers not experiencing any incident. To identify complete trade cuts on the extensive margin, we also measure $Y_{i,j,c,t}$ as an indicator variable for whether any container is imported by customer i from supplier j in year t . In these cases, the coefficient β_1 identifies changes

¹⁶We focus on containers due to their uniform measurement. We also show that our results are robust to using the natural logarithm of the number of shipments from the supplier to the customer in the year; the natural logarithm of the total weight of all shipments from the supplier to the customer in the year; and the natural logarithm of the quantity of all shipments from the supplier to the customer in the year as alternative measures of trade.

in the relative probability of trade between treated and control firms before and after the E&S incident.

2.3 Summary Statistics

Our final stacked panel consists of 1,000,950 supplier-customer-cohort-year observations for the period 2010-2018. In Panel C of Table 1, we report summary statistics for the main dependent and independent variables in our sample. The first two rows of Panel C show that around 0.7% of our supplier-cohort observations are treated with an E&S incident, and that around 71% of our sample consists of control observations where a U.S. customer is linked to the affected supplier but has at least one other international supplier. In other words, while the unconditional probability of an E&S incident is relatively low in our sample, U.S. customers have diversified supply chain structures that include many international suppliers. As a result, the probability that a U.S. customer in our sample faces an E&S incident by at least one of its suppliers is high.¹⁷

The next two rows of Table 1, Panel C, show summary statistics for our main dependent variables, i.e., the number of containers shipped from suppliers to customers in a given year, and the annual probability of a container shipment. The average supplier in our data ships 0.942 to the average customer in our data, with a standard deviation of 1.308 containers per year. Similarly, the probability of a container shipment between the average supplier and the average customer in any given year is equal to 0.471, with a standard deviation of 0.499.

The remainder of Table 1, Panel C, provides summary statistics for the control variables we use in our empirical specifications. We define *Size* as the natural logarithm of the customer's total assets, *MTB* as total assets plus market value of equity minus the book value of equity divided by total assets, *Lev* (the leverage ratio) as long-term debt

¹⁷The relatively large size of the control sample relative to the treated sample also calls for robustness tests using alternative definitions of our control group, which we perform below.

plus short-term debt scaled by total assets, *R&D* as research and development expenditures scaled by total assets, *Capx* as the ratio of capital expenditure to total assets, and *Cash* as the ratio of cash and cash equivalent to total assets. All the variables are lagged by one year, and are winsorized at the 1% and 99% levels.

3 Results

We first present the results of our main specifications and dynamic tests, and study trade reversals as functions of trade cuts and suppliers' E&S posture after the incident. We then study effect heterogeneity based on investor and end-consumer pressure, and (international) spillover effects on non-treated suppliers. We conclude with robustness tests on our main results.

3.1 Baseline Results

Table 3 reports our estimates of regression model (1), where we compare trade changes between international suppliers involved in an E&S incident and their U.S. customers in a six-year window around the incident, and trade changes between other international suppliers and their U.S. customers during the same time window. We first focus on overall trade changes following the E&S incident, and later break down our estimates between the intensive and the extensive margins. Our initial baseline sample includes publicly-listed U.S. customers and both publicly-listed and privately-held international suppliers.

Table 3, Panel A, reports our baseline results. In column (1), we control for relationship (i.e., customer-supplier) pair-cohort fixed effects, year-cohort fixed effects, and additional time-varying variables at the customer level. Column (1) shows that, over the three years following a supplier's E&S incident, the number of annual containers imported by U.S. customers from the supplier decreases by 9.0% on average, corresponding to 0.085

containers per year (relative to the unconditional sample mean) and to 6.5% of a standard deviation. Together with the results of Table 2, this result suggests that E&S incidents have an effect not only on customers' stock market performance, but also a real effect on U.S. customers' supply chain sourcing. This supply chain effect could come from customers' reputational concerns, end-consumer pressure, or investor pressure. The effect could also be a reflection of changes in other policies at the supplier-level, which may result in changes in production and hence in exports. We explore these alternatives later in the paper. The remaining rows of column (1) also show that larger and less-indebted firms, as well as firms with higher R&D investing and higher cash holdings receive on average more container shipments from their international suppliers.

As most U.S. firms in our sample have more than one international supplier, our empirical design allows us to include customer firm-year-cohort fixed effects. In this way, we can control for time-varying customer characteristics and compare imports from suppliers directly affected by incidents, and imports *by the same customers* from suppliers not directly involved in the incidents over the same time period. Column (2) of Panel A show that the results from column (1) are robust both statistically and economically: following supplier scandals, imports by U.S. customers decline on average by 11.1%, relative to the imports by the same U.S. customers from unaffected suppliers. We adopt the within-customer specification (2) in the rest of the paper.

Next, we focus on the extensive and intensive margins of trade. On the extensive margin, we construct a binary variable equal to one if the customer has non-zero imports from the supplier in any given year. On the intensive margin, we use the natural logarithm of containers imported by the U.S customer in any given year (conditional on this number being positive) as a dependent variable. We report our results in Table 3, Panel B. In this panel, column (1) corresponds to the extensive margin tests, and column (2) corresponds to the intensive margin tests.

Column (1) shows that the average relationship between U.S. customers and their in-

ternational suppliers is 4.2% more likely to be terminated after the supplier is hit with an E&S incident. This estimate is quantitatively large, and it implies a nearly 50% increase relative to the 9% unconditional relationship termination rate in our sample. Column (2) similarly shows that, if we condition on trade continuation and study pure intensive margin effects, the average U.S. customer decreases its imports by 9.5% following a supplier’s E&S incident, corresponding to a 0.0895 drop in annual container shipments relative to the unconditional mean and to 6.8% of a standard deviation.

Our intensive margin estimates in Panel B of Table 3 show that even when customers continue their trade relationships, they severely reduce the shipments from suppliers involved in an E&S incident. Such partial trade decrease could imply that U.S. customers starting to diversify their supply chains away from affected suppliers, but are unable to fully terminate the relationship (e.g., due to supplier specificity or the unavailability of competitive alternatives). A complementary hypothesis is that customers may be sending a costly governance threat to the suppliers to improve their E&S performance. In the next section, we document subsequent trade reversal when suppliers improve their E&S performance following trade cuts after the initial incident. This finding lends support for the interpretation of partial adjustments as effective threat mechanisms.¹⁸

3.2 Trade Cuts, E&S Improvements, and Trade Reversals

We start our dynamic analysis by breaking down the main results of Table 3 into year-by-year effects before and after the supplier’s incident. In Panel A of Figure 1, we show the evolution of the baseline treatment effect (corresponding to column (2) of Table 3, Panel A) between years $t - 2$ to $t + 3$ of the event window, taking year $t - 3$ as a baseline. Panel A shows a large and statistically significant 10% drop in container shipments one year

¹⁸In principle, relationship terminations could also be due to supplier “window-dressing” (e.g., by registering the supplier under a different company name, or by adding additional phantom suppliers along the supply chain to hide direct connections) or to ESG assortative matching (as in Dai et al., 2021b). However, we believe these interpretations to be less likely in light of our partial trade adjustment results.

following the supplier incident, which persists throughout the entire event period.¹⁹ In other words, the data shows no significant return to the pre-incident trade levels even three years after incident for the average relationship in our sample. In Panel B of Figure 1, we similarly show the evolution of the treatment effect on the intensive margin (corresponding to column (2) of Table 3, Panel B). Similar to Panel A, Panel B documents a 15% drop in the probability of a trade relationship in the three years following the incident, not followed by trade reversals.

While the full-sample results in Figure 1 show no trade recoveries after the initial supplier incident, one of our main hypotheses is that some customers may use trade cuts as a costly governance threats to ensure their suppliers' E&S adherence. In such cases, initial trade cuts may be followed by subsequent improvements in the supplier's E&S posture, and by the eventual resumption of trade.

To study whether E&S incidents and the associated import cuts by U.S. customers trigger any adjustments on the supplier's future E&S performance and trade, we follow a two-pronged approach. First, we restrict the sample to customer-supplier relationships where the supplier experienced an E&S incident (i.e., the treated relationships in our main sample), and we study whether large trade cuts are followed by changes in the supplier's RepRisk ESG risk rating.²⁰ Second, we ask whether U.S. customers' trade cuts and international suppliers' ESG rating improvements are jointly associated with future trade reversals. We report our results in Table 4.

In Panel A of Table 4, we study the dynamic response of suppliers' RepRisk ESG ratings following trade cuts by U.S. customers. Specifically, we test whether a supplier's ESG risk rating after the scandal varies based on the size of customers' trade cuts in

¹⁹Panel A of Figure 1 also shows a small and statistically not significant decrease in trade in year $t - 1$ relative to year $t - 3$, possibly due to customers' early knowledge of suppliers' E&S-related issues.

²⁰Similar to RepRisk ESG incidents, RepRisk ESG ratings are updated daily based on negative news in the media. These ratings are measured on a AAA to D scale, with D being the worst, and are widely used by asset managers to monitor the ESG performance of their portfolio (see, e.g., <https://corpgov.law.harvard.edu/2017/07/27/esg-reports-and-ratings-what-they-are-why-they-matter/>). Not all suppliers have a RepRisk ESG rating, and thus we limit the sample to suppliers for whom RepRisk ESG ratings are available around the initial incident.

a window of three years (i.e., from year $t - 1$ to year $t + 1$) around the E&S incident. For each foreign supplier, we aggregate export changes around the E&S scandal across all U.S. customers, and then split the sample based on the percentile distribution of aggregate trade changes for each supplier. Column (1) of Panel A corresponds to the sub-sample of suppliers experiencing the largest negative trade changes (the 25% percentile of the aggregate distribution, corresponding to an overall trade change of -29% over the three years around the incident); column (2) corresponds to the sub-sample of suppliers experiencing a trade change within the interquartile range; and column (3) corresponds to the sub-sample of suppliers experiencing the smallest drops in trade in our sample (i.e., trade changes above the 75% percentile).

Panel A of Table 4 shows that, on average, RepRisk ESG risk ratings decrease after the E&S incident, and that this pattern persists over time. This result is expected, as initial E&S incidents are often followed by negative media mentions, which increase the supplier's ESG risk. However, as shown in column (1), the negative effect of the incident on ESG risk ratings is statistically and economically short-lived (as compared to the pre-incident benchmark) when U.S. customers significantly cut trade with affected suppliers. Indeed, column (1) shows a rating recovery after year $t + 2$, suggesting that significant losses in foreign revenues may force international suppliers to improve their E&S postures. No such effect is present for relatively small trade cuts (columns (2)-(3)).²¹

Next, we ask whether improved ESG ratings can be related to trade reversals. Similar to our baseline panel, we group treated and control relationships into cohorts of $[t + 1, t + 6]$ years from the supplier's initial E&S incident. We classify observations in years $[t + 1, t + 3]$ from the incident as "post-incident" observations in which suppliers may adjust their E&S policies, and observations in years $[t + 4, t + 6]$ from the incident as

²¹In related tests, we also investigate whether import cuts by a customer result in ESG rating improvements by the customer's other suppliers not directly involved in the incident. We do not find evidence of such spillovers, suggesting either that the other suppliers operate at the level of E&S desired by the customer, or that trade cuts with one supplier do not change the (perceived) probability of trade cuts with other suppliers.

“post-adjustment” observations. Next, we split relationship cohorts into sub-samples based on i) different distributional cuts of total trade changes ($\Delta Trade$) between the pre- and post-incident periods (i.e., changes in total trade between $[t - 3, t - 1]$ and $[t + 1, t + 3]$); and ii) supplier ESG ratings improvements during the post-incident period (i.e., changes in supplier ESG ratings between $t + 1$ and $t + 3$).

In Table 4, Panel B, we study the joint effect of customer trade cuts and supplier E&S improvements on subsequent trade changes between the same customer and supplier. As in our baseline tests, the dependent variable in this panel is *Containers*, and the control group consists of trade relationships between suppliers unaffected by incidents and their customers. The independent variables include four mutually-exclusive interaction terms between indicator variables for customer trade cuts between the pre- and post-incident periods ($CutTrade = 1$), and supplier rating increases in the post-incident period ($IncRating = 1$). We set the indicator variable $CutTrade$ equal to one if $\Delta Trade$ is negative (column (1)), if $\Delta Trade$ is lower than the 25th percentile of the trade cut distribution (-29%, column (2)), and if $\Delta Trade$ is less than 50% (column (3)).

Two sets of results emerge from Panel B of Table 4. First, the joint presence of customer trade cuts and supplier ESG rating improvements leads to subsequent trade reversals, and these trade reversals are increasing in the original trade cut. Relative to the control group, negative trade cuts, cuts below the 25th percentile, and cuts lower than 50% are associated with relative increases between the post-incident and the post-adjustment period of 37.7%, 44.9%, and 54.9%, respectively. Second, *only* the joint presence of trade cuts and ESG improvements leads to subsequent reversals: we find no evidence of a trade increase in the post-adjustment period if customers’ trade cuts are not followed by supplier E&S improvements, nor if trade was not cut after the E&S incident to begin with. Collectively, the results of Table 4 lend support to our hypothesis that U.S. customers may use real trade activity as an effective mechanism to discipline their suppliers’ E&S adherence.

3.3 Are Investors or End Consumers Driving the Trade Cuts?

Our results so far suggest that E&S shocks have real transmission effects along the supply chain network by reducing trade between U.S. customers and suppliers affected by E&S incidents. In this section, we aim at separating the possible sources of pressure that trigger these trade adjustments. First, U.S. customers could respond to the preferences of their ESG-minded institutional investors. For example, ESG-minded investors may be interested in implementing E&S standards outside of their investment and geographic scopes, and use public U.S. customers' supply chain connections as means to do so. Alternatively, U.S. customers could react to supplier scandals due to pressure from their own end-consumers.

In this section, we explore cross-sectional variation in our baseline effects based on various proxies for customer firms' exposure to investor (E&S) pressure, as well as on proxies for end-consumer exposure. To test our hypotheses, we add supplier-cohort fixed effects to our main regression specification (1), thus controlling for time-varying economic conditions affecting multiple suppliers at the same time (e.g., aggregate trade policy changes), and comparing import responses to the *same* supplier incident by U.S. customers with different investor characteristics and end-consumer exposure. For example, these tests allow us to compare trade changes between a supplier involved in an E&S incident and its U.S. customers subject to high institutional investor ESG pressure, and trade changes between the *same* supplier and its U.S. customers subject to lower institutional investor pressure around the same incident. In our tests, we also control for partitioning variable-year fixed effects to capture general trends that certain characteristics (such as, e.g., ESG salience) could have on international trade, irrespective of E&S scandals.

3.3.1 Investors' ESG Pressure

In Table 5, we start by analyzing investor pressure as a potential explanation for the trade cuts we observe in the data.²² In column (1), we report the results of a first cross-sectional test based on whether the U.S. customer is publicly-listed or privately-held. The motivation behind this test is that privately-held firms are likely to have concentrated shareholdings, while publicly-listed firms are potentially more exposed to ESG activist investors, research analysts, and rating agencies. In order to run this test, we expand our stacked Panjiva-RepRisk panel to include the universe of Panjiva U.S. customers whose ultimate holder's stocks are not publicly-traded. Using data from the Center for Research in Security Prices (CRSP), we create a customer firm-year indicator variable, *Public Cust*, equal to one if the customer's (ultimate holder) stocks are publicly traded in a given year, and equal to zero otherwise.

Column (1) of Table 5 shows a baseline 2.3% reduction in imports by privately-held customers following a supplier E&S incident. This coefficient is statistically significant at the 10% confidence level, and suggests that managerial and end-customer preferences may affect the supply chain network structure even in private firms. The second row of column (1) shows that this baseline effects is almost four times as large for publicly-listed customers—the interaction coefficients between the baseline treatment effect indicator, $TreatSupp \times Post$, and the indicator for publicly-listed customers, *Public Cust*, is negative and statistically at the 1% level, and it implies an overall 13.2% reduction in trade following a supplier E&S incident. Overall, the results of column (1) show that, in response to the same E&S incident, public firms reorganize their supply chains more aggressively than privately-held firms, and provides a first piece of evidence consistent with investor pressure being the main driver of the observed trade adjustments.²³

²²We report results for the overall effects in Table 5, and the corresponding results for the extensive margin effects in Appendix Table A3.

²³An alternative explanation for the results in column (1) is that privately-held firms are more constrained in replacing their existing suppliers. However, in the rest of the table we show that our results hold within the sample of publicly-listed customers, making this explanation less likely.

The results of column (1) add to the ongoing debate on the ESG-related costs and benefits of being public.²⁴ First, the results highlight one of the potential benefits of being private: reorganizing supply chains after an E&S incident can be costly for U.S. customers, and privately-held customers may be shielded from these costs relative to their publicly-held peers. Second, the current trend of public firms' delistings in the U.S. could result in an overall decrease in E&S performance around the globe as long as these delistings are accompanied by lower pressure to discipline international suppliers' E&S adherence.

Next, we return to the sample of the publicly-listed U.S. customers, and ask whether trade cuts are more pronounced when customers' shareholders have stronger pro-ESG preferences. First, we follow the approach developed in Gantchev et al. (2022) and identify E&S-conscious investors based on their Refinitiv ESG ratings.²⁵ We create an indicator variable, *High IO_ESG*, which equals one if the proportion of the customer's outstanding shares owned by E&S-conscious funds in the event year is greater than the sample median and equal to zero otherwise, and interact this indicator variable with the treatment effect indicator $TreatSupp \times Post$. Column (3) shows that the coefficient of $TreatSupp \times Post \times HighIO_ESG$ is negative, suggesting that customers are more likely to reduce imports from treated suppliers when their shareholders have stronger E&S preferences. On the other hand, the coefficient associated with the baseline treatment effect $TreatSupp \times Post$ is economically small and statistically not significant at conventional levels, suggesting that customer firms do not adjust their supply chain structures

²⁴For example, Jason Jay, director of the MIT Sustainability Initiative, argues that some companies will refrain from going public to avoid reporting complexities or sell their dirty assets to look cleaner if the SEC imposes Scope 3 Emission disclosure requirements (Vereckey, 2022): "Companies might not choose to go public because [they think], 'I'm going to be subject to so much complexity of reporting, so I'm just going to stay in the private markets and be opaque to the world in terms of this kind of transparency.'"

²⁵As in Gantchev et al. (2022), we classify investors with average portfolio ratings in the top tercile as ES-conscious, and the remaining investors as non-ES-conscious. Different from Gantchev et al. (2022), who use the overall ESG rating provided by Refinitiv to measure a firm's E&S performance, we use the average environmental and social ratings to construct our measures of investor E&S consciousness. We do not observe divestitures of customers' stocks by E&S-conscious investors after suppliers become involved in E&S incidents.

in response to supplier incidents when they are not owned by E&S-conscious investors.

Second, we use shareholder proposals related to E&S issues as a direct proxy for investors' engagement in E&S activities. We obtain information about shareholder proposals from the Institutional Shareholder Services (ISS), and categorize proposals on socially responsible investments (SRI) as E&S proposals. Due to ISS data availability, we restrict our stacked panel to U.S. customers in the S&P 1500 index. For each customer in the matched sample, we then construct a binary variable, *ESGProposal*, equal to one if the customer received at least one E&S (SRI) proposal from event year $t - 3$ to event year $t - 1$, included. Column (4) confirms that only the interaction term $TreatSupp \times Post \times ESGProposal$ is negative and statistically significant, suggesting that customers are more likely to reduce the imports from treated suppliers when they face more active E&S engagement by shareholders. Similar to column (3), we find no evidence of a baseline treatment effect on customers not experiencing E&S proposals by their investors before the supplier incident.

Overall, the results of Table 5 support the hypothesis that investor pressure is an important determinant of the observed trade adjustments following suppliers' E&S incidents. Importantly, these within-supplier results also reduce potential concerns that the observed trade changes are reflective of changes in suppliers' business or financial risks orthogonal to E&S.²⁶ Given that U.S. customers facing stronger investor pressure are those implementing the largest trade cuts in response to the same supplier incident, we can infer that these customers are either more averse to taking business risks correlated with E&S (such as regulatory actions, fines, or other restrictions), or that their trade cut decisions come purely from E&S concerns.

We also use the customer's ESG rating to proxy for U.S. customer's self-selection into having a positive E&S profile themselves. High ESG ratings indicate the capability to better manage financially relevant ESG risks, and so these customers could be

²⁶For example, an E&S incident may simply signal poor financial conditions of the supplier, or low product quality.

more conscious in only keeping the relationships with good-performing E&S suppliers. We use the Refinitiv ESG score of customer at the time when a supplier scandal hits, and define *High E&S* as a binary variable to indicate customers with above-the-median ESG score. In Column (2), we find a significantly negative interaction term between $TreatSupp \times Post$ and *High ESG*, confirming that the results are driven by customers with better ESG profile.

3.3.2 End-Consumer Exposure

While our results so far suggest that investor pressure plays an important role in driving supply chain adjustments to E&S shocks, an alternative channel for these adjustments is the potential pressure faced by U.S. importers from their own end consumers. To test this channel, we conduct two additional sets of tests, in which we study differential trade adjustments based on customer firms' cross-sectional exposure to end consumers. Our main assumption in these tests is that firms with higher end-consumer exposure (such as retail and apparel brands) face more (social and traditional) media coverage of their international supply chains. As a result, suppliers' E&S incidents may result in more widespread consumer boycotts in these firms, and lead to stronger supply chain adjustments.²⁷

Table 6 reports the results of our cross-sectional tests on importers' end-consumer exposure. Our first proxy for importers' end-consumer exposure is the importer industry's share of final-user sales to total industry sales reported in the 2007 U.S. Bureau of Economic Analysis (BEA) input-output tables. In column (1), we interact a binary variable for industries with above-median final users sales' shares, *High %Final Users*, with our main treatment effect indicator to test for incremental trade changes by importers with high end-consumer exposure. In column (2), our second proxy compares business-to-customer (B2C) industries (where individual consumers are the predominant customers)

²⁷Consistent with this hypothesis, Liaukonytė, Tuchman, and Zhu (2022) document an effect (albeit small) of social-media generated consumer boycotts on individual goods' purchases and total firm sales.

with non-B2C industries.²⁸ We find no statistically significant evidence of an interaction effect between the E&S incident and the importer’s end-consumer exposure in either column (1) or (2), suggesting that firms with high and low end-consumer exposure implement similar supply chain adjustments following a supplier E&S scandal. Overall, the results of Table 6 do not provide support to the explanation that importers reshape their supply chains in response to (or anticipation of) end-consumer pressure.

3.4 International Reallocation

In this section, we study how U.S. customer firms readjust their supply chain relationships following a supplier E&S incident. Specifically, we ask whether U.S. customers switch to other international suppliers and, if so, whether the new suppliers are from the same country as the original supplier involved in the E&S incident.

To identify such reallocation effects, we borrow from Berg, Reisinger, and Streitz (2021) and estimate the regression model (2):

$$Y_{i,j,c,t} = \beta_1 \text{Treat Supp}_{j,c} \times \text{Post}_{c,t} + \beta_2 \% \text{Treat Supp}_{i,c} \times \text{TreatCust}, \text{ ControlSupp}_{j,c} \times \text{Post}_{c,t} + \beta_3 X_{i,t-1} + \gamma_{i,j,c} + \phi_{i,c} + \tau_{c,t} + \epsilon_{i,j,c,t}, \quad (2)$$

where $\% \text{Treat Supp}_{i,c}$ denotes the fraction of suppliers hit by an E&S scandal in each customer-cohort; $\text{TreatCust}, \text{ ControlSupp}_{j,c}$ is an indicator for control suppliers of customers with at least one supplier hit by the E&S scandal; and the remaining variables are identical to those in Equation (1). The coefficient of interest in Specification (2) is β_2 , which identifies the reallocation effects on control suppliers that share a customer link with at least one treated supplier. Similar to Berg et al. (2021), this coefficient identifies marginal post-treatment changes in trade between control suppliers and customers linked to treated suppliers for a marginal increase in the fraction of treated suppliers in

²⁸We follow Lev, Petrovits, and Radhakrishnan (2010) and Flammer (2015) to identify B2C industries based on their four-digit SIC codes.

the cohort.²⁹ We predict the sign of this coefficient to be positive if customers switch from suppliers with E&S incidents to other suppliers.

Table 7, column (1), reports results consistent with our predictions. First, column (1) confirms a negative and statistically significant 8.4% drop in trade between treated suppliers and their customers after the treatment. Second, column (1) also documents a positive and statistically significant reallocation effect on control suppliers. Our estimates suggest that a 1% increase in the share of treated suppliers in a given cohort increases trade between their linked customers and *control* suppliers by 0.8% after the treatment, on average. In other words, our results suggest that U.S. customers partially replace their scandal-hit suppliers with other international suppliers.

Next, we ask whether U.S. customers switch to suppliers located in the same country as the treated suppliers, or to suppliers located in different countries. On the one hand, switching to suppliers from the same country may be less costly (due, e.g., to familiarity with the local institutional environment). On the other hand, the supplier's E&S scandal might impair the reputation of all suppliers in its country, and thus motivate customers to search new partners in other countries to diversify their risks. To test this hypothesis, we split our main indicator $TreatCust, Control Supp_{j,c}$ into two indicator variables: $Treat Cust, Control Supp, Same Country_{j,c}$, indicating control suppliers (of customers linked to treated suppliers) located in the same country as the treated supplier, and $Treat Cust, Control Supp, Diff Country_{j,c}$, indicating control suppliers located in other countries. Column (2) of Table 7 shows that our reallocation effects manifest themselves only in the sample of suppliers from other countries, suggesting that E&S scandals can have negative impacts not only on the affected firms, but also on the reputation their countries.

²⁹Berg et al. (2021) focus on direct treatment spillovers to control and treated groups rather than on indirect spillovers through the network, as we do in Table 7. In this sense, our estimation strategy also bears partial resemblance to the reallocation specifications of Giroud and Mueller (2019), again with the difference that U.S. customers in our sample are not affected by the treatment directly but only through their suppliers.

3.5 Robustness Tests

In this section, we report different sets of robustness tests on our main results from Section 3.1.

3.5.1 Measure Validation

In Table 8, we start by validating our E&S scandal measures. First, in column (1) we perform a cross-sectional test by the severity of the scandal, using the definition of severity offered by RepRisk.³⁰ In Column (1), we partition the sample according to severity, and find that while imports shrink for both high-severity and low-severity scandals, trade cuts are larger for higher-severity scandals.

Second, in column (2) we ask whether trade cuts vary across environmental and social scandals.³¹ Our hypothesis is that U.S. customers should be equally sensitive to “E” and “S” issues, which carry externalities on local communities and can result in reputational damages along the supply chain. Additionally, we hypothesize that incidents carrying *both* “E” and “S” implications should have the largest externalities, and we should observe larger trade cuts for these incidents. Column (2) confirms our hypotheses: we document a slightly larger (but statistically not significant) effect for pure social incidents as compared to pure environmental incidents, and the largest effects for incidents that have both environmental and social implications.

Third, while data on international supplier characteristics is scarce (most of the suppliers in our data are privately-held), we can study cross-sectional effects based on

³⁰RepRisk provides a proprietary coding of scandal severity. Severity is determined as a function of three dimensions: i) the consequences of the incident (e.g., health and safety incidents are ranked based on whether they have no further health consequences or whether they results in injuries or deaths); ii) the incident impact (e.g., if one person, a group of people, or a large number of people are involved in the incident); and iii) whether the incident is caused by an accident, negligence, intent, or systematic issues. We group high-severity and medium-severity incidents into the high-severity group since very few cases are actually coded as high-severity in the RepRisk data.

³¹Our sample includes both environmental (“E”) and social (“S”) incidents. Environmental incidents are related to pollution, ecosystems and landscapes, overuse and wasting of resources, and animal mistreatment. Social incidents involve community relations (such as human rights abuses and social discrimination) and employee relations (such as forced or child labor and occupational health and safety).

whether the supplier is privately-held or publicly-listed. Our hypothesis is that, when suppliers are publicly-listed, they are more directly exposed to external governance of their E&S performance. Hence, customers may rely on this external governance rather than on trade cuts to discipline the supplier after an incident. In column (3), we confirm that our baseline effects are indeed stronger (both economically and statistically) when suppliers are privately-held. When combined with our previous results, the result of column (3) suggests a special role for ESG-minded investors of U.S. public firms in improving the E&S performance of small, privately-held international suppliers. Our results suggest that, effectively, U.S. customers may end up exporting the E&S preferences of their own investors to foreign suppliers.

Fourth, we look at whether the effects are stronger in the sample period after the 2015 Paris Agreement, which presumably triggered media and policy discussions on firms' ESG posture, as well as pressure from U.S. institutional investors. In column (4), we indeed see that our baseline effects are larger in the post-2015 period.

Fifth, we ask whether the observed effects vary with the competitiveness of customers' input market. We hypothesize that supplier switching costs are lower when the global input market is more competitive, and that we should observe larger trade cuts in more competitive industries following a supplier E&S incident. Using the Herfindahl-Hirschman Index (HHI) of the supplier's two-digit HS product in the event year to measure the customer's input market competitiveness, in column (5) we find a significantly larger effect when supplier HHI is low.³² The results of column (5) suggests that the threat of exit may be less credible if customers' choice set of alternative suppliers is limited, and that governance by exit may be less effective when supplier inputs are highly specific to the customer's production process.

Overall, Table 8 shows that our results are stronger in sub-samples of the data where one would expect stronger results, thus validating our E&S incident measure. In Table

³²If a supplier ships more than one product category, we use the shipment-weighted average HHI of each product category.

A4, we also show that our results are consistent when we focus on relationship termination on the extensive margin.

3.5.2 Additional Robustness

In Table 9, we report additional robustness tests on our baseline specifications from Table 3. In Panel A, we show that our results are robust to alternative measures of trade intensity, namely the number of individual annual shipments (column (1)), the total shipment weight (in tonnes, column (2)), and the total shipment quantity (in terms of individual units in a shipment, column (3)). Our results are consistent across different measurement choices, and columns (2) and (3) show even larger effects when we measure trade using shipment weights and quantities.

In Panel B, we estimate our baseline specifications over alternative matching samples. In column (1), we match treated and control samples based on customer firms' four-digit SIC industries—for each cohort, we only include control customers operating in the same industry as treated customers (i.e. customers with a link to the treated suppliers). In column (2), we similarly match on customer firms' four-digit SIC industry and size deciles. In column (3), we match on customer firms' four-digit SIC industry and size deciles, as well as on supplier country. That is, we only include control suppliers from the same country as treated suppliers. Panel B shows that our results are economically and statistically robust to these alternative choices, suggesting that our choice of the control group does not systematically affect our main results. Additionally, the estimated coefficient in column (3) is slightly smaller in magnitude than those in the first two columns of the panel, providing additional support for our international reallocation results in Table 7.

In Panel C, we loosen the restriction of excluding suppliers with confounding (and distinct) E&S incident in the $[t - 3, t + 3]$ year window around the scandal. In column (1), we only include suppliers that do not to have such confounding scandals in a narrower

$[t - 2, t + 2]$ year window. In column (2), we only include suppliers that do not have such scandals in an even narrower $[t - 1, t + 1]$ year window. In both cases, we match on customer firms' SIC industry and size deciles. Even in this case, we obtain results consistent with our baseline estimates.

4 Discussion and Conclusions

We provide empirical evidence on how U.S. firms adapt their global supply chains after their international suppliers become involved in E&S scandals. We use the full cargo import data of U.S. firms based on the declarations to U.S. Customs and Border Protection over 2007-2020 to study how international E&S scandals of the exporter in these import declarations are related to the future trade relationships between firms.

We establish a partial trade adjustment. In terms of shipments, the imports from affected suppliers decrease by 11.1% compared to those from suppliers not involved in any scandals. The importers start switching to other suppliers, especially to those in other countries, but do not always fully terminate their relationships. The trade relationship is 4.2% more likely to be terminated following E&S incidents.

The partial decreases we observe in the data could mean that U.S. customers are unable to fully switch suppliers due to unavailability of competitive alternatives. Alternatively, customers could be sending a costly governance threat to suppliers to improve their E&S performance. We find evidence of trade reversals over the long run if U.S. customers' initial trade cuts are followed by improved E&S performance by the supplier, suggesting that partial trade adjustments could act as an effective mechanism of governance by exit.

We also find stronger effects when investors are likely to exert pressure on U.S. firms, either through shareholder activism, shareholder proposals, or by the threat of tilting their portfolios, suggesting that investors' E&S preferences can shape global sup-

ply chains. Importantly, we find that the effect is only present among U.S. customers that are publicly-listed. This finding adds to the ongoing debate on the ESG-related benefits and costs of being public. If privately-held U.S. customers do not receive pressure from financial markets to reorganize their supply chains after an E&S scandal, they retain more flexibility in building their supply chain networks, which may reduce their incentives to go public. If this is the case, the current trend of delistings in the U.S. and abroad could lead to lower E&S standards adherence in countries where the suppliers are located.

The option to cut (rather than engage with) the supplier also suggests previously-unstudied benefits from having suppliers outside of the boundaries of the firm. First, the customer has the option to pick an alternative supplier rather than invest in fixing the underlying E&S issue with the current supplier. Second, the option of quitting the relationship creates an actionable threat that can improve the supplier's performance. Another aspect of the theory of the firm suggested by this paper is that a publicly listed U.S. firm might be an attractive investment for E&S-minded shareholders who want to monitor private foreign suppliers otherwise outside of their investment universe.

Our results also speak to the current policy debate on regulatory outsourcing of global supply chain monitoring activities. Foreign suppliers' E&S activities are beyond the reach of the U.S. government. However, the U.S. government can impose domestic supply chain regulations to gain extraterritorial reach. One recent example of such regulatory outsourcing is the Dodd-Frank Wall Street Reform and Consumer Protection Act's section 1502 on conflict minerals.³³ As summarized by Sarfaty (2015), with this legislation U.S. government is forcing multinational companies to regulate themselves

³³See Christensen (2022) for a discussion on the effectiveness of this legislation. A related regulation is the California Transparency in Supply Chains Act 2010, which requires businesses to disclose the actions they are taking (if any) to proactively address slavery and human trafficking in their supply chains. This act applies to retail sellers and manufacturers of goods doing business in California and with worldwide gross receipts of USD \$100 million or more, irrespective of their domicile. See She (2022) for a study of the real effects of this act. A similar UK Modern Slavery Act also applies to all companies around the world with turnover over £36 million that operate in the UK market.

and indirectly regulate other firms in their supply chain. Compliance by U.S. companies is thus linked to compliance by their suppliers. As a result, companies listed in the U.S. are responsible for implementing and enforcing regulatory standards on firms abroad, on behalf of the U.S. government.

We document that U.S. firms' governance by exit of their suppliers' E&S activities shows some effectiveness beyond the specific setting of conflict minerals, especially for U.S. firms with stronger investor pressure. In this respect, the currently-discussed Scope 3 Emissions reporting requirements could help investors gather more knowledge on firms' supply chain environmental performance, put necessary pressure when needed, and thus effectively assist the U.S. government to achieve extraterritorial reach. Future work could study whether the loss of U.S. customers and reputation due to high-profile E&S scandals could also induce foreign countries to improve their local regulations.

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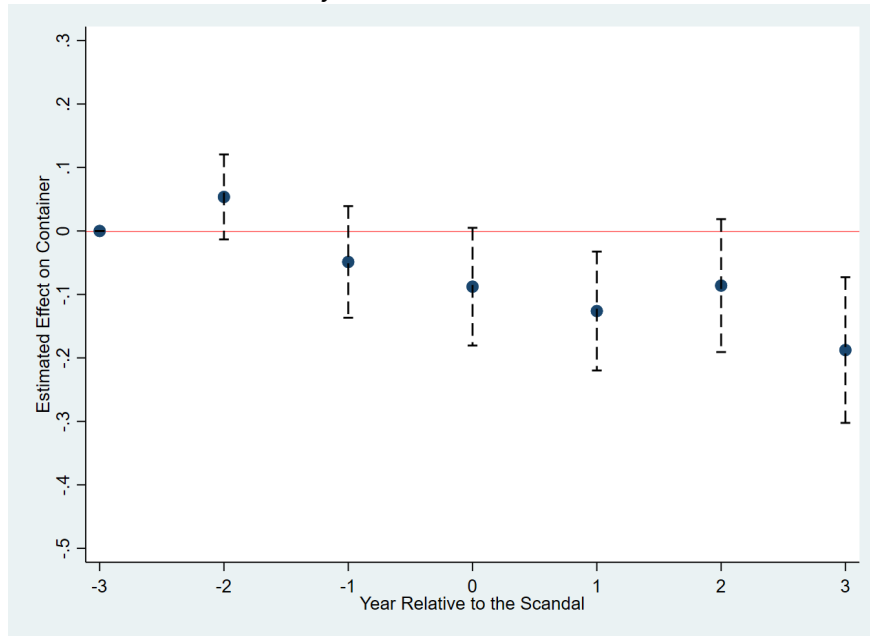
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Figure 1: Dynamic Effects of Supplier E&S Incidents on International Trade

This figure displays the dynamic effects of supplier E&S scandals on international trade. To map out the pattern of exposure to supplier E&S scandals, we replace the $Treat\ Supp \times Post$ indicator from Specification (1) with interaction terms between the $Treat\ Supp$ indicator and event year indicators from $t - 2$ to $t + 3$ around event year t , taking event year $t - 3$ as our baseline. In this figure, we plot the estimated interaction coefficients and their associated 10% confidence intervals.

Panel A: Dynamic Effects on Containers



Panel B: Dynamic Effects on Pure Intensive Margin

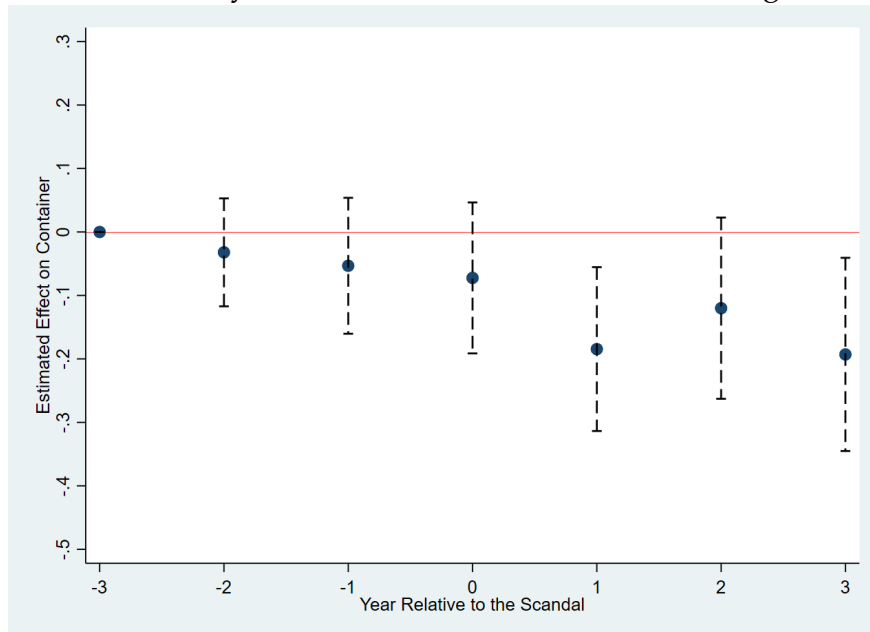


Table 1: Summary Statistics

Panel A reports the sample distribution across cohorts (i.e., event years of supplier scandals). Panel B reports the distribution of treated relationships across the Fama-French 48 industry of the customer. Panel C reports descriptive statistics for the variables used in our main analyses.

Panel A: Sample Distribution

Cohort	#Relationships	#Treated Suppliers	#Treated Relationships	#Customers	#Affected Customers
2010	19,586	76	88	848	57
2011	18,470	74	84	799	56
2012	27,524	129	166	802	107
2013	21,215	103	133	789	83
2014	23,945	131	175	794	106
2015	26,217	135	180	786	109
2016	29,536	142	173	771	112
2017	24,702	121	149	772	112
2018	22,213	138	172	697	103
All	60,305	1,010	1,281	1,515	434

Panel B: Distribution of Treated Relationships by Customer Industry

FF48 Industry	Freq.	FF48 Industry	Freq.
Agriculture	4	Aircraft	20
Food Products	28	Defense	1
Candy & Soda	1	Precious Metals	1
Tobacco Products	1	Non-Metallic and Industrial Metal Minin	1
Recreation	25	Petroleum and Natural Gas	47
Printing and Publishing	13	Personal Services	2
Consumer Goods	55	Business Services	26
Apparel	100	Computers	56
Healthcare	1	Electronic Equipment	75
Medical Equipment	8	Measuring and Control Equipment	22
Pharmaceutical Products	37	Business Supplies	31
Chemicals	78	Shipping Containers	3
Rubber and Plastic Products	5	Transportation	35
Textiles	16	Wholesale	65
Construction Materials	13	Retail	231
Construction	3	Restaraunts, Hotels, Motels	9
Steel Works Etc	33	Banking	15
Fabricated Products	2	Insurance	1
Machinery	96	Trading	1
Electrical Equipment	23	Other	18
Automobiles and Trucks	79		

Table 1: Summary Statistics (Continued)

Panel C: Summary Statistics of Variables

Variable	Obs.	Mean	Std. Dev.	P25	P50	P75
Treat Supp	1,000,950	0.007	0.084	0.000	0.000	0.000
Treat Cust, Control Supp	1,000,950	0.711	0.453	0.000	1.000	1.000
Post	1,000,950	0.559	0.496	0.000	1.000	1.000
Container	1,000,950	0.942	1.308	0.000	0.000	1.609
1 (Trade>0)	1,000,950	0.471	0.499	0.000	0.000	1.000
Size	1,000,950	8.418	2.251	6.846	8.272	9.813
MTB	1,000,950	1.350	1.147	0.515	1.075	1.741
Lev	1,000,950	0.221	0.166	0.088	0.225	0.308
R&D	1,000,950	0.020	0.040	0.000	0.000	0.026
Capx	1,000,950	0.045	0.031	0.020	0.038	0.063
Cash	1,000,950	0.128	0.113	0.041	0.095	0.182

Table 2: Customers' Stock Market Reactions Around Supplier Scandals

This table shows U.S. customers' stock market reactions around international suppliers' E&S incidents. We start with all E&S incidents recorded in the RepRisk data, and remove incidents with confounding events in the week before the incident. CAR $[-t, +t]$ is the cumulative abnormal return for customer firms from day $-t$ to day $+t$, and day 0 is the incident announcement date. Abnormal returns are estimated using the market model in a $[-200, -60]$ trading day window before the event (e.g., Chen et al. 2007; Qui and Wang 2018). We require a minimum of 60 days in the estimation window, and winsorize all variables at the 1% and 99% levels. Standard errors for the t -test of the null that the average CAR is equal to zero are clustered at the supplier-level.

	Obs.	Mean (%)	Median (%)	t -stat: Mean = 0
CAR $[-1,+1]$	9,957	-0.10%	-0.08%	-2.79
CAR $[-3,+3]$	9,957	-0.19%	-0.08%	-2.79
CAR $[-5,+5]$	9,957	-0.19%	-0.07%	-2.47

Table 3: The Effect of Supplier E&S Incidents on Trade

This table shows the effect of supplier E&S incidents on trade relationships. Panel A reports the baseline effects. The dependent variable in Panel A is *Container*, defined as the number of containers received by a U.S. customer from a given supplier over the year. Column (1) controls for relationship×cohort and customer firm×cohort fixed effects, as well as for the time-varying controls. Column (2) controls for relationship×cohort and customer firm×cohort×year fixed effects. Panel B reports the results of the extensive and intensive margin tests. The dependent variables in columns (1) and (2) are $1(Trade>0)$ and *Container*, respectively. Column (2) requires a relationship-cohort-year to have a positive amount of trading to be included in the regression sample. In Panel B, both columns control for relationship×cohort and customer firm×cohort×year fixed effects. All the variables are defined in Table A1. All continuous variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the supplier-cohort level and displayed in parentheses. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

Panel A: Baseline Results

<i>Dep. Var. =</i>	Log Containers	
	(1)	(2)
Treat Supp×Post	-0.090** (0.041)	-0.111*** (0.039)
Size	0.185*** (0.008)	
Leverage	-0.597*** (0.027)	
R&D	2.448*** (0.212)	
Capx	-0.244*** (0.093)	
Cash	0.148*** (0.033)	
Pair×Cohort FE	Yes	Yes
Year×Cohort FE	Yes	No
Firm×Cohort×Year FE	No	Yes
Obs.	994,962	990,439
Adj. R ²	0.267	0.392

Panel B: Extensive versus Intensive Margins

	Extensive Margin	Intensive Margin
	(1)	(2)
Treat Supp×Post	-0.042*** (0.014)	-0.095* (0.054)
Pair×Cohort FE	Yes	Yes
Firm×Cohort×Year FE	Yes	Yes
Obs.	990,439	410,322
Adj. R ²	0.160	0.640

Table 4: Trade Cuts, E&S Improvements, and Trade Reversal

This table studies supplier E&S rating changes and trade reversals after initial imports cut by U.S. customers. In Panel A, we construct a cohort-supplier-year panel over a $[t - 3, t + 6]$ years window around the incident year t . The dependent variable is the supplier's RepRisk ESG risk rating. *Treat* is a binary variable indicating whether the supplier is hit by a scandal in year t , and *Post* (n) is a binary variable indicating the n -th year after the incident. For each supplier, we aggregate trade changes between years $t - 1$ and $t + 1$ across all U.S. customers, and we partition the sample based on distributional cuts of these trade changes. Columns (1) to (3) correspond to trade cuts below the bottom quartile (i.e., the largest trade cuts), within the interquartile range (i.e., moderate trade cuts), and in the top quartile (i.e., small trade cuts) of the trade cut distribution, respectively. All columns control for supplier-cohort and year-cohort fixed effects. In Panel B, we construct a cohort-relationship-year sample over a $[t - 3, t + 6]$ years window around the incident year t . The dependent variable is *Container*. *Treat* is a binary variable indicating suppliers hit by scandals. *Post4* is a binary variable indicating observations in the interval $[t + 4, t + 6]$ after the incident. *CutTrade* is a relationship-specific indicator equal to one if the growth of average trade from the $[t - 3, t - 1]$ period to the $[t + 1, t + 3]$ period falls below the threshold indicated on the top of the table (0, -29%, and -50%, in columns (1) to (3), respectively), and zero otherwise. *Inc_Rating* is a supplier-specific indicator equal to one if the supplier improved its RepRisk ESG risk rating between year $t - 1$ and year $t + 3$, and zero otherwise. All columns controls for relationship-cohort and firm-year-cohort fixed effects. The variables are defined as in Table A1. All continuous variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the supplier-cohort level and displayed in parentheses. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

Panel A: Future Supplier Risk

Dep. Var. =	Supplier RepRisk ESG Score		
	< P25	P25-P75	>P75
	(1)	(2)	(3)
Treat×Post (0)	-1.063*** (0.067)	-1.059*** (0.047)	-1.080*** (0.065)
Treat×Post (+1)	-1.055*** (0.075)	-1.000*** (0.053)	-1.075*** (0.075)
Treat×Post (+2)	-0.337*** (0.091)	-0.302*** (0.055)	-0.502*** (0.073)
Treat×Post (+3)	-0.104 (0.108)	-0.273*** (0.066)	-0.439*** (0.083)
Treat×Post (+4)	0.075 (0.124)	-0.174** (0.082)	-0.433*** (0.097)
Treat×Post (+5)	0.107 (0.164)	-0.126 (0.092)	-0.306*** (0.113)
Supplier×Cohort FE	Yes	Yes	Yes
Year×Cohort FE	Yes	Yes	Yes
Obs.	17,772	35,849	17,886
Adj. R ²	0.856	0.845	0.830

Table 4: Trade Cuts, E&S Improvements, and Trade Reversal (Continued)

Panel B: Trade Reversal

<i>Dep. Var. =</i>	Log Containers		
	where CutTrade=1 is defined if		
	$\Delta\text{Trade} < 0$	$\Delta\text{Trade} < -0.29$	$\Delta\text{Trade} < -0.5$
	(1)	(2)	(3)
Treat×Post4 (CutTrade=1, Inc.Rating=1)	0.377*** (0.106)	0.449*** (0.109)	0.549*** (0.119)
Treat×Post4 (CutTrade=1, Inc.Rating=0)	0.219 (0.241)	0.296 (0.252)	0.477 (0.319)
Treat×Post4 (CutTrade=0, Inc.Rating=1)	-0.126 (0.156)	-0.160 (0.146)	-0.142 (0.127)
Treat×Post4 (CutTrade=0, Inc.Rating=0)	-0.298 (0.207)	-0.313 (0.199)	-0.303* (0.177)
Relationship×Cohort FE	Yes	Yes	Yes
Firm×Cohort×Year FE	Yes	Yes	Yes
Obs.	233,442	233,442	233,442
Adj. R ²	0.566	0.566	0.566

Table 5: Cross-sectional Tests: Investor E&S Preferences

This table shows the differential effects that the same supplier scandal has for trade with customers with different investor characteristics. The dependent variable is *Container*. Column (1) expands the stacked panel to include relationships with privately-held customers. *Public Cust* is a dummy variable equal to one if the customer's shares are publicly-traded customers, and equal to zero otherwise. The data comes from CRSP. The remaining columns of the table use the same sample as in Table 3. *High CustESG* is a binary variable indicating customers with above-the-median Refinitiv ESG ratings in the event year. *High IO_ESG* is a binary variable indicating customers with above-the-median outstanding shares' ownership by E&S-conscious investors at the beginning of the event year. E&S-conscious investors are defined similar to Gantchev et al. (2022) as investors with average portfolio E&S ratings in the top tercile of the distribution. *ESGProposal* is a binary variable indicating publicly-listed customers receiving at least one E&S-related shareholder proposal in the three-year window preceding the event year. All columns include supplier×cohort and customer firm×cohort×year fixed effects. Variable definitions are in Table A1. All continuous variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the supplier-cohort level and displayed in parentheses. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

<i>Dep. Var. =</i>	Log Containers			
	(1)	(2)	(3)	(4)
Treat Supp×Post	-0.023* (0.013)	-0.054 (0.050)	-0.045 (0.058)	0.017 (0.067)
Treat×Post×Public Cust	-0.109*** (0.041)			
Treat×Post×High CustESG		-0.138* (0.079)		
Treat×Post×High IO_ESG			-0.151** (0.077)	
Treat×Post×ESG Proposal				-0.235** (0.100)
Partition Var. × Year FE	Yes	Yes	Yes	Yes
Supplier×Cohort FE	Yes	Yes	Yes	Yes
Firm×Cohort×Year FE	Yes	Yes	Yes	Yes
Obs.	28,005,984	990,439	990,439	559,468
Adj. R ²	0.279	0.353	0.353	0.364

Table 6: Cross-sectional Tests: End Consumer Exposure

This table shows the differential effects that the same supplier scandal has for trade with customers with different end-consumer exposure. The dependent variable is *Container*. *High %Final User* is a binary variable that equals one if the customer industry's final-user sales to total sales ratio is above the sample median. *B2C* is a binary variable that equals one if the customer industry is categorized as business-to-consumer industry (Lev et al., 2010, Flammer, 2015). All columns control for supplier×cohort and customer firm×cohort×year fixed effects. Variable definitions are in Table A1. All continuous variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the supplier-cohort level and displayed in parentheses. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

<i>Dep. Var. =</i>	Log Containers	
	(1)	(2)
Treat Supp×Post	-0.095** (0.044)	-0.076 (0.052)
Treat×Post×High %Final User	-0.147 (0.114)	
Treat×Post×B2C		-0.068 (0.074)
Partition Var. × Year FE	Yes	Yes
Supplier×Cohort FE	Yes	Yes
Firm×Cohort×Year FE	Yes	Yes
Obs.	830,537	990,439
Adj. R ²	0.371	0.353

Table 7: International Supply Chain Reallocation

This table documents trade reallocation along the supply chain network. The dependent variable is *Container.%Treat Supp* is the fraction of suppliers hit by an E&S scandal in any given cohort. *Treat Cust, Control Supp* is a binary variable indicating control suppliers of “treated” customers (i.e., customers with at least one supplier hit by an E&S scandal). *Treat Cust, Control Supp, Same Country* is a binary variable indicating control suppliers of “treated” customers located in the same country of the treated supplier. *Treat Cust, Control Supp, Diff Country* indicates control suppliers in other countries. All columns control for relationship×cohort and customer firm×cohort fixed effects. Variable definitions are in Table A1. All continuous variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the supplier-cohort level and displayed in parentheses. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

<i>Dep. Var. =</i>	Log Containers	
	(1)	(2)
Treat Supp×Post	-0.084** (0.040)	-0.084** (0.040)
%Treat×Post×Treat Cust, Control Supp	0.832*** (0.176)	
%Treat×Post×Treat Cust, Control Supp, Same Country		0.015 (0.335)
%Treat×Post×Treat Cust, Control Supp, Diff Country		1.055*** (0.200)
Size	0.184*** (0.008)	0.184*** (0.008)
Leverage	-0.611*** (0.027)	-0.611*** (0.027)
R&D	2.863*** (0.224)	2.865*** (0.224)
Capx	-0.313*** (0.095)	-0.313*** (0.095)
Cash	0.151*** (0.034)	0.151*** (0.034)
Pair×Cohort FE	Yes	Yes
Year×Cohort FE	Yes	Yes
Obs.	959,024	959,024
Adj. R ²	0.265	0.265

Table 8: Cross-sectional Tests: Measure Validation

This table validates our main E&S incident measures using cross-sectional splits on scandal and supplier characteristics. The dependent variable is *Container*. Column (1) partitions scandals into high-severity (*Treat Supp, High Severity*) and low-severity (*Treat Supp, Low Severity*). Column (2) partitions scandals into scandals related to environmental issues only (*Treat Supp, E only*), social issues only (*Treat Supp, S only*), and both environmental and social issues (*Treat Supp, E & S*). Column (3) partitions suppliers into public suppliers (*Treat Supp, Public*) and private suppliers (*Treat Supp, Private*). Column (4) partitions scandals into scandals that occurred on or before 2015 (*Pre2016*), and scandals that occurred on or after 2016 (*Post2016*). Column (5) partitions suppliers into a group with high HS product Herfindahl-Hirschman Index (HHI) (*High HHI*) and a group with low HS product HHI (*Low HHI*). All columns control for relationship×cohort and customer firm×cohort×year fixed effects. Variable definitions are in Table A1. All continuous variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the supplier-cohort level and displayed in parentheses. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

Dep. Var. =	Log Containers				
	(1)	(2)	(3)	(4)	(5)
Treat Supp, High Severity×Post	-0.140** (0.059)				
Treat Supp, Low Severity×Post	-0.086* (0.051)				
Treat Supp, E only×Post		-0.044 (0.110)			
Treat Supp, S only×Post		-0.096* (0.051)			
Treat Supp, E & S×Post		-0.180*** (0.069)			
Treat Supp, Public×Post			-0.088 (0.059)		
Treat Supp, Private×Post			-0.124** (0.050)		
Treat Supp, Pre2016×Post				-0.056 (0.049)	
Treat Supp, Post2016×Post				-0.200*** (0.064)	
Treat Supp, High HHI×Post					-0.036 (0.048)
Treat Supp, Low HHI×Post					-0.217*** (0.064)
Pair×Cohort FE	Yes	Yes	Yes	Yes	Yes
Firm×Cohort×Year FE	Yes	Yes	Yes	Yes	Yes
Obs.	990,439	990,439	990,439	990,439	990,439
Adj. R ²	0.392	0.392	0.392	0.392	0.392

Table 9: Additional Robustness

This table shows the results of robustness tests on our main results from Table 3. Panel A reports results using alternative measures of trade. The dependent variables in columns (1) to (3) are *#Ship*, *Weight*, and *Quantity*, respectively. Panel B reports results using alternative matching samples. Column (1) matches treatment and control relationships based on the customer’s four-digit SIC industry. Column (2) matches treatment and control relationships based on the customer’s four-digit SIC industry and asset size decile. Column (3) matches treatment and control relationships based on the customer’s industry, the customer’s asset size decile, and the supplier’s country. Panel C reports results using alternative approaches to deal with confounding incidents. Column (1) requires no confounding incidents two years before and two years after the focal incident. Column (2) requires no confounding incidents one year before and after the focal incident. We match treatment and control relationships based on customer industry, customer size decile, and supplier country. Variable definitions are in Table A1. All continuous variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the supplier-cohort level and displayed in parentheses. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

Panel A: Alternative Trade Measures

<i>Dep. Var.</i> =	#Shipments	Weight	Quantity
	(1)	(2)	(3)
Treat Supp × Post	-0.092*** (0.036)	-0.462*** (0.151)	-0.237** (0.099)
Pair × Cohort FE	Yes	Yes	Yes
Firm × Cohort × Year FE	Yes	Yes	Yes
Obs.	990,439	990,439	990,439
Adj. R ²	0.393	0.246	0.315

Panel B: Matching Sample

	Log Containers		
	Industry	Industry, Size	Industry, Size, Supplier Country
	(1)	(2)	(3)
Treat Supp × Post	-0.110*** (0.039)	-0.110*** (0.038)	-0.103** (0.044)
Pair × Cohort FE	Yes	Yes	Yes
Firm × Cohort × Year FE	Yes	Yes	Yes
Obs.	788,608	735,878	163,495
Adj. R ²	0.393	0.393	0.434

Table 9: Additional Robustness (Continued)

Panel C: Alternative Restrictions on Confounding Incidents

<i>Dep. Var. =</i>	Log Containers	
	No confounding incidents two years before and after the event	No confounding incidents one year before and after the event
	(1)	(2)
Treat Supp×Post	-0.105*** (0.034)	-0.057** (0.027)
Firm×Cohort FE	Yes	Yes
Firm×Cohort×Year FE	Yes	Yes
Obs.	811,101	1,093,221
Adj. R ²	0.394	0.393

Appendix: Intended for Online Publication

Table A1: Variable Definitions

Variable	Definition
Container	The natural logarithm of the number of containers shipped from the supplier to the customer in the year.
1(Trade>0)	A binary variable that equals one if the customer has non-zero container imports from the supplier in the year.
Ship	The natural logarithm of the number of shipments from the supplier to the customer in the year.
Weight	The natural logarithm of the total weight of all shipments from the supplier to the customer in the year.
Quantity	The natural logarithm of the number of individual items shipped from the supplier to the customer in the year.
Treat Supp	A binary variable that equals one if the supplier is subject to an ES scandal.
Post	A binary variable that equals one for the periods following the supplier's ES scandal.
Size	The natural logarithm of the asset size of the customer firm.
Leverage	The sum of short term and long term debt scaled by total assets.
R&D	The ratio of R&D expenditure to total assets. Missing values are replaced with zero.
CAPX	The ratio of capital expenditure to total assets.
Cash	The ratio of cash and cash equivalents to total assets.
Treat Supp, High Severity	The product of <i>Treat Supp</i> and a binary variable that equals one if the supplier scandal is coded as a high- or medium-severity scandal by RepRisk.
Treat Supp, Low Severity	The product of <i>Treat Supp</i> and a binary variable that equals one if the supplier scandal is not coded as <i>High Severity</i> .
Treat Supp, E only	The product of <i>Treat Supp</i> and a binary variable that equals one if the incident is coded as environment-related but not as social-related.
Treat Supp, S only	The product of <i>Treat Supp</i> and a binary variable that equals one if the incident is coded as social-related but not as environment-related.
Treat Supp, E & S	The product of <i>Treat Supp</i> and a binary variable that equals one if the incident is coded as both environment-related and social-related.
Treat Supp, Public	The product of <i>Treat Supp</i> and a binary variable that equals one if the supplier is a public firm.
Treat Supp, Private	The product of <i>Treat Supp</i> and a binary variable that equals one if the supplier is a private firm.
Treat Supp, Pre2016	The product of <i>Treat Supp</i> and a binary variable that equals one if the scandal occurred on or before 2015.
Treat Supp, Post2016	The product of <i>Treat Supp</i> and a binary variable that equals one if the scandal occurred on or after 2015.

Table A1: Variable Definitions (Continued)

Variable	Definitions
Treat Supp, High HHI	The product of <i>Treat Supp</i> and a binary variable that equals one if the HHI of the supplier's two-digit HS product is above the sample median.
Treat Supp, Low HHI	The product of <i>Treat Supp</i> and a binary variable that equals one if the HHI of the supplier's two-digit HS product is below the sample median.
Public Cust	A binary variable that equals one if the customer firm is publicly listed in the event year.
High IO_ESG	A binary variable that equals one if the fraction of outstanding shares owned by E&S-conscious investors at the beginning of the event year is above the sample median.
High ESG	A binary variable that equals one if the customer firm's Refinitiv ESG score in the event year is above the sample median.
ESG Proposal	A binary variable that equals one if the customer firm received at least one ES-related shareholder proposal in the three-year window before the event year.
B2C	A binary variable that equals one if the customer firm operates in business-to-customer industries.
High %Final User	A binary variable that equals one if fraction of industry final-user sales to total sales is greater than the sample median.

Table A2: Panjiva Sample Selection

Step	#Suppliers	#Customers	#Supplier-Customers	#Relationship-years
Panjiva Sample	1,598,415	382,215	4,322,747	-
(-) Private Customer	222,279	7,032	331,516	-
(-) Relationship Appearing Only Once	90,074	4,537	12,3081	-
(-) Missing $t - 1$ Financial Data	58,298	1,937	73,916	-
Create a Relationship-year Panel	58,298	1,937	73,916	497,397

Table A3: Investor E&S Preferences: Robustness Tests on the Extensive Margin

This table provides robustness tests on our investor preferences results from Table 5. In this table, we replace the dependent variable with the indicator $1(Trade > 0)$. The specifications are otherwise identical to those in Table 5.

	Extensive Margin			
	(1)	(2)	(3)	(4)
Treat Supp×Post	-0.017*** (0.005)	-0.021 (0.019)	-0.011 (0.021)	-0.002 (0.026)
Treat×Post×Public Cust	-0.028* (0.015)			
Treat×Post×High CustESG		-0.047* (0.027)		
Treat×Post×High IO.ESG			-0.056** (0.028)	
Treat×Post×ESG Proposal				-0.070** (0.035)
Partition Var. × Year FE	Yes	Yes	Yes	Yes
Supplier×Cohort FE	Yes	Yes	Yes	Yes
Firm×Cohort×Year FE	Yes	Yes	Yes	Yes
Obs.	28,005,984	990,439	990,439	559,468
Adj. R ²	0.105	0.160	0.160	0.173

Table A4: Measure Validation: Robustness Tests on the Extensive Margin

This table provides robustness tests on our investor preferences results from Table 8. In this table, we replace the dependent variable with the indicator $1(Trade > 0)$. The specifications are otherwise identical to those in Table 8.

	Extensive Margin				
	(1)	(2)	(3)	(4)	(5)
Treat Supp, High Severity×Post	-0.042** (0.021)				
Treat Supp, Low Severity×Post	-0.043** (0.019)				
Treat Supp, E only×Post		-0.033 (0.038)			
Treat Supp, S only×Post		-0.019 (0.018)			
Treat Supp, E & S×Post		-0.099*** (0.028)			
Treat Supp, Public×Post			-0.032 (0.024)		
Treat Supp, Private×Post			-0.048*** (0.017)		
Treat Supp, Pre2016×Post				-0.021 (0.018)	
Treat Supp, Post2016×Post				-0.077*** (0.023)	
Treat Supp, High HHI×Post					-0.027 (0.018)
Treat Supp, Low HHI×Post					-0.065*** (0.023)
Pair×Cohort FE	Yes	Yes	Yes	Yes	Yes
Firm×Cohort×Year FE	Yes	Yes	Yes	Yes	Yes
Obs.	990,439	990,439	990,439	990,439	990,439
Adj. R ²	0.160	0.160	0.160	0.160	0.160