Journal of Accounting Research

DOI: 10.1111/1475-679X.12530
Journal of Accounting Research
Vol. 62 No. 2 May 2024
Printed in U.S.A.

CHICAGO BOOTH

The Real Effects of Supply Chain Transparency Regulation: Evidence from Section 1502 of the Dodd–Frank Act

BOK BAIK,* OMRI EVEN-TOV,† RUSSELL HAN,‡ AND DAVID PARK*

Received 1 December 2021; accepted 10 January 2024

ABSTRACT

Section 1502 of the Dodd–Frank Act requires SEC-registered issuers to conduct supply chain due diligence and submit conflict minerals disclosures (CMDs) that indicate whether their products contain tantalum, tin, tungsten, or gold (3TG) sourced from the Democratic Republic of the Congo (DRC) or its neighboring countries ("covered countries"). Consistent with the reputational cost hypothesis, we find that heightened public attention to CMDs increases responsible sourcing. After Section 1502 takes effect, we find higher demand for 3TG products processed in certified smelters, decreased conflicts in covered countries' mining regions relative to other regions, and reduced sensitivity of conflict risk to conflict minerals' price spikes. Finally, we find that conflicts decrease in Eastern DRC territories with prevalent 3T (tantalum, tin, and tungsten) mines but increase in territories with prevalent gold mines. Overall, our findings highlight the real effects of enhanced supply chain transparency regulation.

*Seoul National University; †University of California, Berkeley; ‡Hong Kong Polytechnic University, School of Accounting and Finance

Accepted by Valeri Nikolaev. We thank David Aboody, Lily Asia (IBM), Chris Bayer (DI), Nicolas Berman, Nerissa C. Brown, Samuel Chang, George SheChih Chiu (discussant), Jong-Hag Choi, Sunhwa Choi, Stacey Soyeon Choy, Darin Christensen (PRG), Hans B Chris-

JEL codes: C23, D22, D74, G14, G18, G38, K2, L2, M41, M48, O13, Q34

Keywords: real effects; Dodd–Frank Act; conflict minerals disclosures; nonfinancial disclosure; corporate social responsibility; responsible sourcing; ESG; due diligence; supply chain; resource curse

1. Introduction

The extraction and distribution of Africa's natural resources have produced conflicts with significant economic, geopolitical, and humanitarian implications (U.N. Security Council [2010]).[1] Many of the region's vast and valuable mineral reserves are located in areas with heightened political volatility and corruption, weak institutional structures and accountability, and poor social welfare. Scholars have coined a term for this paradox: the "resource curse" (Auty [1993], Sachs and Warner [1995], Auty [2001], Gylfason [2011]). This curse has been particularly pronounced in the Democratic Republic of the Congo (DRC), which has been the site of 5.4 million deaths since 1996 related to conflicts over its abundant natural resources (Chase [2010]).

---

tensen, Ross Chu, Benjamin Clair (Datastake), Mathieu Couttenier, Michael Dambra, Mickael Daudin (iTSCi), Raphaël Deberdt (RSN), Patricia Dechow, Michael Donohoe, Kimberlyn George, Kimberly Gianopoulos (GAO), David Godsell, Eliana Gonzalez Torres (DI), Jihae Hong (PRG), Solomon Hsiang, Iny Hwang, Jinsung Hwang, Nsengiyumva Majune Ignace, Sun-Moon Jung, Woon-Oh Jung, Benjamin Katz (OECD), Dan Katz (USSD), Chin Kim, Jiho Kim, Jongha Kim, Jooyun Kim, Pureum Kim, Yoojin Kim, Taeho Ko, Brooke Stearns Lawson (USAID), Junghoon Lee, Sang-Mok Lee, Woo-Jong Lee, Yong-Gyu Lee, Youngjo Lee, Christian Leuz, Haotian Li, Fabiana Di Lorenzo (RBA), Michelle Lowry (discussant), Luca Maiotti (OECD), Ken Matthysen (IPIS), Melody McNeil (USAID), Simmi Mookerjee (discussant), Kay Nimmo (iTSCi), Shail Pandit (discussant), Duri Park (discussant), Ester Park, Hungsoo Joshua Park, Sehee Park, Sophia Sohee Park, Sunyoung Park, Alyssa Perkinson (USSD), Jennifer Peyser (RBA), Itay Saporta, Galit Sarfaty, Guoman She, Jae Yong Shin, Annie Signorelli (Apple), Benjamin Skolnik (USAID), Richard Sloan, Nik Stoop, Hee-Yeon Sunwoo, Brett Trueman, Agathe Tshimpanga (USAID), Peter Van der Windt, Ryan Vaughan (GAO), Pilar Velasquez (USLD), Marijke Verpoorten, Jordan Yoo, Aaron Yoon, Young Yoon, Steve Young, seminar participants at the 2021 and 2022 American Accounting Association Annual Meetings, the 2022 Hawaii Accounting Research Conference, the Korean Accounting Association Conference 2021 and 2022, and the Korean Accounting Information Association Conference 2021. We thank the workshop participants at the Hanken School of Economics, National University of Singapore, University of Buffalo, University of California, Los Angeles, University of Michigan, University of Tennessee, Université Paris-Dauphine, Seoul National University, and Tel Aviv University; the Private-Public Alliance and the OECD Forums. We also thank Alex Gunwoo Kim, Chanseok Lee, Peter Chanmu Park, Andy Jiarui Su, Jaeho Yoo, and Sunho Yoo for their valuable research assistance. Bok Baik acknowledges financial support from the Institute of Management Research, College of Business Administration Seoul National University. An online appendix to this paper can be downloaded at https://www.chicagobooth.edu/jar-online-supplements. In online appendix OA-1, we provide additional details about the list of experts with whom we held private discussions.

[1] Conflict minerals are not the only drivers of conflicts within our study's purview. Specifically, the extant literature proposes three additional factors that might prolong conflicts in Africa: weak and poorly functioning political institutions, ethnic fragmentation and polarization, and endemic poverty (Ross [2004]).

Concerned that the corporate purchase of conflict minerals (i.e., tantalum, tin, tungsten, and gold, also referred to as 3TG) was exacerbating the humanitarian crisis by financing the region's armed groups, the U.S. Congress enacted Section 1502 as part of the Dodd–Frank Wall Street Reform and Consumer Protection Act of 2010 (hereafter, "Dodd–Frank Act" or "the Act"). The final rule in 2012 required Securities and Exchange Commission (SEC) issuers to file by the end of May 2014, and annually thereafter, conflict minerals disclosures (CMDs) to indicate whether their products contain conflict minerals originating in the DRC or any of its nine neighboring countries, collectively referred to as the "covered countries".[2] In effect, Section 1502 sought to compel greater firm accountability by enhancing supply chain transparency. Yet, despite the regulation's importance, there is limited empirical evidence on whether it has effectively stimulated responsible sourcing and mitigated conflicts.[3] To fill this void, we investigate whether and how Section 1502 successfully fulfills its goal of conflict mitigation.

It is ex ante unclear to what extent Section 1502 promotes greater accountability in SEC-issuers' sourcing practices. On the one hand, the section requires companies to conduct due diligence to ascertain if sourced minerals are linked to conflicts in the covered countries.[4] To the extent that these disclosures garner attention from investors, consumers, government officials, and other stakeholders, firms may avert reputational costs by embracing responsible sourcing (Kraft, Valdés, and Zheng [2020], She [2022]).[5] Those that fail to comply with Section 1502 in good faith may face liability under Section 18 of the Securities Exchange Act of 1934, providing further incentive to conduct reasonable, good-faith inquiries to determine if sourced conflict minerals originate from the covered countries.

---

[2] Covered countries include the DRC and nine "adjoining countries". The term "adjoining countries" is defined in the Dodd–Frank Act as countries that share an internationally recognized border with the DRC. Specifically, these countries are Angola, Burundi, Central African Republic, the Republic of the Congo, Rwanda, South Sudan, Tanzania, Uganda, and Zambia. See online appendix OA-2 for a map that identifies the covered countries.

[3] We define responsible sourcing as an approach to corporate sourcing and supply chain management in which an organization actively sources and procures both products and services in an ethical, sustainable, and socially conscious way. For a literature review, see Yawar and Seuring [2017].

[4] Under the rule, a company must exercise due diligence on the source and chain of custody of its conflict minerals in accordance with a nationally or internationally recognized due diligence framework, such as the Organization for Economic Co-operation and Development's Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas ("OECD Due Diligence Guidance"). See online appendix OA-3 for the OECD Due Diligence Guidance and online appendix OA-4 for a compliance guide flowchart summary of Section 1502.

[5] For example, companies can incur reputational costs (e.g., Christensen et al. [2017]) if they are perceived to indirectly finance armed groups through their procurement practices, thereby fueling conflicts in the covered countries.

On the other hand, there are several reasons why Section 1502 may not effectively promote responsible sourcing. First, companies may struggle to acquire and provide detailed information about their conflict minerals sourcing, especially if they operate multilayered supply chains (Kim and Davis [2016]). This challenge may lead SEC-issuers to state that they were 'unable to determine with certainty' whether their conflict minerals originate in the covered countries without altering their sourcing behavior. Second, if companies discover that their conflict minerals are sourced from covered countries, they must then undertake numerous, often costly steps to address the issue. If those costs outweigh the benefits of responsible sourcing, firms may continue to use conflict minerals that originate in the covered countries (Kalkanci and Plambeck [2020]). Third, companies may continue to source conflict minerals from covered countries without legal repercussions, especially as the mandate does not constitute an embargo on trading conflict minerals from these countries. Given the intricate factors and motivations surrounding supply chain due diligence and disclosure repercussions, it remains an open empirical question whether Section 1502 promotes responsible sourcing, let alone reduces conflicts in the covered countries.

Our study examines whether and how Section 1502, especially following the CMD's 2014 effective date, compels companies to take real actions to source conflict-free minerals to avert reputational costs, and if so, whether these actions alleviate conflicts in the DRC and its neighboring countries.[6] To investigate sourcing behaviors, we collect data on the number of conflict-free certified smelters and total smelters disclosed in all CMDs for the filing years 2014–2018.[7] We supplement our proprietary data with a data set from Development International, a not-for-profit organization that processed information on firms' sourcing practices via CMDs for the filing years 2015–2017. Across both data sets, our summary statistics reveal a gradual increase in the percentage of certified smelters following Section 1502's effective year, suggesting that the regulation gradually promotes responsible sourcing.

We then examine whether improved information acquisition (e.g., Cheng, Cho, and Yang [2018], Khan, Ryan, and Varma [2019], Kang, Loumioti, and Wittenberg-Moerman [2021]) can explain this trend. Specifically, we investigate whether public attention, measured by the number of

[6] Conflict-free minerals are defined as minerals that do not directly or indirectly benefit armed groups in the covered countries.

[7] For brevity, the term "smelters" may be used throughout our paper to describe both smelters and refiners. We define certified smelters as conformant smelters registered with the Responsible Minerals Initiative (RMI), formerly known as the Conflict-Free Sourcing Initiative (CFSI)—the largest of the conflict mineral certification programs. RMI audits smelters to determine whether the minerals they process come solely from conflict-free mines and makes its results publicly available on its web site (https://www.responsiblemineralsinitiative.org/responsible-minerals-assurance-process/smelters-refiners-lists/export-all-conformant/). This allows firms to verify whether they source conflict-free minerals.

times a firm's CMDs are downloaded by non-robots from EDGAR, influences a firm's decision to pursue responsible sourcing. Using both data sets, we find that firms are more likely to shift toward responsible sourcing when their CMDs garner greater public attention, implying that reputational repercussions are a significant motivational lever.

Next, we investigate Section 1502's real effects at the smelter level, as this is where conflict-free certification is rendered. Once minerals are melted and refined, their mineralogical and geochemical characteristics are lost, making it impossible to determine their origins (Manhart and Schleicher [2013]). As a result, smelters, the metallurgical facilities responsible for initial processing of crude metal products, are pivotal to conflict-free certification; SEC-issuers that cite conflict-free sourcing procure 3TG minerals from certified smelters or upstream suppliers who source from them. Thus, we investigate whether there is an increase in demand for 3TG products originating from certified smelters after Section 1502 takes effect in 2014. Our findings reveal that an increasing number of SEC-issuers directly or indirectly purchase from a smelter once it obtains certification.

Our evidence demonstrates that Section 1502 fosters increased responsible sourcing and demand for products made in certified smelters. But the regulation's impact on conflict mitigation in the DRC and neighboring countries remains unclear. In fact, prior research on the Eastern DRC finds that Section 1502's enactment exacerbated the region's conflicts. Specifically, Parker and Vadheim [2017], Stoop, Verpoorten, and van der Windt [2018], and Bloem [2023] examine the legislation's effects using the post-enactment period years and find that conflicts escalated in the region in the years after 2010. Our paper re-examines the regulation's effectiveness by focusing on the post-implementation period years—after issuers were mandated to submit CMDs in 2014. This approach allows us to estimate the incremental real effects of supply chain transparency regulation over time.

Several institutional factors call for an extended period to observe real effects. First, although the legislation was designed to prompt issuers to consider conflict minerals in their supply chains beginning in 2013 (SEC [2012]), studies found that in the first year of implementation (i.e., 2014), most companies could not determine whether their products contained them (Amnesty International [2015], Bayer [2015], Government Accountability Office (GAO) [2015], Kim and Davis [2016]). Second, the Department of Commerce was unable to provide a list of facilities processing conflict minerals worldwide until the end of 2014, suggesting that issuers needed more time to trace conflict minerals within their supply chains. Consequently, we posit that Section 1502's real effects can only be observed after 2014.[8]

[8] In online appendix OA-5, we provide additional institutional and empirical evidence to substantiate our selection of 2015 as the treatment period's starting point in our empirical analyses.

We employ a difference-in-difference-in-differences (DDD) research design in alignment with Section 1502's sole application to covered countries and mining-related conflict mitigation. Specifically, we examine the following three differences: (1) pre- and post-effective year of disclosure; (2) covered versus noncovered countries; and (3) mining versus nonmining regions. Using this design, we compare changes in conflicts between mining and nonmining regions of covered countries with those of noncovered countries around 2014.

To construct our sample, we follow Berman et al. [2017] and exploit a georeferenced panel data set that divides the continent of Africa into about 10,000 subnational units (i.e., square cells 55×55 km in area at the equator). We then obtain information on the locations of large-scale (industrial) mining sites from Raw Material Data (RMD). To obtain data on conflicts, we use the Armed Conflict Location & Event Database (ACLED), which provides information on conflict events. Our sample consists of 103,240 cell/year observations spanning a 10-year window from 2010 to 2019. We find that the average number of conflicts in mining regions of covered countries declined by about 35% relative to other regions during the post-implementation period, suggesting that firms' actions help mitigate conflicts.

In a cross-sectional analysis, we examine whether conflict reduction is more pronounced in countries with weak political institutions. Prior research finds that institutional quality influences the extent to which mineral deposits contribute to a country's resource curse (Mehlum, Moene, and Torvik [2006]). Thus, we hypothesize that Section 1502's impact will be stronger in countries with weak and unaccountable institutions that fail to prevent the misappropriation of resources (Robinson, Torvik, and Verdier [2006]). To test this prediction, we classify countries' political institutions as strong (i.e., democracy) or weak (i.e., nondemocracy) based on the Center for Systemic Peace's Polity IV Democracy Index published in 2010 (Polity IV [2016]). We then divide our sample based on whether a cell is located within a country that meets the threshold for a democratic nation. Consistent with Christensen, Maffett, and Rauter [2024], we find a more pronounced reduction in the nondemocratic nations subsample, where the resource curse may have been more prevalent in the mining regions and where external economic shocks may have a greater impact on the treated region.

To gain further insights, we examine whether Section 1502 mitigates the impact of commodity price spikes on mineral-related conflicts. Prior studies provide evidence that rising commodity prices increase conflict risk by boosting profits for armed groups that control the extraction areas (e.g., Miner [2013], Berman et al. [2017]). If Section 1502 reduces armed groups' profitability from 3TG price spikes, we expect conflict-price sensitivity to be lower in covered countries' mining regions after the regulation takes effect. Consistent with our expectation, we find that conflict risk in

the covered countries becomes less sensitive to commodity price hikes after Section 1502's implementation.

Finally, to mitigate the possibility that our results are driven by concurrent initiatives that do not explicitly target 3TG-related conflicts, we follow the approach of Parker and Vadheim [2017] and Stoop, Verpoorten, and van der Windt [2018] by utilizing the International Peace Information Service (IPIS) database to focus on artisanal mines in the Eastern DRC. As opposed to RMD, the IPIS database enables us to identify the specific mineral extracted (e.g., 3T or gold) and covers artisanal mines, where Section 1502's impact is likely to be more pronounced.[9] However, it only includes mines in the Eastern DRC, whereas Section 1502 applies to 10 countries. Using this setting, we observe a significant decrease in conflicts after 2014 in territories where 3T mining is prevalent. In contrast, we find weak evidence of increased conflicts in territories with a high prevalence of gold mining. The latter finding aligns with Stoop, Verpoorten, and van der Windt [2018], who propose that armed groups stationed at Eastern DRC artisanal 3T mines may shift to gold mines because that mineral is less traceable to armed groups and easier to smuggle.

Our study makes several contributions to the existing literature. First, it responds to Christensen, Hail, and Leuz [2021] call for more research on the consequences of environmental, social, and governance (ESG) reporting (Christensen et al. [2017], Rauter [2020], Krueger et al. [2021], She [2022], Darendeli et al. [2022], Fiechter, Hitz, and Lehmann [2022], Tomar [2023]). More broadly, we extend the literature on the real effects of disclosures (e.g., Kanodia and Sapra [2016], Leuz and Wysocki [2016], Roychowdhury, Shroff, and Verdi [2019]) by exploring whether enhanced supply chain transparency resulting from Section 1502 encourages companies to undertake real actions with far-reaching impact on nonfinancial stakeholders, such as communities affected by corporations' upstream operations. Moreover, we provide novel evidence that smelters are in increased demand from SEC-issuers after they obtain conflict-free certification, highlighting a critical mechanism through which responsible sourcing can bear humanitarian impacts (Young [2018], Chang and Christensen [2023], Loch et al. [2023]). Collectively, our research suggests that Section 1502 effectively motivates companies to engage in responsible sourcing, thereby mitigating mineral-related conflicts in the covered countries.

Second, we contribute to prior studies about Section 1502's real effects on conflicts (Parker and Vadheim [2017], Stoop, Verpoorten, and van der Windt [2018]). In contrast to Parker and Vadheim [2017] and Stoop, Verpoorten, and van der Windt [2018], who focus on the years immediately following the regulation's enactment, we present new evidence by extending the sample period to include the years after its implementation. Our study

[9] In subsection 4.2.5, we explain the challenges of distinguishing between 3TG and non-3TG mines using the RMD data.

thus offers novel insights into the incremental real effects of enhanced supply chain transparency. We also find evidence that supply chain transparency regulation can help reduce conflicts by lowering their sensitivity to mineral price fluctuations. Moreover, while these prior studies focus on Eastern DRC, our empirical design broadens scope by providing evidence of a decrease in mining regions' conflicts in the 10 covered countries relative to those in the noncovered countries.[10]

Finally, our research directly assesses Section 1502's efficacy, and thus bears significant policy implications for regulators, corporations, and nongovernmental organizations (NGOs). It is particularly relevant in light of the SEC's 2017 call for comments on whether to abandon Section 1502[11] and the Government Accountability Office's (GAO) search for performance indicators to measure progress toward the goal of reducing armed groups' exploitation of conflict minerals.[12] Additionally, the European Union's mandated ESG disclosures, including targeted Conflict Minerals Regulation that began in January 2021,[13] and the German Supply Chain Act ("Lieferkettengesetz") that took effect in January 2023, increase the pertinence and range of our findings. Overall, our research has important implications for stakeholders interested in promoting responsible sourcing practices.

2. *Institutional Background*

2.1 THE RESOURCE CURSE IN THE DRC

The resource curse refers to the paradox that countries with the largest endowment of natural resources often suffer from high levels of political corruption, economic distress, and conflicts (Auty [1993], Sachs and Warner [1995], Auty [2001], Gylfason [2011]). Oil-rich Nigeria and mineral-abundant Republic of Sierra Leone exemplify this phenomenon. It is well-documented that the extraction and sale of abundant natural resources attracts armed groups (Ross [2004]). Given its vast mineral deposits, the DRC is particularly noted for its resource curse (U.N. Security Council [2010]). A study by the United Nations Environment Programme in 2011 estimates that the DRC has an untapped deposit of minerals worth 24 trillion U.S. dollars (International Resource Panel, United Nations Environment Programme [2011]).

---

[10] We discuss similarities and differences between our paper and Bloem [2023], who evaluates the post-enactment effects in the 10 covered countries relative to those in the noncovered countries in online appendix OA-6.

[11] During the SEC's Reconsideration of Conflict Minerals Rule Implementation in 2017, the agency received public comments on whether to repeal the mandate. After carefully reviewing all 323 comments, we find that 270 support the legislation. This analysis of comment letters is available upon request. See online appendix OA-7 for a discussion on the comment letters.

[12] See https://www.gao.gov/products/gao-20-595

[13] See https://ec.europa.eu/trade/policy/in-focus/conflict-minerals-regulation/regulation-explained/

The DRC's paramilitary groups exploit the trade of natural resources to finance their operations, propelling further violence (SEC [2012], Prendergast and Bafilemba [2018]). Moreover, armed groups in Eastern DRC commit numerous human rights abuses, including the use of child labor, and perpetrate sexual violence to drive local populations away from an artisanal mining area (Dranginis [2014], Prendergast and Bafilemba [2018]).[14] Collier, Hoeffler, and Rohner [2009] posit that armed groups gauge operational costs to determine the profitability of waging violence in a particular geographical location. As conflict minerals are the most lucrative revenue source for armed groups in Central Africa, a decrease in the demand for conflict minerals from covered countries may compromise the viability of their continuing dominion over those areas (OECD [2022]).[15]

Starting in the late 1990s and early 2000s, NGOs such as The Enough Project and Global Witness launched awareness campaigns to highlight the role of conflict minerals in perpetuating the DRC's emergency humanitarian crisis (Diemel and Hilhorst [2019]). Consequently, since the early 2000s, the DRC's government and the international community have sought ways to sever the linkage between mineral extraction and conflicts. Following suit, in an effort to end the exploitation, capture, and trade of conflict minerals by armed groups that finance conflict in DRC regions, in 2010 the U.S. Congress enacted Section 1502 of the Dodd–Frank Act—the first regulation to establish binding rules for disclosing human rights-related due diligence concerning conflict minerals in a company's supply chain (Sarfaty [2013]).

2.2 SECTION 1502 OF THE DODD–FRANK ACT

Congress's decision to use a securities law disclosure requirement to achieve a specific humanitarian objective represents a marked shift from the SEC's traditional role of investor protection to one of stakeholder protection (Lynn [2011]). By enhancing supply chain transparency, Section 1502 aims to discourage conflict mineral sourcing that finances armed groups. The regulation addresses the role of conflict minerals in exacerbating the DRC's human rights crisis by requiring that SEC-issuers conduct a reasonable inquiry in good faith to determine whether their conflict minerals are sourced from covered countries. To ensure compliance, Section 1502 mandated that SEC-issuers file specialized disclosures by the end of May 2014 and annually thereafter. Firms that discover conflict

[14] Artisanal mining refers to a manual mode of extraction conducted by individuals or small communities. This type of mining is performed in approximately 80 countries worldwide; it is particularly widespread in developing countries in Africa, Asia, Central and South America, and Oceania (World Bank). The World Bank estimates that about 100 million people (workers and their families) depend on artisanal mining (Stoop et al. [2018]).

[15] In 2008, it was estimated that armed groups earned around $185 million from conflict minerals (Bafilemba et al. [2014]).

minerals within their supply chain must also submit a conflict minerals report.[16]

Section 1502 is particularly noteworthy for its provision of coordinated action among federal agencies, including the SEC, Department of Commerce, State Department, USAID, and GAO (SEC [2012]). In consultation with the State Department, the SEC developed corporate disclosure and reporting regulations. The Chamber of Commerce compiled a directory of all known conflict mineral-processing facilities worldwide. The State Department and USAID drafted the implementation strategy and have collaborated with other stakeholders through the Public–Private Alliance for Responsible Minerals Trade (PPA) to support its implementation.[17] As a result of this coordination, various initiatives facilitate Section 1502 compliance, as noted by the GAO (Sarfaty [2015]).[18] Because companies centralize and coordinate responsible sourcing efforts through these channels (e.g., RMI), compliance is far easier and more effective. Given this fact, it is difficult to isolate the effect of disclosure and due diligence programs (Christensen [2022]) on amelioration of the resource curse. However, the 2014 effective date of Section 1502's disclosure requirement permits us to estimate its incremental real effects because no other initiative with parallel aims took effect during the same year.[19]

3. Hypotheses Development

Section 1502 outlines the due diligence process required of all SEC-issuers. As a first step, if conflict minerals are integral to the functionality of the issuer's product, they must conduct a "reasonable country of origin inquiry". Following this inquiry, the issuer has until the end of May of the following year to file a specialized disclosure form (i.e., Form SD) that reports whether the conflict minerals originated in the covered countries. If

[16] We use the term "CMD" to represent both specialized disclosures (i.e., Form SDs) and the exhibits within the specialized disclosures—conflict minerals reports. For an example of a conflict minerals report, see online appendix OA-8 or https://www.apple.com/supplier-responsibility/pdf/Apple-Conflict-Minerals-Report.pdf.

[17] PPA provides funding and coordination support to organizations working within the region to develop verifiable responsible supply chains, align chain-of-custody programs and practices, encourage responsible sourcing, promote transparency, and strengthen civil society and governmental capacity. Participants are the International Conference on the Great Lakes Region (ICGLR), the International Peace Information Service (IPIS), the International Tin Research Institution's Tin Supply Chain initiative (iTSCi) program, the Organization for Economic Co-operation and Development (OECD) Centre for Responsible Business Conduct, RMI, Responsible Sourcing Network (RSN), USAID, U.S. Department of Labor, the U.S. Department of State, and others. For the entire list of participants, see https://www.resolve.ngo/site-ppa/whoweare.htm. In addition, the PPA established direct relations with the DRC's Ministry of Mines to facilitate responsible mineral trade in the region.

[18] See https://www.gao.gov/products/gao-14-575 for the GAO's study.

[19] See online appendix OA-9 for a list of initiatives related to responsible conflict mineral sourcing.

a company describes any of its products as "DRC conflict-free" in its CMD, it must obtain an independent private-sector audit on its due diligence; if a company has products that are not described as "DRC conflict-free," it must disclose the smelters used to produce the conflict minerals and the efforts made to determine the mine or location of origin.

The comment letters on the reevaluation of Section 1502 in 2017 reveal that most people believe that CMDs improve stakeholders' ability to assess social (i.e., human rights concerns) and reputational risks within a company's supply chain. Prior literature shows that censure for socially *irresponsible* actions may result in higher cost of equity, employee stigma, and lower consumer sales (Cao et al. [2015], Novak and Bilinski [2018], Wang, Lee, and Polonsky [2018], Hartzmark and Sussman [2019], Rauter [2020]). Furthermore, extant studies show that public scrutiny and shareholder attention can play a critical role in managerial discipline and corporate governance (Shleifer and Vishny [1986], Dyreng, Hoopes, and Wilde [2016], Christensen et al. [2017], Rauter [2020], Aghamolla and An [2023], She [2022], Christensen, Maffett, and Rauter [2022], Christensen, Maffett, and Rauter [2024]). To the extent that greater reputational costs affect corporate responsiveness, we anticipate that Section 1502 will motivate firms to strive toward more responsible sourcing.

To declare responsible sourcing, SEC-issuers must disclose that they source 3TG minerals from certified smelters and/or only purchase from upstream suppliers that source from certified smelters. Therefore, as companies strive toward responsible sourcing, we expect greater market demand for products made in certified smelters that do not process conflict minerals from mining regions controlled by armed groups.[20] H1 focuses on responsible sourcing by SEC-issuers, and is stated at the firm and smelter levels (stated in the alternative form):

H1a: In response to greater public attention due to Section 1502 of the Dodd–Frank Act, firms will source more responsibly by increasing procurement from certified smelters.

H1b: In response to greater firm engagement in responsible sourcing, smelters that refine and process 3TG minerals will experience increased demand for their products upon receiving certification.

Given the global interconnectedness of SEC-issuers, we anticipate that a widespread change in sourcing practices would significantly impact the

[20] One concern regarding Section 1502's implementation is the risk of economic boycott of the region, which could harm legitimate miners, including artisanal miners. Based on our discussions with practitioners, we learn that stakeholders acknowledge the potential for such unintended consequences. To alleviate these risks, NGOs, such as the RSN, encourage firms to source minerals responsibly from the DRC to bolster the region's civil society and governmental capacity. Moreover, firms have partnered with the PPA to support the implementation of Section 1502. Finally, we find progress being made in mine certifications and an increase in exports from the DRC, suggesting that a legitimate market for conflict minerals has developed. We present these trends in online appendix OA-5.

conflict minerals market. We highlight Mizuno, Ohnishi, and Watanabe [2016] finding that the structure of global inter-firm linkages allows for a small number of firms to make a real impact. Specifically, their numerical simulation shows that if 3% of all the firms in the Group of Eight (G8) comply with supply chain transparency regulation on conflict minerals, this would effectively decrease 97.3% of the distribution of all conflict minerals within the G8.[21] To the extent that Section 1502 effectively encourages responsible sourcing, it may promote the establishment of legal and responsible markets for conflict minerals, because responsible sourcing will increase demand for conflict-free minerals (Young [2018], Loch et al. [2023]), subsequently diminishing the profitability and attractiveness of conflict minerals for armed groups. Weakened financing will disincentivize armed groups' operations in mining regions, leading to conflict reduction.[22] Our second hypothesis is stated in the alternative form:

H2: In response to Dodd–Frank Act Section 1502, conflicts in the mining regions of the covered countries will be alleviated.

4. Results

4.1 RESPONSIBLE SOURCING

4.1.1. Sample Selection, Variable Definitions, and Descriptive Statistics. We leverage three data sets to determine whether and how Section 1502 compels firms and smelters to source responsibly. As mentioned in subsection 2.2, all SEC-issuers are required to file a specialized disclosure. If a firm uses conflict minerals, it must also disclose a conflict minerals report that includes (1) a description of the products manufactured or contracted to be manufactured that are not ''DRC conflict-free,'' (2) the facilities (e.g., smelters) used to process the conflict minerals, (3) the country of origin of the conflict minerals, and (4) the efforts undertaken to identify the mine or location of origin.

To construct our first proxy for responsible sourcing, we utilize data collected from conflict minerals reports for the filing years 2014–2018. We begin with a sample of specialized disclosures consisting of 4,082 firm-year observations for 1,035 unique firms. We then gather information on the total number of smelters and certified conflict-free smelters used by firms

[21] G8 refers to the group of eight highly industrialized nations—France, Germany, Italy, the United Kingdom, Japan, the United States, Canada, and Russia.

[22] Prior literature on conflict modeling notes that an increase (decrease) in contestable income can lead to an increase (decrease) in acts of violence by raising the gains from appropriation (see Hirshleifer [1991], Grossman [1999], Fearon [2005]). These studies predict that armed actors will intensify their efforts in locations where resource rents can be extracted and move away from locations where they cannot. Drawing from this body of literature, we predict that after Section 1502 takes effect, a decrease in the contestable income that armed groups may exploit by exerting acts of violence can disincentive them from committing acts of violence or battling to control the mining region.

subject to Section 1502 during the sample period. Using these data, our first measure of responsible sourcing, *% of Conflict-Free Smelters*, is the ratio of conflict-free smelters to total smelters. After matching our collected sample with financial data from the *Compustat* annual file, this sample is limited to 1,358 firm-year observations for 450 unique firms that have the *% of Conflict-Free Smelters* variable.[23]

To construct our second proxy of responsible sourcing, we leverage data from *Development International*, a not-for-profit organization that collected qualitative data from CMDs for filing years 2015–2017. In its classification system, if firm *i* indicates that it "implemented risk management plans, monitored and tracked performance of risk mitigations, and suspended or discontinued engagement with a supplier after failed attempts at risk mitigation or corrective action," they code that firm *i* has "dissociation policies in place". As such, our second measure of responsible sourcing, *Dissociation*, is an indicator variable equal to 1 if there is evidence that a firm suspended or ceased engagement with risky smelters after failed attempts at risk mitigation or corrective action, and 0 otherwise. After matching this sample with *Compustat*, the sample is limited to 1,988 firm-year observations for 791 unique firms that have the *Dissociation* variable.[24]

To construct our third proxy of responsible sourcing, we gather information on smelter names and locations from firms' CMDs filed between 2014 and 2018.[25] We then extract standardized smelter names, IDs, metals, and locations from the RMI database.[26] After processing and cleaning the data, we match the standard smelter names in the RMI database to our data set, resulting in 315,383 firm-smelter-years. On average, a firm lists 170 smelters. We determine the certification status of smelters by creating annual lists of certified smelters from the CMDs. Our third measure of responsible sourcing, *Certified Smelter*, is an indicator variable equal to 1 if smelter *j* appears as a certified smelter in the annual list of certified smelters for year *t*, and 0 otherwise. We obtain a final sample of 1,284 smelter-year observations pertaining to 301 unique smelters for the *Certified Smelter* variable.

To execute our empirical analysis, we construct several additional variables. To proxy for public scrutiny, we measure *Public Attention*, the total number of firm *i*'s specialized disclosures downloaded by non-robots

[23] Given the lack of uniform guidelines for Form SD content and formatting, firms have considerable discretion in determining disclosure content. We observe that fewer than 50% of firms report the names of the smelters used to process their integral conflict minerals, which explains the lower number of observations in our subsample of firms with the *% of Conflict-Free Smelters* variable.

[24] Firms that disclose information on disassociation policies may not disclose a smelter list, resulting in the difference in sample size.

[25] In 2014, out of the 1,328 firms that filed specialized disclosures, 224 provided smelter lists; in 2015: 398 of 1,275; in 2016: 554 of 1,223; in 2017: 524 of 1,162; and in 2018: 512 of 1,119. For an example of a smelter list, see online appendix OA-10.

[26] See https://www.responsiblemineralsinitiative.org/smelters-refiners-lists/smelter-reference-lists-export/

from EDGAR.[27] We expect that companies with higher levels of *Public Attention* will be subject to greater reputational costs, following Dambra, Even-Tov, and Naughton [2023]. For control variables, we follow Kim and Davis [2016] and construct several firm characteristic variables that may confound the impact of *Public Attention* on *Responsible Sourcing*, such as return on assets (e.g., *ROA*), the natural logarithm of revenues (e.g., *Sales*), and the natural logarithm of total assets (e.g., *Total Assets*). We also control for the natural logarithm of cash (*Cash*) and free cash flow (*Free Cash Flow)* to account for firms' financial ability to alter their sourcing behavior. Finally, we control for a firm's book-to-market ratio (*BTM*) and leverage ratio (*Leverage*). All variables are defined in the appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the impact of outliers.

Panel A of table 1 reports descriptive statistics for the variables of our constructed samples. The average *% of Conflict-Free Smelters* is 71.6%. *Dissociation* statements can be found in 52.3% of the disclosures. For our other variables, we provide descriptive statistics for those used in our subsample where both *Dissociation* and the control variables are available. On average, a specialized disclosure is downloaded 84 times per year. The average firm has $7.315 billion in total assets and $7.119 billion in sales.

Panel B of table 1 provides descriptive evidence of *Responsible Sourcing* changes by year. The average *% of Conflict-Free Smelters* monotonically increases from 44.6% in 2014 to 81.9% in 2018, and the cumulative level of firms that adopt or plan to adopt dissociation policies (i.e., *Dissociation*) increases from 45.1% to 64.3% between 2015 and 2017. These trends demonstrate that corporations do obtain and disclose information about conflict minerals in their supply chains to meet Section 1502's due diligence requirements. Moreover, corporations' gradual dissociation from smelters and refiners that source conflict minerals from the covered countries provides preliminary evidence in support of our first hypothesis.

4.1.2. Empirical Analysis of Responsible Sourcing. Increased public awareness of conflict minerals within a firm's supply chain may incentivize firms to shift toward more responsible sourcing practices. To determine whether public attention motivates them to do so, we estimate the following regression:

$$\begin{aligned} \textit{Responsible Sourcing}_{i,t} = {} & \beta_1 \textit{Public Attention}_{i,t-2} + \beta_{2-8} \textit{Controls}_{i,t-1} \\ & + \eta_{ind} + \eta_{t-1} + \varepsilon_{i,t-1}, \end{aligned} \tag{1}$$

[27] The EDGAR Server Log data, which contain information on Internet search traffic for EDGAR filings through SEC.gov, are produced by the SEC's Division of Economic and Risk Analysis. For more information, visit https://www.sec.gov/dera/data/edgar-log-file-data-set.html. We follow Loughran and McDonald [2017] to obtain our data and thank them for making their data and codes publicly available. Due to limited data availability, our EDGAR log data on specialized disclosures are derived from filings spanning 2014–2016; the data are unavailable from 2017 to 2020.

TABLE 1
Descriptive Statistics

Panel A: Descriptive statistics

	n	Mean	SD	Q1	Median	Q3
% of Conflict-Free Smelters	1,358	0.716	0.242	0.593	0.776	0.903
Dissociation	1,988	0.523	0.500	0.000	1.000	1.000
Public Attention	1,251	84.392	109.340	33.000	53.000	88.000
Free Cash Flow	1,251	0.054	0.118	0.034	0.071	0.108
ROA	1,251	0.092	0.136	0.066	0.111	0.155
Leverage	1,251	0.437	0.210	0.290	0.431	0.557
BTM	1,251	0.633	0.272	0.438	0.604	0.810
Cash	1,251	0.179	0.160	0.057	0.133	0.245
Sales	1,251	7.119	2.016	5.827	7.341	8.441
Total Assets	1,251	7.315	2.060	5.935	7.486	8.640

Panel B: Responsible sourcing by filing year

	n	Mean	SD	n	Mean	SD
	% of Conflict-Free Smelters			*Dissociation*		
2014	147	0.446	0.265			
2015	252	0.637	0.255	677	0.451	0.498
2016	324	0.726	0.215	666	0.479	0.500
2017	319	0.792	0.186	645	0.643	0.479
2018	316	0.819	0.172			
Total	1,358	0.716	0.242	1,988	0.523	0.500

This table presents summary statistics for the variables used in our firm-level analyses. The sample period for our *% of Conflict-Free Smelters* measure is filing years 2014–2018 based on our data collected from conflict minerals reports, while the sample period for the *Dissociation* measure is filing years 2015–2017 based on data available from Development International. Panel A provides descriptive statistics of the variables used in our analyses. Panel B provides the distribution of the *Responsible Sourcing* measures by year. All continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in the appendix.

where η_{ind} is Fama–French 12 industry fixed effects to account for time-invariant unobserved heterogeneity at the industry level and η_{t-1} year fixed effects to account for annual shocks. We run an ordinary least squares regression when the *Responsible Sourcing* variable is *% of Conflict-Free Smelters* and a probit regression when the *Responsible Sourcing* variable is *Dissociation.* We intuit a two-year time lag between *Responsible Sourcing* and *Public Attention* based on the supposition that public attention to a CMD report filed in 2014 should impact a firm's real sourcing behavior in 2015, which would be reported in the 2016 filing year.

Table 2 presents the results for estimating equation (1). Consistent with our H1a, the coefficient on *Public Attention* indicates that companies are more likely to source responsibly, as proxied by *% of Conflict-Free Smelters* and *Dissociation* by 1.2% ($p < 0.05$) and 4.5% ($p < 0.01$), respectively, when there is greater public attention directed to their conflict minerals reports. We multiply public attention by 100 to express the rate per 100 downloads/year. Thus, the economic interpretation is as follows: 100 downloads of a firm's specialized disclosure from EDGAR is associated with a 1.2%

TABLE 2
Public Attention and Responsible Sourcing

	(1) *% of Conflict-Free Smelters*	(2) *Dissociation*
Public Attention	0.012**	0.045***
	(2.35)	(3.37)
Free Cash Flow	0.122	0.466
	(1.78)	(0.81)
ROA	−0.072	−0.475
	(−0.75)	(−1.12)
Cash	−0.038	−0.333
	(−0.30)	(−0.95)
Leverage	0.064**	−0.074
	(2.67)	(−0.48)
BTM	−0.01	−0.233**
	(−0.43)	(−2.55)
Sales	−0.012	0.138
	(−0.45)	(1.24)
Total Assets	0.003	−0.057
	(0.18)	(−0.58)
Industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Adjusted/Pseudo R^2	0.085	0.052
Observations	920	1,251

This table presents coefficient estimates from regressions of *Responsible Sourcing* variables on *Public Attention*. Column (1) reports the regression of *% of Conflict-Free Smelters*, the ratio of the number of conflict-free smelters to the number of total smelters, on *Public Attention* with controls. Column (2) reports the probit regression of *Dissociation*, an indicator variable equal to 1 if there is evidence that a firm suspended or discontinued engagement with risky smelters and refiners after failed attempts at risk mitigation or corrective action, and 0 otherwise, on *Public Attention* with controls. The variable of interest is *Public Attention*, the total number of firm *i*'s specialized disclosures downloaded from EDGAR by non-robots. Standard errors are clustered at the industry level. *t*/*z*-Statistics are reported in parentheses.***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. All continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in the appendix.

increase in *Conflict-Free Smelters* and a 4.5% increase in the likelihood of *Dissociation*.[28] These results are consistent with the reputational cost hypothesis, which postulates that reputational costs associated with a higher level of public attention shape corporate behavior (Christensen et al. [2017], Dambra, Even-Tov, and Naughton [2023]). Overall, our evidence demonstrates how regulation that promotes supply chain transparency can compel firms to source responsibly.

We utilize our smelter-level data to investigate whether there is increased demand for products refined in certified smelters. In our sample, the average firm discloses information on 170 smelters, some certified, some not.

[28] Information on specialized disclosures can also be found on firms' web sites or other channels, such as NGO reports. Therefore, the number of EDGAR log downloads of a firm's specialized disclosure may underestimate the public attention a firm receives.

To test whether SEC-issuers are more likely to source from smelters after they've received RMI certification, we estimate the following regression:

$$Demand_{j,t} = \beta_1 Certified\ Smelter_{j,t} + \eta_{c\#y} + \eta_{sm} + \varepsilon_{j,t}, \quad (2)$$

where $Demand_{j,t}$ is the number of times that smelter j appears as a supplier for our entire sample of SEC-issuers during year t. *Certified Smelter* is an indicator variable equal to 1 if smelter j appears as a certified smelter in the annual list of certified smelters for year t, and 0 otherwise. Further, we control for the characteristics of the country that hosts the smelter by employing country × year fixed effects ($\eta_{c\#y}$), which should absorb the effect of any time-varying shocks at the country level that could coincide with demand for products made in certified smelters. Finally, we introduce smelter fixed effects (η_{sm}) to account for time-invariant unobserved heterogeneity at the smelter level. To the extent that the demand for a smelter j's products increases after smelter j becomes certified in year t, we would expect β_1 to be positive and statistically significant.

Table 3 presents our findings on the real effects of Section 1502 at the smelter level. In panel A, we observe a temporal increase in the demand for products made from both certified (column 1) and noncertified smelters (column 2). However, in column 3, we find evidence of a diverging gap in demand between the two groups, with a greater increase in demand for 3TG products made in certified smelters. In panel B, we present our results for estimating equation (2) and find strong evidence of increased demand for 3TG products made in certified smelters.[29] In terms of economic magnitude, the coefficient in column (1) suggests that a certified smelter is listed by about 23 more SEC-issuers on their Form SD. Our results remain robust when we regress changes in *Demand* on the change to a *Certified Smelter* in column (2). Overall, our findings in table 3 demonstrate the potential link between responsible sourcing and reduced incentives for armed groups to capture 3TG mines in covered countries.

The real effects documented in tables 2 and 3 indicate far-reaching changes across the global supply chains of numerous SEC-issuers' upstream operations. These changes can be linked back to the raw-mineral certification process, highlighting its potential to bear significant impact on responsible sourcing.

4.2 CONFLICTS IN COVERED COUNTRIES

4.2.1. Sample Selection, Variable Definitions, and Descriptive Statistics. To analyze how Section 1502 impacts conflicts in covered countries' mining regions, we assemble a PRIO-GRID/year-level panel data set that includes 53 African countries represented by roughly 10,000 cells. Specifically, drawing

[29] We drop 93 singleton observations when we run our regressions, which explains the difference in the number of observations between the descriptive statistics and the multivariate analysis.

TABLE 3
Smelter Certification and Market Demand

Panel A: Univariate analysis

	(1) *Certified Smelter* = 1			(2) *Certified Smelter* = 0			(3) Diff.
	n	Mean	SD	n	Mean	SD	(1) − (2)
2014	64	65.02	52.38	137	50.31	57.27	14.70**
2015	142	125.84	108.84	100	79.90	101.37	45.94***
2016	187	221.70	81.49	78	166.22	121.42	55.48***
2017	195	423.66	125.55	92	280.89	22.09	182.18***
2018	174	435.53	110.27	115	334.51	183.32	101.02***
All years	762	291.18	175.15	522	176.55	183.34	114.63***

Panel B: Multivariate analysis

	(1) *Demand*	(2) Δ*Demand*
Certified Smelter	23.148***	
	(3.75)	
Δ*Certified Smelter*		16.672*
		(1.85)
Smelter fixed effects	Yes	Yes
Country × Year fixed effects	Yes	Yes
Adjusted R^2	0.846	0.458
Observations	1,191	899

This table presents our smelter-level analyses. Panel A presents a univariate analysis of the *Demand* using smelters, partitioned by whether *Certified Smelter* = 1 or 0. *Demand* is the number of firms that source from smelter *j* during year *t*. Column (3) shows the difference in means between columns (1) and (2). Column (1) of panel B reports the regression of *Demand*, the number of firms that disclose smelter *j* in year *t*, on *Certified Smelter*, which is an indicator variable that equals 1 if smelter *j* is registered as a certified smelter by RMI in year *t*, and 0 otherwise. Column (2) of panel B reports the regression of Δ*Demand*, the change in the number of firms that disclose smelter *j* in year *t*, on Δ*Certified Smelter*, a smelter that shifts to a certification approach for conflict minerals, and includes smelter and country × year fixed effects. Standard errors are clustered at the smelter level. *t*-Statistics are reported in parentheses.***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. All continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in the appendix.

upon Berman et al. [2017] design, we create a geo-referenced panel data set that divides the continent of Africa into 10,335 subnational units (i.e., square cells 55 × 55 km in area at the equator), covering the period from 2010 to 2019. This data set covers virtually all of Africa's terrestrial regions with a resolution of 0.5 × 0.5 longitude and latitude across 10 years. We supplement these data with RMD, which provides the locations of large-scale (industrial) mining sites.

Berman et al. [2017] note that violence is likely to be spatially concentrated around mining regions and that conflicts in one mining cell can spill over to neighboring cells (e.g., due to the roaming of armed groups). Harari and La Ferrara [2018] also document that conflicts exhibit high spatial persistence; conflicts in an individual cell elevate the probability that neighboring cells will experience conflicts during the same year. Hence, we

define *Mining Region* as an indicator variable equal to 1 if cell *k* contains a mine and/or any of its neighboring cells contain a mine, and 0 otherwise.[30] We define *Post* as an indicator variable equal to 1 for years after 2014, and 0 otherwise. We define *Covered Country* as an indicator variable equal to 1 if a country is designated as a covered country under Section 1502, and 0 otherwise.

Next, following the extant economics and political science literature examining conflicts in Africa (e.g., Berman et al. [2017], Harari and La Ferrara [2018]), we obtain data from the ACLED (Raleigh et al. [2010]) on conflict events between 2010 and 2019.[31] In accordance with prior research, we merge the ACLED data with the geo-referenced panel data set after collapsing conflict information at the cell/year level. We remove cells that correspond to the four nations where conflicts were not reported in ACLED data during our sample period.[32] Our variable *Conflict* is measured at the cell/year level and denotes an indicator variable equal to 1 when at least one conflict occurs in a cell *k* during year *t*, and 0 otherwise. The appendix presents detailed variable definitions. Finally, to mitigate the effect of outliers, we winsorize all continuous variables at the 1st and 99th percentiles. Our sample consists of 103,240 cell/year observations inclusive of 49 African countries. Table 4 presents descriptive statistics for our sample. The average number of conflicts is 0.943 per cell. Cells of covered countries account for 22.4% and mining regions account for 19.7% of all cells.

4.2.2. Empirical Analysis of Impact of Responsible Sourcing on Conflicts in Covered Countries. To test our second hypothesis, we employ a DDD research design and compare changes in the average level of conflicts in the mining and nonmining regions of covered countries to those of noncovered

[30] Our decision to include surrounding cells is consistent with field experts (Vlassenroot and Raeymaekers [2004], Raeymaekers [2010]), who state that conflict minerals impact communities in the mine's surrounding areas and with prior literature that documents spillover effects when cell sizes are defined as 55 km × 55 km (Maystadt et al. [2014], Berman et al. [2017], Harari and La Ferrara [2018]).

[31] According to ACLED, its coding process "assures that it is accurate, comprehensive, transparent, and regularly updated. Data are posted as they are complete, although there are ongoing checks to ensure the thoroughness of previously collected events. ACLED data are coded by a range of experienced researchers who collect information primarily from secondary source information and apply the guidelines outlined in the codebook to extract information from news reports. ACLED data are collected each week after individual researchers have scrutinized the information from reports; they are then aggregated and revised by the first coding reviewer, investigated and cross-checked by the second reviewer and then event notes and details are inspected by the third and final reviewer. The process is designed to assure: (1) validity through intra- and inter-coder checks; (2) accuracy to correct mistakes in coding; and (3) relevance by determining whether each compiled event constitutes an act of political violence or protest."

[32] These four countries are Sao Tome and Principe, Rep. of Mauritius, Union of Comoros, and the Rep. of Cape Verde.

TABLE 4
Descriptive Statistics of PRIO-GRID Sample

	n	Mean	SD	Min	Q1	Median	Q3	Max
Conflicts (# of conflicts)	103,240	0.943	3.735	0.000	0.000	0.000	0.000	28.000
Conflict	103,240	0.162	0.368	0.000	0.000	0.000	0.000	1.000
Covered Country	103,240	0.224	0.417	0.000	0.000	0.000	0.000	1.000
Mining Region	103,240	0.197	0.398	0.000	0.000	0.000	0.000	1.000

This table presents summary statistics for the variables used in our PRIO-GRID analysis. The sample period spans 2010–2019. All continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in the appendix.

countries. We estimate the following regression:

$$Conflict_{k,t} = \beta_1 Post \times Mining\ Region \times Covered\ Country_{k,t} + \eta_{m\#t} + \eta_{c\#t} + \eta_k + \varepsilon_{k,t}, \quad (3)$$

where the variable *Conflict* is measured at the cell/year level. We include mining region × year (i.e., $\eta_{m\#t}$), country × year (i.e., $\eta_{c\#t}$), and cell (η_k) fixed effects: the mining region–year interactive fixed effects should alleviate any potential (un-)observed variations in mining region characteristics; the country–year interactive fixed effects absorb the effects of time-varying institutional and political factors at the national level that coincide with Section 1502's implementation; and the cell fixed effects should account for time-invariant co-determinants of local conflicts, such as weak state capacity, property rights enforcement in remote places, and latent political instability (Berman et al. [2017]).

Table 5, column (1), presents the results of estimating equation (3). Our focus is on the triple interaction term *Post* × *Mining Region* × *Covered Country*. Thus, we compare the pre-post difference in conflicts in covered countries' mining regions and covered countries' nonmining regions with the pre-post difference in conflicts in noncovered countries' mining regions and noncovered countries' nonmining regions. In this DDD model, the country × year fixed effects subsume both the simple year effects and the country effects. Further, because cells represent subnational units that are more granular than countries, the cell fixed effects subsume the simple country effects and the mining region–country interactive effects. Thus, the main effects of *Post*, *Covered Country*, and *Mining Region* are subsumed by our fixed effects' structure. Additionally, the *Post* and *Covered Country* interaction term and the *Covered Country* and *Mining Region* interaction terms are subsumed by country × year and cell fixed effects, respectively. The results show that the coefficient of interest is negative and significant, indicating that the probability of having at least one conflict in covered countries' mining regions is 3.3 percentage points lower relative to other regions. This suggests that the actions companies take in alignment with

TABLE 5

Conflicts in Mining Regions of Covered Countries Pre- and Post-Regulation

	Conflict (1)	*Conflicts* (2)
Post × *Mining Region* × *Covered Country*	−0.033**	−0.424***
	(−2.28)	(−5.34)
Cell fixed effects	Yes	Yes
Mining region × Year fixed effects	Yes	Yes
Country × Year fixed effects	Yes	Yes
Observations	103,240	41,690

This table presents the regression results of differential changes in conflicts pre- and post-regulation between the mining and nonmining regions of covered countries to the difference between mining and nonmining regions of noncovered countries. We include cell, mining region × year, and country × year fixed effects. The sample period spans 2010−2019. *Conflict* in column (1) is an indicator variable equal to 1 if at least one conflict occurs in cell *k* during year *t*. *Conflicts* in column (2) is the number of conflicts in cell *k* during year *t*. *Post* is an indicator variable equal to 1 for years after 2014. *Covered Country* is an indicator variable equal to 1 if the cell is within the DRC or an adjoining country. *Mining Region* is an indicator variable equal to 1 if the cell contains a mine or neighbors a cell containing a mine. Column (1) presents the linear probability regression, while column (2) presents the conditional fixed effects Poisson regression results. *t*-Statistics, based on Conley [1999] standard errors, allowing for spatial correlation within a 500-km radius and for infinite serial correlation, are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. All continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in the appendix.

Section 1502's enhanced supply chain transparency regulation can alleviate conflicts.[33]

To evaluate the robustness of our findings and gain a deeper understanding of the effects of regulation on conflict intensity variations, we focus on the number of conflicts (*Conflicts*) as our dependent variable. Following prior literature, we estimate the conditional fixed effects Poisson model (Hausman, Hall, and Griliches [1984]). This model provides consistent and reasonably efficient estimates when analyzing count data (Gourieroux, Montfort, and Trognon [1984], Cohn, Liu, and Wardlaw [2022], Chen and Roth [2023]).

Table 5, column (2), presents our results from the Poisson regression. The results show that the coefficient of interest is negative and significant. In economic terms, we find that the average number of conflicts in the mining regions of covered countries is lower by 34.6% (i.e., $e^{-0.424} - 1 = -34.6\%$) relative to other regions.[34] Such results continue to reinforce the

[33] Although we observe a more significant reduction in conflicts around mining regions in covered countries compared to nonmining regions and mining regions in noncovered countries, our univariate figure in online appendix OA-11 suggests that overall conflicts in covered countries' mining regions may not have decreased but instead remained relatively stable compared to conflicts in noncovered countries' mining regions. Consequently, we advise caution in interpreting our findings. Moreover, it is essential to recognize that traceability systems, certification schemes, and other initiatives collectively contribute to achieving Section 1502's objectives.

[34] The number of observations differ from the main result because the conditional fixed effects specification drops observations corresponding to cells for which there is no variation in activity over the entire observation period.

notion that responsible sourcing, when aligned with appropriate regulations, has the potential to mitigate conflicts.

4.2.3. Parallel Trends and Robustness. Our DDD research design relies on the parallel trends assumption (Bertrand, Duflo, and Mullainathan [2004], Gow, Larcker, and Reiss [2016], Cuny, Even-Tov, and Watts [2021]). To gauge the plausibility for this, we conduct several tests. First, we follow Angrist and Pischke [2009] and Lechner [2011] and use pre-treatment period indicator variables. Olden and Møen [2022] state that the triple difference estimator requires only one parallel trends assumption to hold. As such, we employ a mining regions subsample to test the parallel trends assumptions.[35] In this test, we replace the *Post* × *Covered Country* indicator with separate interactions for each of the years in our sample (except for 2014, which serves as the benchmark). The results of this analysis are presented in figure 1. In support of the parallel trends assumption, figure 1 shows that the estimated treatment effects in the pre-treatment period are close to zero and statistically indistinguishable from the benchmark period. In line with the notion that Section 1502 suppresses conflicts in covered countries, during the post-regulation period, treated cells exhibit a gradually decreasing level of conflicts relative to control cells. The gradual decrease in the coefficient estimates is consistent with the supposition that armed groups are unlikely to abruptly halt their activities and that regulatory changes take time to materialize (Christensen, Maffett, and Rauter [2024]).[36]

Second, to evaluate the potential impact of unobservable factors on the common time trend in both the treatment and control groups, we use a generalized synthetic control estimator (Xu [2017], Liu, Wang, and Xu [2024]). This approach allows us to construct a control group based on a convex combination of control units that closely match the characteristics

[35] In this analysis, we do not compare mining and nonmining regions; instead, we compare the changes in conflicts in the mining regions of covered countries to contemporaneous changes in the mining regions of noncovered countries after Section 1502's implementation. We estimate the following regression: $Conflict_{k,t} = \beta_1 Post \times Covered\ Country + \beta_{2-5} Controls_{c,t} + \eta_k + \eta_t + \varepsilon_{k,t}$. We add several country-level controls to our model. Specifically, we collect information about country-level economic activity from TheGlobalEconomy.com, which contains over 300 economic indicators for over 200 countries culled from multiple sources, including the World Bank, the World Economic Forum, and the World Governance Index. We include the following variables as control variables: (1) gross domestic product (GDP) per-capita, (2) labor force, (3) unemployment rate, and (4) political stability. See online appendix OA-11 for more details on this analysis.

[36] To further confirm the validity of the parallel trends assumption, we examine univariate trends for the treatment group of mining regions of covered countries and the control group of mining regions in noncovered countries. The figure presented in online appendix OA-11 supports the parallel trends assumption.

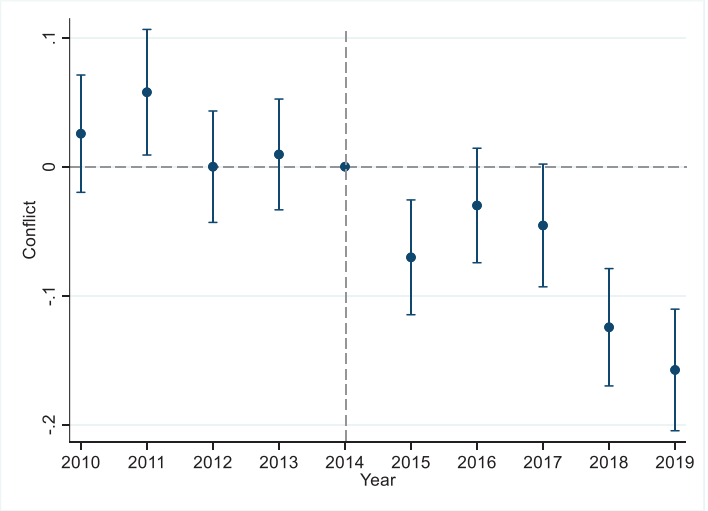

FIG 1.—Coefficients on year dummy × covered country in mining regions. This figure presents the regression coefficient estimates in footnote 35 (on the x-axis) and 95% confidence intervals (on the y-axis) for the analysis estimating the effects of the post-regulation decrease in conflicts for each year. The sample period spans 2010−2019. We estimate *Year* × *Covered Country* with separate interactions for each of the years in our sample (except for 2014, which serves as the benchmark). *Year* is a set of indicator variables for each year in our sample period. The vertical dotted line partitions our sample by pre- and post-regulation years (i.e., 2015–2019 are post-regulation). *Conflict* is an indicator variable equal to 1 if there is at least one conflict in cell *k* during year *t*. Standard errors are clustered at the cell level. All continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in the appendix.

of the treatment units exposed to the intervention, providing a better comparison than any comparison unit alone.[37]

In figure 2, we plot the estimated average real effects of *Conflict* over our sample period. We find a statistically significant and negative coefficient after Section 1502's implementation, indicating that our inferences are robust to reweighting and matching pre-exposure trends. During the pre-period, treatment effects are statistically insignificant. In online appendix OA-11, we gauge the plausibility of our parallel trends assumptions by including a longer pre-period (eight years) from 2007 to 2019 rather than balanced pre- and post-periods and find support for our assumptions. In addition, we show that our results are robust to a placebo test, different

[37] As noted by Athey and Imbens [2017], the synthetic control approach is arguably the most important innovation in the policy evaluation literature in the last 15 years. As such, this method has been widely used in empirical research to match the treated units' trends prior to the policy intervention, and to control for the effect of unobservable factors (Acemoglu, et al. [2016], Tomy [2019], Cascino et al. [2021], Hail et al. [2021], Fiechter et al. [2022]).

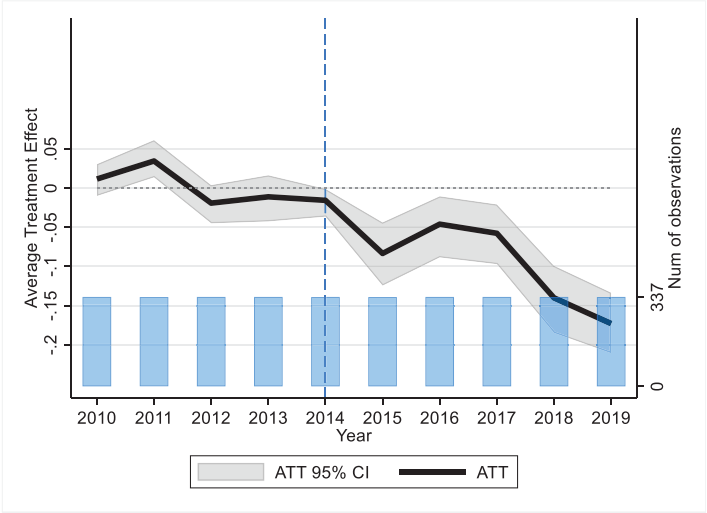

FIG 2.—Estimated average treatment effect: Synthetic controls method. This figure presents the estimated average treatment effect (on the y-axis) in the mining regions of covered countries (blue line) using synthetic controls over our sample period. The sample period spans 2010–2019. This figure shows the variation in *Conflict*, an indicator variable equal to 1 if there is at least one conflict in cell *k* during year *t*. For each panel, years are displayed on the x-axis. The vertical dotted line partitions our sample by pre- and post-regulation years (i.e., 2015–2019 are post-regulation). All continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in the appendix.

specifications of spatial and serial correlation adjustment, and equivalence tests.

4.2.4. The Role of Political Institutions. Prior research finds that institutional quality influences the effect of mineral wealth on a country's resource curse (Mehlum, Moene, and Torvik [2006]). Robust and accountable institutions prevent resource misappropriation (Robinson, Torvik, and Verdier [2006]); thus we expect to observe a more significant decrease in conflicts in countries with weak political institutions, where the resource curse is likely to be more prevalent. To test this prediction, we follow Christensen, Maffett, and Rauter [2024] and divide the covered countries based on the strength of their political institutions. Specifically, we classify countries' political institutions as strong or weak based on the Center for Systemic Peace's Polity IV Democracy Index published in 2010. The Polity IV index ranks countries' political institutions on a scale of −10 (autocracy) to 10 (full democracy). If a country's Polity IV score is less than 6, which represents the threshold for a democracy, we assign the country to the weak political institution group (i.e., nondemocracies). To test the different effects of the SEC mandate on covered countries with strong and weak political institutions, we estimate equation (3) separately in each group.

Table 6 presents the results of our analysis. We find a statistically significant decline in conflicts in countries with weak political institutions

TABLE 6
Role of Political Institutions

	Democracy (1) *Conflict*	Nondemocracy (2) *Conflict*
Post × *Mining Region* × *Covered Country*	0.003	−0.048***
	(0.12)	(−2.60)
F-test: (1) – (2)	0.051* (1.89)	
Cell fixed effects	Yes	Yes
Mining region × Year fixed effects	Yes	Yes
Country × Year fixed effects	Yes	Yes
Observations	21,630	70,550

This table captures whether institutional quality plays a role in the relationship between Section 1502 and conflicts. We use a linear probability model. The sample period spans 2010–2019. *Conflict* is an indicator variable equal to 1 if at least one conflict occurs in cell *k* during year *t*. *Post* is an indicator variable equal to 1 for years after 2014. *Mining Region* is an indicator variable equal to 1 if the cell contains a mine or neighbors a cell containing a mine. *Covered Country* is an indicator variable equal to 1 if the cell is within the DRC or an adjoining country. The results show the differential changes in the number of conflicts pre- and post-regulation between the mining and nonmining regions of covered countries to the difference between mining and nonmining regions of noncovered countries. We include cell, mining region × year, and country × year fixed effects. Column (1) presents the results focusing only on democracies. Column (2) presents the results focusing only on nondemocracies. *t*-Statistics based on Conley [1999] standard errors, allowing for spatial correlation within a 500-km radius and for infinite serial correlation, are in parentheses. F-test compares the magnitude of the coefficients on *Conflict* between columns (1) and (2).***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. All continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in the appendix.

(column 2) and an insignificant decrease in countries with strong political institutions (column 1). Additionally, we find a more pronounced effect in countries with weak political institutions, consistent with external economic shocks exerting greater influence over nondemocratic nations. We reason that the resource curse has been more prevalent in nondemocratic nations because they have not been able to control the misappropriation of resources. In online appendix OA-12, we report our parallel trends and robustness tests.

4.2.5. The Sensitivity of Conflict Risk to Global Commodity Price Spikes. In this subsection, we explore additional exogenous shocks within the sample period to further gauge Section 1502's impact on conflicts. Our evidence thus far does not track the relationship between profitability from conflict minerals sales and armed groups' propensity for violence. To explore this effect, we draw from prior studies in economics and political science that leverage exogenous price shocks in the international commodity markets to examine the link between changes in resource rents and conflicts. In particular, by exploiting exogenous variations in world commodity prices, Berman et al. [2017] find that heightened mineral prices increase conflict risk in the commodity's mining regions. Miner [2013] also finds that global shocks to the price of tantalum are followed by increased violence in Africa near those mines. The underlying premise of these studies is that rising (falling) commodity prices increase (decrease) resource rents, thus rendering conflicts more (less) feasible and the extraction site a more (less)

TABLE 7
Mineral Price, Regulation, and Conflicts

	Conflict
Post × *Covered Country* × *Price*	–0.013***
	(−3.94)
Price	0.093
	(1.48)
Cell fixed effects	Yes
Year fixed effects	Yes
Observations	8,940

This table presents LPM regression results from testing whether conflict-price sensitivity diminishes in covered countries' mining regions after Section 1502 takes effect. The sample period spans 2010−2019. *Conflict* is an indicator variable equal to 1 if at least one conflict occurs in cell k during year t. *Post* is an indicator variable equal to 1 for years after 2014. *Covered Country* is an indicator variable equal to 1 if the cell is within the DRC or an adjoining country. *Price* is the natural logarithm of (1 + world price of mineral m) during year t, where world price of mineral m is obtained from the U.S. Geological Survey for 2T prices and the World Bank Commodities prices data set for gold prices. This table includes cell and year fixed effects. t-Statistics based on Conley [1999] standard errors, allowing for spatial correlation within a 100-km radius and for infinite serial correlation, are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. All continuous variables, except for *Price*, are winsorized at the 1st and 99th percentiles. All variables are defined in the appendix.

valuable prize for armed actors, increasing (decreasing) the likelihood of conflict outbreaks.[38]

Drawing from this body of literature, we test whether Section 1502 dampens armed groups' profitability from price spikes, as rents not only vary with the value of resources, but also with the armed actors' capacity to sell the commodity. We focus on regions of conflict minerals mining and employ the following research design:

$$Conflict_{k,t} = \beta_1 Post \times Covered\ Country \times Price^m_{k,t}\ \beta_2 Price^m_{k,t} + \eta_k + \eta_t + \varepsilon_{k,t}, \quad (4)$$

where $Price^m_{k,t}$ is the natural logarithm of (1 + world price of mineral m in year t) produced in cell k. We include cell (η_k) and year (i.e., η_t) fixed effects. We predict that conflict-price sensitivity will diminish in covered countries' mining regions after Section 1502 takes effect. Hence, we expect the coefficient of the triple interaction term (β_1) to be negative and significant and that of $Price^m_{k,t}$ (β_2) to be positive and significant.

We present our regression results in table 7. As expected, we find that the coefficient of the triple interaction term (β_1) is negative and significant. Our results are largely consistent with the notion that armed groups are less incentivized to engage in violence amid mineral price spikes, as certified smelters no longer purchase conflict minerals from regions controlled by those groups. In other words, our evidence suggests that conflict risk in

[38] The exogeneity of world mineral prices is generally assumed in these studies. We obtain data on world prices of minerals from the World Bank Commodities prices data set for gold and the US Geological Survey for the other conflict minerals. Our data on conflicts come from ACLED.

the covered countries becomes less sensitive to commodity price spikes after Section 1502 takes effect, alleviating concerns that concurrent changes unrelated to conflict minerals may explain our inferences. Overall, our results support Berman et al.'s finding that transparency measures may help to limit the effect of mineral price spikes on conflicts around mines.

For this analysis, we rely on RMD to distinguish between 3TG and non-3TG mines. However, doing so presents several challenges. First, Berman et al. only provide information about mines that produce minerals with available pricing data. As such, their data only include mines that produce 14 out of 25 minerals. Unfortunately, tungsten, one of our four minerals of interest, does not have available pricing and is thus not included in the RMD. Second, Berman et al.'s mining area is defined as the mineral with the highest output produced in that area. For example, even if a cell has both tin and copper mines, Berman et al. will only code it by the single most dominant mineral. Therefore, given significant clustering of different mines, RMD does not provide a clear distinction between 3TG (or more correctly 2TG) mines and others. Considering these limitations, we advise caution in interpreting our results.

4.2.6. The Impact of Responsible Sourcing on Conflicts in Eastern DRC's Mining Regions. Section 1502 defines 3TG minerals as conflict minerals. To speak more directly to 3TG and alleviate concerns that concurrent initiatives that do not explicitly target 3TG mining-related conflicts drive our results, we use data from the IPIS, an independent research institute that compiles detailed information about mineral mining within Eastern DRC. IPIS partners with the DRC's Ministry of Mines and other local independent civil society organizations to map small-scale (artisanal) mining sites. The first map was published in 2009, and subsequent updates have been published (Spittaels and Hilgert [2013], Jaillon et al. [2019]).

The identification strategy used in this section draws from Parker and Vadheim [2017] and Stoop, Verpoorten, and van der Windt [2018] and defines the treatment area based on the intersection of administrative territories impacted by the DRC governmental ban on artisanal mining (i.e., all 22 territories of North-Kivu, South-Kivu, and Maniema) and the administrative territories noted in the U.S. State Department's Section 1502 map of conflict mining zones (which also includes three territories in Katanga and two territories in Orientale). Specifically, we compare conflicts in treated and nontreated administrative territories within Eastern DRC while separately considering territories where 3T minerals and gold are mined.

Parker and Vadheim [2017] cite two key reasons why Section 1502 is more likely to affect extraction of 3T minerals than gold. First, most of the gold mined in the DRC supplies jewelry markets in Middle Eastern and Asian countries rather than the United States (de Koning [2011]). Second, gold is more difficult to trace to mines controlled by armed groups (i.e., easier to smelt and separate from excess rock, which can be used to trace a mineral to its extracted region; Sanchez de la Sierra [2020]). Alternatively,

TABLE 8
Descriptive Statistics of Eastern DRC Sample

	N	Mean	SD	Min	Q1	Median	Q3	Max
Conflicts (# of conflicts)	8,400	0.989	2.423	0.000	0.000	0.000	1.000	14.000
Conflict	8,400	0.278	0.448	0.000	0.000	0.000	1.000	1.000
CMD	8,400	0.193	0.395	0.000	0.000	0.000	0.000	1.000
3T Mines	8,400	9.671	18.595	0.000	0.000	0.000	8.000	78.000
Cassiterite (Tin) Mines	8,400	7.429	15.969	0.000	0.000	0.000	3.000	72.000
Coltan (Tantalum) Mines	8,400	1.800	5.714	0.000	0.000	0.000	1.000	39.000
Wolframite (Tungsten) Mines	8,400	0.443	1.305	0.000	0.000	0.000	0.000	7.000
Gold Mines	8,400	22.929	42.521	0.000	0.000	2.000	33.000	193.000
Dry Month Indicator	8,400	0.250	0.433	0.000	0.000	0.000	0.500	1.000
Wet Month Indicator	8,400	0.250	0.433	0.000	0.000	0.000	0.500	1.000

This table presents summary statistics for the variables used in our Eastern DRC analysis. The sample period spans 2010–2019. All continuous dependent variables are winsorized at the 1st and 99th percentiles. All variables are defined in the appendix.

3T minerals are extracted with excess rock that can help distinguish their origin (Lezhnev and Prendergast [2009]). Therefore, we expect Section 1502's impact to be greater in 3T mining territories than gold mining territories. Specifically, we estimate the following regression:

$$Conflict_{k,\tau} = \beta_1 CMD_{k,\tau} + \beta_2 CMD \times 3T_{k,\tau} + \beta_3 CMD \times G_{k,\tau} + \beta_{4-5} Controls_{k,\tau} + \eta_k + \eta_\tau + \varepsilon_{k,\tau}, \quad (5)$$

where $Conflict_{k,\tau}$ represents an indicator variable equal to 1 if at least one conflict occurs within a given territory k during month τ. The variables $3T_{k,\tau}$ and $G_{k,\tau}$ are continuous treatment variables indicating the number of 3T and G mines in a given territory k, respectively. To alleviate concerns related to endogenous mine closures, we measure the numbers of 3T and G mines in the pre-period. The variable *CMD* is a binary dummy variable that equals 1 for treated territories in Eastern DRC *after* Section 1502 takes effect in 2014, and 0 otherwise.[39] The coefficients β_2 and β_3 are our coefficients of interest, which interact $3T_{k,\tau}$ and $G_{k,\tau}$ with *CMD*; these coefficients estimate Section 1502's impact on the outcome variable $Conflicts_{k,\tau}$ in treated territories after 2014. Following prior literature (Parker and Vadheim [2017], Stoop, Verpoorten, and van der Windt [2018]), we control for dry and wet seasons, which account for exogenous shocks to agricultural income (i.e., opportunity costs of engaging in conflicts). Finally, η_k represents territory fixed effects and η_τ represents month fixed effects.

Table 8 provides descriptive statistics for the variables used in this analysis. The average territory in our Eastern DRC sample has 9.67 3T mining sites and 22.93 gold mining sites, in line with Stoop, Verpoorten, and van der Windt [2018]. Table 9 presents the results of the multivariate analysis.

[39] Treated territories in Eastern DRC are defined in the U.S. State Department's Section 1502 map of conflict mining zones. Specifically, these territories include all 22 territories of North-Kivu, South-Kivu, and Maniema; 3 territories in Katanga; and 2 territories in Orientale.

TABLE 9

Conflicts in Mining Regions in the Eastern DRC Pre- and Post-Regulation

	Conflict
CMD	0.107***
	(3.07)
CMD × *3T*	−0.003***
	(−2.62)
CMD × *G*	0.001***
	(3.30)
Controls	Yes
Territory fixed effects	Yes
Month fixed effects	Yes
Observations	8,400

This table presents LPM regression results of differential changes in conflicts pre- and post-regulation in Dodd–Frank treatment areas based on the number of 3T or gold mines in a given territory *k*. The sample period spans 2010−2019. *Conflict* is an indicator variable equal to 1 if at least one conflict occurs in territory *k* during month τ. *CMD* is an indicator variable equal to 1 for years after 2014 in Dodd–Frank treatment areas. *3T* is the number of tin, tantalum, or tungsten mines in territory *k*. *G* is the number of gold mines in territory *k*. We include controls for *Wet* and *Dry* seasons and territory and month fixed effects. *z*-Statistics based on Conley [1999] standard errors, allowing for spatial correlation within a 500-km radius and for infinite serial correlation, are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. All continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in the appendix.

We find that, post-regulation, there is a decrease in conflicts in the treated territories with a prevalence of 3T mining sites, but we also find evidence of an increase in conflicts in treated territories with a prevalence of gold mining, suggesting a displacement of violence from 3T mining sites to gold mining sites. For treated territories with the average number of 3T mines, the result implies a reduction of 22.80% in the average monthly probability of at least one conflict after Section 1502 takes effect.[40] For treated territories with the average number of gold mines, the result implies an increase in the average monthly probability of conflicts after Section 1502 takes effect. These results are in line with the IPIS report, suggesting diminished

[40] The calculation of the economic significance is as follows. The mean probability of a conflict in the treated territories prior to Section 1502 was 0.385 (untabulated). Hence, the positive and significant coefficient on *CMD* of 0.107 implies that the probability of conflict in treated territories increased by 27.79% after Section 1502. The mean probability of a conflict occurring prior to Dodd–Frank in a treated territory with at least one 3T mine was 0.360 (untabulated). The number of 3T mines in the treated territories ranged from 3 to 78, with a mean of 27.3, conditional on having at least one 3T mine (untabulated). Hence, the coefficient of –0.003 means the probability of a conflict occurring decreased by 27.3 x –0.003 = –0.082 in a treated territory with the mean number of 3T mines. This is a 22.8% decrease relative to the pre-Dodd–Frank mean of 0.360. The mean probability of a conflict occurring prior to Dodd–Frank in a treated territory with at least one gold mine was 0.364 (untabulated). The number of gold mines in the treated territories ranged from 1 to 193 with a mean of 63.3, conditional on having at least one gold mine (untabulated). Hence, the coefficient of 0.001 means the probability of a conflict occurring increased by 63.3 x 0.001 = 0.063 in a treated territory with the mean number of gold mines. This is a 17.3% increase relative to the pre-Dodd–Frank mean of 0.364. We note that most mines in the Eastern DRC are gold mines. Thus, readers should exercise caution when interpreting the overall effects on conflict in the Eastern DRC.

armed group presence and illegal taxation in mining areas where due diligence programs are implemented (i.e., 3T mines; Jaillon et al. [2019]). They are also consistent with Stoop, Verpoorten, and van der Windt [2018], who document the presence of conflict displacement using an earlier sample period. Overall, we provide new evidence and contribute to prior studies by showing that conflicts decrease in Eastern DRC's territories where 3T mines are prevalent following Section 1502's implementation. Our results are generally robust under a placebo test, various specifications of spatial and serial correlation adjustment, the inclusion of lagged conflicts, an alternative dependent variable, and controlling for linear time trends of territories (Conley [1999], [2010]]), and a conditional fixed effects Poisson model. We report these robustness tests in online appendix OA-13.

5. *Conclusion*

In 2010 Congress passed Dodd–Frank Act Section 1502, which directed the SEC to issue rules mandating disclosure of conflict minerals if deemed necessary for a company's production or product functionality. This study investigates Section 1502's real effects and extends prior research in several ways. First, we find that firms increase procurement from certified smelters when their CMDs garner greater public attention, implying that reputational repercussions can motivate responsible sourcing. Second, we find that when a smelter is certified, more SEC-issuers purchase 3TG products from them, reflecting a viable market for responsibly sourced 3TG. Third, using a sample of conflicts in Africa that spans 2010−2019 and a DDD approach, we show that Section 1502 effectively decreased conflicts in covered countries' mining regions relative to other regions after 2014, the year that the disclosure requirement took effect. Furthermore, consistent with reduced incentives for armed groups to engage in violence during mineral price spikes, we find that conflict-price sensitivity diminishes in the covered countries' mining regions after 2014. Finally, we focus on the Eastern DRC and find that conflicts decreased around territories with a prevalence of 3T mining sites. Concurrently, we find that conflicts increased around territories with a prevalence of gold mining sites, consistent with evidence of displacement of violence from 3T mining sites to gold mining sites (Stoop, Verpoorten, and van der Windt [2018]). Overall, our evidence suggests that supply chain transparency regulation can promote responsible sourcing, consequently reducing mineral-related conflicts in the DRC and its neighboring countries.

We acknowledge several limitations. First, we recognize that regulation does not occur in a vacuum (Leuz [2018]), and any improvements in social welfare in the covered countries are likely also attributable to concurrent diplomatic efforts and certification changes (Christensen [2022]). Although our DDD research design and additional analyses should help alleviate concerns that these forces explain our results, caution is war-

ranted regarding our evidence's support of a direct causal outcome of supply chain transparency. Second, although our study documents the potentially transformative role of targeted transparency regulation on firms' sourcing behavior and conflict mitigation in the covered countries, we do not explore its effect on overall social welfare. It is possible that the regulation has also engendered negative consequences, such as greater compliance costs, reduced economic growth, increased smuggling, and adverse effects on artisanal mining, which are often not part of regulated supply chains and are excluded from the market. As our study does not provide a comprehensive analysis of the regulation's costs and benefits, further research is warranted to evaluate its net social impact.

APPENDIX

Variable Definitions

Variable	Definition
Responsible Sourcing Variables:	
% Conflict-Free Smelters	The ratio of the number of conflict-free certified smelters and refiners to the number of total smelters and refiners
Dissociation	An indicator variable equal to 1 if there is evidence that a firm suspended or discontinued engagement with risky smelters and refiners after failed attempts at risk mitigation or corrective action, and 0 otherwise
Certified Smelter	An indicator variable equal to 1 if a smelter is registered as a certified smelter by RMI in year *t*, and 0 otherwise
Public Attention	The total number of firm *i*'s specialized disclosures downloaded from EDGAR by non-robots
Free Cash Flow	(Net Cash Flow from Operating Activities – Dividends)/Total Assets
ROA	Earnings Before Income Tax, Depreciation, and Amortization (EBITDA)/Total Assets
Leverage	(Long-Term Debt + Current Liabilities)/Total Assets
BTM	Total Assets / (Total Liabilities + Market Value)
Cash	The natural logarithm of (1 + Cash)
Sales	The natural logarithm of (Total Annual Sales)
Total Assets	The natural logarithm of (Total Assets)
Demand	The total number of times smelter *j* is listed as a supplier for any of the firms in our sample during year *t*
PRIO-GRID Analysis Variables	
Conflicts	A variable equal to the sum of conflicts occurring in cell *k* during year *t*, and 0 otherwise
Conflict	An indicator variable equal to 1 if at least one conflict occurs in cell *k* during year *t*, and 0 otherwise
Post	An indicator variable equal to 1 for years after 2014 (i.e., between 2015 and 2019), and 0 otherwise

Variable	Definition
Placebo_2011_2014	An indicator variable equal to 1 for years after 2010 (i.e., between 2011 and 2014), and 0 otherwise.
Placebo_2011_2016	An indicator variable equal to 1 for years after 2010 (i.e., between 2011 and 2016), and 0 otherwise.
Mining Region	An indicator variable equal to 1 if cell k hosts at least one mine or neighbors a cell that hosts at least one mine, and 0 otherwise
Covered Country	Defined by Section 1502 of the Dodd–Frank Act as the Democratic Republic of the Congo (DRC) and its nine "adjoining countries," which include Angola, Burundi, Central African Republic, the Republic of the Congo, Rwanda, South Sudan, Tanzania, Uganda, and Zambia
DRC	An indicator variable equal to 1 if the cell is within the Democratic Republic of the Congo (DRC), and 0 otherwise.
Democracy	An indicator variable equal to 1 if a covered country's Polity IV score is six or higher, the threshold for a Democracy, and 0 otherwise. The Polity IV score is based on the Center for Systemic Peace's Polity IV Democracy 2010 Index
GDP-per-capita	Gross domestic product (GDP) divided by mid-year population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products measured in U.S. dollars
Labor Force	The segment of the population that is 15 years or older and able to work
Male Unemployment Rate	The share of the male labor force that is without work but available for and seeking employment
Political Stability	The index of Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically motivated violence and terrorism. The index is an average of several other indexes from the Economist Intelligence Unit, the World Economic Forum, and the Political Risk Services, among others
Price	The natural logarithm of (1 + world price of mineral m) during year t, where the world price of mineral m is obtained from the U.S. Geological Survey for 3T prices and the World Bank Commodities prices data set for gold price
Eastern DRC Analysis Variables	
CMD	An indicator variable equal to 1 for years after 2014 in Dodd–Frank treated territories in the Eastern DRC defined in the U.S. State Department's Section 1502 map of conflict mining zones (i.e., all 22 territories of North-Kivu, South-Kivu, and Maniema; 3 territories in Katanga; and 2 territories in Orientale), and 0 otherwise
3T	The number of tin, tantalum, and tungsten mines in territory k
G	The number of gold mines in territory k
Wet/Dry	An indicator variable equal to 1 for territory k in a particular month if the long-run average precipitation for that month ranks among the highest/lowest three months (based on 1997−2015 precipitation averages), and 0 otherwise

REFERENCES

Acemoglu, D.; S. Johnson; A. Kermani; J. Kwak; and T. Mitton. "The Value of Connections in Turbulent Times: Evidence from the United States." *Journal of Financial Economics* 121 (2016): 368–91.

Aghamolla, C., and B. An. "Mandatory vs. Voluntary ESG Disclosure, Efficiency, and Real Effects." *Nanyang Business School Research Paper*, 2023: 22–41.

Amnesty International. "Digging for Transparency: How U.S. Companies are only Scratching the Surface of Conflict Minerals Reporting." Amnesty International (2015).

Angrist, J. D., and J. S. Pischke. "Instrumental Variables in Action: Sometimes You Get What You Need," in *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton, NJ: Princeton University Press, 2009: 113–220.

Athey, S., and G. W. Imbens. "The State of Applied Econometrics: Causality and Policy Evaluation." *Journal of Economic Perspectives* 31 (2017): 3–32.

Auty, R. M. *Sustaining Development in Mineral Economies: The Resource Curse Thesis*. London: Routledge, 1993.

Auty, R. M. "The Political Economy of Resource-Driven Growth." *European Economic Review* 45 (2001): 839–46.

Bafilemba, F.; T. Mueller; and S. Lezhnev. "The Impact of Dodd–Frank and Conflict Minerals Reforms on Eastern Congo's Conflict." The Enough Project (2014).

Bayer. "Dodd–Frank Section 1502: Post Filing Survey 2014." Development International (2015).

Berman, N.; M. Couttenier; D. Rohner; and M. Thoenig. "This Mine Is Mine! How Minerals Fuel Conflicts in Africa." *American Economic Review* 107 (2017): 1564–610.

Bertrand, M.; E. Duflo; and S. Mullainathan. "How Much Should We Trust Differences-in-Differences Estimates?" *The Quarterly Journal of Economics* 119 (2004): 249–75.

Bloem, J. R. "Good Intentions Gone Bad? The Dodd–Frank Act and Conflict in Africa's Great Lakes Region." *Economic Development and Cultural Change* 71 (2023): 621–66.

Cao, Y.; J. N. Myers; L. A. Myers; and T. C. Omer. "Company Reputation and the Cost of Equity Capital." *Review of Accounting Studies* 20 (2015): 42–81.

Cascino, S.; Tamayo, A.; and F. Vetter. "Labor Market Effects of Spatial Licensing Requirements: Evidence from CPA mobility." *Journal of Accounting Research* 59 (2021): 111–61.

Chang, S., and H. Christensen. "Nothing Gold Can Stay: Artisanal Mine Certifications and Conflict Dynamics in the Congo." University of Chicago, Becker Friedman Institute for Economics Working Paper (144), 2023.

Chase, M. "Conflict Minerals and the Democratic Republic of Congo". San Francisco: Business for Social Responsibility, 2010. Available at http://www.bsr.org/reports/BSR_Conflict_Minerals_and_the_DRC.pdf.

Chen, J., and J. Roth. "Logs with Zeros? Some Problems and Solutions." *The Quarterly Journal of Economics* (2023).

Cheng, Q.; Y. J. Cho; and H. Yang. "Financial Reporting Changes and the Internal Information Environment: Evidence from SFAS 142." *Review of Accounting Studies* 23 (2018): 347–83.

Christensen, H. B. "Is Corporate Transparency the Solution to Political Failure on our Greatest Problems? A Discussion of Darendeli, Fiechter, Hitz, and Lehmann (2022)." *Journal of Accounting and Economics* 74 (2022): 101542.

Christensen, H. B.; E. Floyd; L. Y. Liu; and M. Maffett. "The Real Effects of Mandated Information on Social Responsibility in Financial Reports: Evidence from Mine-Safety Records." *Journal of Accounting and Economics* 64 (2017): 284–304.

Christensen, H. B.; L. Hail; and C. Leuz. "Mandatory CSR and Sustainability Reporting: Economic Analysis and Literature Review." *Review of Accounting Studies* (2021): 1–73.

Christensen, H. B.; Maffett, M. G.; and Rauter, T.. "Policeman for the World: The Impact of Extraterritorial FCPA Enforcement on Foreign Investment and Internal Controls." *The Accounting Review* 97 (2022): 189–219.

Christensen, H. B.; M. G. Maffett; and T. Rauter. "Reversing the Resource Curse: Foreign Corruption Regulation and Economic Development." *American Economic Journal: Applied Economics* 16 (2024): 90–120.

Cohn, J. B.; Z. Liu; and M. I. Wardlaw. "Count (and Count-Like) Data in Finance." *Journal of Financial Economics* 146 (2022): 529–51.

Collier, P.; A. Hoeffler; and D. Rohner. "Beyond Greed and Grievance: Feasibility and Civil War." *Oxford Economic Papers* 61 (2009): 1–27.

Conley, T. G. "GMM Estimation with Cross Sectional Dependence." *Journal of Econometrics* 92 (1999): 1–45.

Conley, T. G. "Spatial Econometrics," in *Microeconometrics*. London: Palgrave Macmillan, 2010: 303–13.

Cuny, C.; O. Even-Tov; and E. M. Watts. "From Implicit to Explicit: The Impact of Disclosure Requirements on Hidden Transaction Costs." *Journal of Accounting Research* 59 (2021): 215–42.

Dambra, M.; O. Even-Tov; and J. Naughton. "The Economic Consequences of GASB Financial Statement Disclosure." *Journal of Accounting and Economics* 75 (2023): 101555.

Darendeli, A.; P. Fiechter; J. M. Hitz; and N. Lehmann. "The Role of Corporate Social Responsibility (CSR) Information in Supply-Chain Contracting: Evidence from the Expansion of CSR Rating Coverage." *Journal of Accounting and Economics* 74 (2022): 101525.

De Koning, R.. "Conflict Minerals in the Democratic Republic of the Congo: Aligning Trade and Security Interventions." Stockholm International Peace Research Institute (2011).

Diemel, J. A., and D. J. M. Hilhorst. "Unintended Consequences or Ambivalent Policy Objectives? Conflict Minerals and Mining Reform in the Democratic Republic of Congo." *Development Policy Review* 37 (2019): 453–69.

Dranginis, H. *Interrupting the Silence: Addressing Congo's Sexual Violence Crisis within the Great Lakes Regional Peace Process*. Washington, DC: Enough Project, 2014.

Dyreng, S. D.; J. L. Hoopes; and J. H. Wilde. "Public Pressure and Corporate Tax Behavior." *Journal of Accounting Research* 54 (2016): 147–86.

Fearon, J. D. "Primary Commodity Exports and Civil War." *Journal of Conflict Resolution* 49 (2005): 483–507.

Fiechter, P.; J. Hitz; and N. Lehmann. "Real Effects of a Widespread CSR Reporting Mandate: Evidence from the European Union's CSR Directive." *Journal of Accounting Research* 60 (2022): 1499–549.

Gourieroux, C.; A. Montfort; and A. Trognon. "Pseudo Maximum Likelihood Methods: Applications to Poisson Models." *Econometrica* 53 (1984): 701–20.

Government Accountability Office (GAO). Initial Disclosures Indicate Most Companies were Unable to Determine the Source of Their Conflict Minerals. GAO Publication No. 15–561, 2015.

Gow, I. D.; D. F. Larcker; and P. C. Reiss. "Causal Inference in Accounting Research." *Journal of Accounting Research* 54 (2016): 477–523.

Grossman, H. I. "Kleptocracy and Revolutions." *Oxford Economic Papers*, 51 (1999): 267–83.

Gylfason, T.. "Natural Resources, Education, and Economic Development." *European Economic Review* 45 (2011): 847–59.

Hail, L.; Muhn, M.; and Oesch, D.. "Do Risk Disclosures Matter When it Counts? Evidence from the Swiss Franc Shock." *Journal of Accounting Research* 59 (2021): 283–330.

Harari, M., and E. LA Ferrara. "Conflict, Climate, and Cells: A Disaggregated Analysis." *Review of Economics and Statistics* 100 (2018): 594–608.

Hartzmark, S. M., and A. B. Sussman. "Do Investors Value Sustainability? A Natural Experiment Examining Ranking and Fund Flows." *Journal of Finance* 74 (2019): 2789–837.

Hausman, J.; B. H. Hall; and Z. Griliches. "Econometric Models for Count Data with an Application to the Patents-R&D Relationship." *Econometrica* 52 (1984): 909–38.

Hirshleifer, J.. "The Paradox of Power." *Economics & Politics*, 3 (1991): 177–200.

International Resource Panel, United Nations Environment Programme. Sustainable Consumption and Production Branch. Decoupling Natural Resource Use and Environmental Impacts from Economic Growth. UNEP/Earthprint, 2011.

Jaillon, A.; A. Heuty; E. Gobbers; M. Claeys Bouuaert; and T. Makori. Assessing the Impact of Due Diligence Programmes in Eastern DRC: A Baseline Study. *International Peace Information Service*, 2019.

Kalkanci, B., and E. L. Plambeck. "Managing Supplier Social and Environmental Impacts with Voluntary Versus Mandatory Disclosure to Investors." *Management Science* 66 (2020): 3311–28.

Kang, J.; M. Loumioti; and R. Wittenberg-Moerman. "The Harmonization of Lending Standards Within Banks Through Mandated Loan-Level Transparency." *Journal of Accounting and Economics* 72 (2021): 101386.

Kanodia, C., and H. Sapra. "A Real Effects Perspective to Accounting Measurement and Disclosure: Implications and Insights for Future Research." *Journal of Accounting Research* 54 (2016): 623–76.

Khan, U.; S. G. Ryan; and A. Varma. "Fair Value Versus Amortized Cost Measurement and the Timeliness of Other-than-Temporary Impairments: Evidence from the Insurance Industry." *The Accounting Review* 94 (2019): 285–307.

Kim, Y. H., and G. F. Davis. "Challenges for Global Supply Chain Sustainability: Evidence from Conflict Minerals Reports." *Academy of Management Journal* 59 (2016): 1896–916.

Kraft, T.; L. Valdés; and Y. Zheng. "Motivating Supplier Social Responsibility under Incomplete Visibility." *Manufacturing & Service Operations Management* 22 (2020): 1268–86.

Krueger, P.; Z. Sautner; D. Y. Tang; and R. Zhong. "The Effects of Mandatory ESG Disclosure around the World." *European Corporate Governance Institute-Finanance Working Paper* 754 (2021): 21–44.

Lechner, M.. "The Estimation of Causal Effects by Difference-in-Difference Methods." *Foundations and Trends in Econometrics* 4 (2011): 165–224.

Leuz, C.. "Evidence-Based Policymaking: Promise, Challenges and Opportunities for Accounting and Financial Markets Research." *Accounting and Business Research* 48 (2018): 582–608.

Leuz, C., and P. D. Wysocki. "The Economics of Disclosure and Financial Reporting Regulation: Evidence and Suggestions for Future Research." *Journal of Accounting Research* 54 (2016): 525–622.

Lezhnev, S., and J. Prendergast. From Mine to Mobile Phone. Enough Project, 2009.

Liu, L.; Wang, Y.; and Xu, Y.. "A Practical Guide to Counterfactual Estimators for Causal Inference with Time-Series Cross-Sectional Data." *American Journal of Political Science* 68 (2024): 160–76.

Loch, M.; G. Mthembu-Salter; F. Schaap; and K. Loch. "Conflict Minerals: Over a Decade of Efforts and Impacts." (2023).

Loughran, T., and B. Mcdonald. "The Use of EDGAR Filings by Investors." *Journal of Behavioral Finance* 18 (2017): 231–48.

Lynn, D. M. "The Dodd–Frank Act's Specialized Corporate Disclosure: Using the Securities Laws to Address Public Policy Issues." *Journal of Business & Technology Law* 6 (2011): 327.

Manhart, A., and Schleicher, T.. "Conflict Minerals: An Evaluation of the Dodd–Frank Act and Other Resource-Related Measures." Freiburg: Öko-Institut, 2013.

Maystadt, J. F.; G. De Luca; P. G. Sekeris; and J. Ulimwengu. "Mineral Resources and Conflicts in DRC: A Case of Ecological Fallacy?" *Oxford Economic Papers* 66 (2014): 721–49.

Mehlum, H.; K. Moene; and R. Torvik. "Institutions and the Resource Curse." *The Economic Journal* 116 (2006): 1–20.

Miner, C. "Death, Cellphones, and International Mineral Prices: Violence Against Civilians in Africa." (2013).

Mizuno, T.; Ohnishi, T.; and Watanabe, T., "Structure of Global Buyer–Supplier Networks and Its Implications for Conflict Minerals Regulations." *EPJ Data Science* 5 (2016): 1–15.

Novak, J., and P. Bilinski. "Social Stigma and Executive Compensation." *Journal of Banking and Finance* 96 (2018): 169–84.

OECD. Monitoring and Evaluation Framework for the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas. OECD, 2022.

Olden, A., and J. Møen. "The Triple Difference Estimator." *The Econometrics Journal* 25 (2022): 531–53.

Parker, D. P., and B. Vadheim. "Resource Cursed or Policy Cursed? US Regulation of Conflict Minerals and Violence in the Congo." *Journal of the Association of Environmental and Resource Economists* 4 (2017): 1–49.

Polity IV. Political Regime Characteristics and Transitions, 1800–2015: Dataset Users' Manual. Center for Systemic Peace Report Project, 2016.

Prendergast, J., and F. Bafilemba. *Congo Stories: Battling Five Centuries of Exploitation and Greed.* UK: Hachette, 2018.

Raeymaekers, T.. "Protection for Sale? War and the Transformation of Regulation on the Congo–Ugandan Border." *Development and Change* 41 (2010): 563–87.

Raleigh, C.; A. Linke; H. Hegre; and J. Karlsen. "Introducing ACLED: An Armed Conflict Location and Event Dataset: Special Data Feature." *Journal of Peace Research* 47 (2010): 651–60.

Rauter, T.. "The Effect of Mandatory Extraction Payment Disclosures on Corporate Payment and Investment Policies Abroad." *Journal of Accounting Research* 58 (2020): 1075–116.

Robinson, J. A.; R. Torvik; and T. Verdier. "Political Foundations of the Resource Curse." *Journal of Development Economics* 79 (2006): 447–68.

Ross, M. L. "What Do We Know about Natural Resources and Civil War?" *Journal of Peace Research* 41 (2004): 337–56.

Roychowdhury, S.; N. Shroff; and R. S. Verdi. "The Effects of Financial Reporting and Disclosure on Corporate Investment: A Review." *Journal of Accounting and Economics* 68 (2019): 101246.

Sachs, J. D., and A. M. Warner. "Natural Resource Abundance and Economic Growth (No. w5398)." *National Bureau of Economic Research*, 1995.

Sanchez De La Sierra, R.. "On the Origin of States: Stationary Bandits and Taxation in Eastern Congo." *Journal of Political Economy* 128 (2020): 32–74.

Sarfaty, G. A. "Shining Light on Global Supply Chains." *Harvard International Law Journal* 56 (2015): 419.

Sarfaty, G. A. "Human Rights Meets Securities Regulation." *Virginia Journal of International Law* 54 (2013): 97.

Securities And Exchange Commission (SEC). "Final Rule: Conflict Minerals (November)." 2012. Available at https://www.sec.gov/rules/final/2012/34-67716.pdf.

She, G.. "The Real Effects of Mandatory Nonfinancial Disclosure: Evidence from Supply Chain Transparency." *The Accounting Review* 97 (2022): 399–425.

Shleifer, A., and R. W. Vishny. "Large Shareholders and Corporate Control." *Journal of Political Economy* 94 (1986): 461–88.

Spittaels, S., and F. Hilgert. Analysis of the Interactive Map of Artisanal Mining Areas in Eastern DR Congo. *International Peace Information Service*, 2013.

Stoop, N.; M. Verpoorten; and P. van der Windt. "More Legislation, More Violence? The Impact of Dodd–Frank in the DRC." *PloS One* 13 (2018): e0201783.

Tomar, S.. "Greenhouse Gas Disclosure and Emissions Benchmarking." *Journal of Accounting Research* 61 (2023): 451–92.

Tomy, R. E. "Threat of Entry and the Use of Discretion in Banks' Financial Reporting." *Journal of Accounting and Economics* 67 (2019): 1–35.

U.N. Security Council, 65TH Sess., 6324TH mtg. U.N. Doc. S/PV.6324 (May 28, 2010). 2010. Available at https://undoc.org/en/S/PV.6324.

Vlassenroot, K., and T. Raeymaekers. *Conflict and Social Transformation in Eastern DR Congo.* Academia Press, 2004.

Wang, Z.; A. Lee; and M. Polonsky. "Egregiousness and Boycott Intensity: Evidence from the BP Deepwater Horizon Oil Spill." *Management Science* 64 (2018): 149–63.

Xu, Y.. "Generalized Synthetic Control Method: Causal Inference with Interactive Fixed Effects Models." *Political Analysis* 25 (2017): 57–76.

YAWAR, S., and S. SEURING. "Management of Social Issues in Supply Chains: A Literature Review Exploring Social Issues, Actions and Performance Outcomes." *Journal of Business Ethics* 141 (2017): 621–43.

YOUNG, S. B. "Responsible Sourcing of Metals: Certification Approaches for Conflict Minerals and Conflict-free Metals." *The International Journal of Life Cycle Assessment* 23 (2018): 1429–47.