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Good Intentions Gone Bad? The Dodd Frank Act and Conflict in Africa's Great Lakes Region

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Good Intentions Gone Bad? The Dodd Frank Act and Conflict in Africa’s Great Lakes Region*

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Abstract

The Dodd-Frank Act imposes reporting requirements on US companies regarding the presence of ‘conflict minerals’ in their supply chains. The explicit intention of this policy is to reduce the violence and conflict in Africa’s Great Lakes Region allegedly funded in part by the international trade of ‘conflict minerals’. Despite broad agreement in the goal to reduce the United States’ role in supporting armed conflict around the world, the implementation of this legislation is controversial. I empirically analyze the impact of the Dodd-Frank Act on the prevalence of conflict events in the Democratic Republic of the Congo and surrounding countries. Difference-in-differences estimates show that the Dodd-Frank Act increased the probability of conflict at the second sub-national administrative level. These results are robust to permutation tests and synthetic control estimation. Therefore this study finds evidence of unintended consequences of mandatory reporting requirements as a stand-alone policy designed to reduce conflict.

Keywords: Conflict Minerals, Civil War, International Trade Policy, and Policy Analysis

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“In the Congo, despite the occasional hue and cry raised by the media, corporate responsibility has been largely ignored—the supply chain is more convoluted, passing through traders, brokers, smelters, and processing companies. The tin and coltan that come from the Congo are mixed with those from Brazil, Russia, and China before they make it into our cell phones and laptops. There is a burgeoning consensus in international law that we should care about the conditions under which the products we consume—sweatpants, sneakers, and even timber—are produced. If we can hold companies accountable for their business practices, we will give an incentive to the Congolese government to clean up the mining sector. The ‘conflict minerals’ legislation signed into law by President Obama in July 2010 is a step, albeit a small one, in the right direction” - Stearns, J. (2012) *Dancing in the Glory of Monsters: The Collapse of the Congo and the Great War of Africa*

“When his father could no longer make enough money from the tin mine, when he could no longer pay for school, Bienfait Kabesha ran off and joined a militia. It offered the promise of loot and food, and soon he was firing an old rifle on the front lines of Africa’s deadliest conflict. He was 14.” - Raghavan, S. (2014) *The Washington Post*

1 Introduction

Over the past two decades, somewhere between 2 and 6 million people have been killed due to violent conflict in the Democratic Republic of Congo (DRC) and surrounding countries.¹ The presence of such conflict also stalls and even reverses economic development and efforts to alleviate poverty. A popular narrative maintains that armed rebel groups control mineral mines and earn a substantial portion of their revenues through exports of tin, tantalum, tungsten, and gold (3TG). In 2010, US lawmakers designed and passed legislation with the intentions of severing the connection between US consumers and armed rebel groups and therefore reducing conflict in Africa’s Great Lakes Region. Section 1502 of the Dodd Frank Wall Street Reform and Consumer Protection Act, requires companies registered with the US Securities and Exchange Commission (SEC) to disclose whether the minerals in their supply chain are sourced in mines connected to armed groups. In particular, companies must perform due diligence about whether any of these minerals in their supply chain originated in the DRC and surrounding countries.²

The passage of this legislation was, and remains, controversial. US companies, who are most directly affected by this law, claim that compliance costs impose an undue burden on US manufacturing.³ Critics also claim that the policy is built on faulty assumptions about the actual causal

¹See Spagat et al. (2009) for a discussion on the statistical discrepancies of estimating war deaths.

²The full list of covered countries includes the DRC and any country that shares a national boarder with the DRC: Angola, Burundi, Central African Republic, the Democratic Republic of Congo, the Republic of Congo, Rwanda, South Sudan, Tanzania, Uganda, and Zambia.

³There is large discrepancy in estimates of the total compliance cost. The U.S. Securities and Exchange Commission estimates the cost is \$71 million, while the National Association of Manufacturers estimates the cost are between \$9 and \$16 billion.

factors of conflict in Africa’s Great Lakes Region. Ultimately, civil conflict and violence in the DRC and surrounding countries is driven by poverty, land use, corruption, local political and social frustrations, and hostile relationships between a myriad of local actors (Autesserre 2012; Geenen 2012; Seay 2012; Radley and Vogel 2015; Vogel and Raeymaekers 2016). This raises an important question: What is the impact of the Dodd Frank Act on the prevalence of conflict in the DRC and surrounding countries?

Numerous studies examine the impacts of the Dodd Frank Act on livelihoods in the DRC (Cuvelier et al. 2014; Greenen 2012; Radley and Vogel 2015; Vogel and Raeymaekers 2016). Although these studies provide suggestive evidence that the Dodd Frank Act may have unintended consequences, they ultimately struggle to pin down the causal relationship between the Dodd Frank Act and conflict (Stearns 2014). More recent contributions compare outcomes in geographic areas within the DRC with ‘conflict mineral’ mines to those without 3TG mines and find additional evidence that, while well-intentioned, the Dodd Frank Act may be causing harm in the DRC (Parker and Vadheim 2017; Parker et al. 2016). These studies provide an important and worthwhile methodological improvement, in terms of causal identification, but still may suffer from endogeneity issues. As Maystadt et al. (2014) note, the relationship between minerals and conflict in the DRC may possess characteristics of an ecological fallacy; whereby extraction of minerals is not linked to conflict when analyzing data within territories, but is linked to conflict across territories. If conflict spreads within countries, rather than remaining isolated within given local geographical areas, then causal estimates of the impact of the Dodd Frank Act—based on within country comparisons—may be biased.⁴ Therefore, empirical analysis that examines across-country variation in the coverage of the Dodd-Frank Act provides a worthwhile addition to the existing evidence on its effects in the DRC and surrounding countries.

I analyze the impact of the Dodd Frank Act using data from the Armed Conflict Location and Event Data (ACLED) project. To estimate the impact of this legislation, I use a difference-in-differences estimation strategy. This method compares the prevalence of conflict over time at the second sub-national administrative level across countries covered by the Dodd Frank Act and other sub-Saharan African countries not covered by the legislation. These estimates provide additional insight into the causal impacts of the Dodd Frank Act in the DRC (Parker and Vadheim 2017; Parker et al. 2016). This study is also closely related to the existing literature on the impacts of

⁴Technically, if conflict spills over from geographic areas with 3TG mineral mines into areas without 3TG mineral mines, then the stable unit treatment value assumption (SUTVA) is violated.

international trade regulations on locally extracted natural resources and civil conflict (Janus 2012) and the relationship between commodity price fluctuations and conflict (Bellemare 2015; Dube and Vargas 2013; Fearon 2005; Koren 2018).

I find results that suggest substantial unintended consequences within the DRC stemming from the passage of the Dodd Frank Act. Impact estimates show that the Dodd Frank Act roughly doubled the probability of conflict at the second sub-national administrative level within the DRC. This general result of the Dodd Frank Act increasing the probability of conflict persists even when disaggregating conflict into different types of conflict. Violence against civilians, rebel group battles, riots and protests, and deadly conflict all increase within the DRC and are plausibly caused by the passage of the Dodd Frank Act. These results are robust to a variant of Fisher’s permutation test (Fisher, 1935; also see Buchmueller et al. 2011; Cunningham and Shah 2017), and to synthetic control estimation (Abadie et al. 2010; 2015).

Although the DRC is the primary focus of the Dodd Frank Act, the legislation also regulates minerals from countries that boarder the DRC as well. A complete evaluation of the impact of the Dodd Frank Act should therefore consider the prevalence of conflict in these countries. This analysis also examines the impact of the Dodd Frank Act on all of the covered countries, and finds no evidence of systematic change in the prevalence of conflict in general, or disaggregated types of conflict. This result further supports the conclusion that the Dodd Frank Act did not lead to the intended outcomes and may have contributed to an increase in the prevalence of conflict in Africa’s Great Lakes Region.

The contributions of this paper fall under two broad categories. First, the empirical results provide additional and supporting evidence of the unintended consequences of the Dodd Frank Act (Autesserre 2012; Geenen 2012; Seay 2012; Radley and Vogel 2015; Vogel and Raeymaekers 2016). The empirical analysis builds on the recent work of Parker and Vadheim (2017) in both time and space. Parker and Vadheim (2017) examine the impact of the Dodd Frank Act on the prevalence of conflict within the DRC up until 2013, one year before the SEC fully implemented Section 1502 of the Dodd Frank Act. I implement an across-country analysis that extends the impact evaluation through 2016, two full years after Section 1502 was officially implemented. While providing an additional methodology for estimating the impact of the Dodd Frank Act and corroborating within-country analysis, this across-country analysis has the added benefit of examining the impact of the Dodd Frank Act on the full list of covered countries, rather than only the DRC. Preliminary results align with the early warnings by political scientists and other researchers performing ethnographic

field work in eastern DRC that “top-down” regulations do not address the root cause of conflict and may make the situation worse (Autesserre 2012; Geenen 2012; Seay 2012).

Second, this analysis provides suggestive insight into the underlying causes of conflict in the DRC and other countries in sub-Saharan Africa (Blattman and Miguel 2010; Brunnschweiler and Bulte 2008; Collier and Hoeffler 2004). For decades conflict has halted and at times even reversed economic and social development in the region. This study supports the notion that the causal link between ‘conflict minerals’ and real-life conflict events is not simple or straightforward (Maystadt et al. 2014; Ross 2006; Lujala 2010). Rather, while revenues earned from mineral mines do indeed fund some rebel groups, the motivating factors for perpetuating conflict are much more complicated than simply greed or economic incentives (Stearns 2012).

The remainder of this paper is organized as follows. The next section provides discussion of the implementation and implicit theory of change behind Section 1502 of the Dodd Frank Act. This section also discusses competing theories of intended and unintended consequences. Section three describes the empirical framework of this study and explains the identification strategies employed to estimate causal effects. Section four discusses the results of these estimation strategies. Section five uses the synthetic control method as a robustness check on these estimated effects. Finally, section six concludes.

2 Implementation Amid Controversy

Section 1502 of the Dodd Frank Act is a transparency measure that creates a reporting requirement for all US publicly traded companies who buy or sell products containing any tin, tantalum, tungsten, and gold (3TG). As part of the legislation, companies must publicly disclose whether any of these minerals in their supply chain originated in the Democratic Republic of Congo or surrounding countries. The determination of whether or not a 3TG mineral mine is connected to an armed group is performed by the International Conference on the Great Lakes Region, an international NGO consisting of a number of Central and South African member countries.

The Dodd Frank Act was officially passed by the US Congress and signed into law in July 2010. In September 2010, upon the passage of the Dodd Frank Act and before the law was officially implemented, the government of the DRC shut down its entire mineral export industry. This measure publicly communicated an effort of the DRC government to comply with the forthcoming US regulation. Although the mineral mines eventually re-opened in 2011, by April of that year a leading tin exporter, the Malaysia Smelting Corporation (MSC), began a *de facto* embargo on

minerals originating from the DRC and surrounding countries. These actions, which occurred even before the official implementation of Section 1502 of the Dodd Frank Act, lead to a dramatic reduction in mineral exports. Seay (2012) cites estimates which suggest that in North Kivu, a DRC region bordering Uganda and Rwanda, exports of tin dropped by 90 percent.

In August of 2012 the US Securities and Exchange Commission voted on the final rules to require publicly traded companies to disclose information related to their use of conflict minerals. A year later, in July 2013, the National Association of Manufacturers, the Chamber of Commerce, and the Business Roundtable filed a lawsuit against the SEC rule. *National Association of Manufactures v. Securities and Exchange Commission* ultimately focuses on two key objections: (1) The SEC ignored its statutory obligations and engaged in rulemaking that was arbitrary and capricious. (2) The statute and rule violated the Constitution’s First Amendment freedom of speech grantee. This lawsuit has gone to various federal courts after each decision and appeal. Meanwhile, US publicly traded companies filed their first disclosures in May of 2014. Most recently, in April of 2015 a US federal appeals court struck down some aspects of the reporting requirements as a violation of corporations’ freedom of speech, by forcing companies to label their products, but left other aspects of the legislation in place (Seitzinger and Ruane 2015). At the present time, companies are not forced to describe certain products as having been “not found to be DRC conflict free”, but must still file an annual report on the linkages of their products to conflict minerals in the DRC and surrounding countries.

2.1 Theories of Intended and Unintended Consequences

The theory behind the implementation of Section 1502 of the Dodd Frank Act rests on the strength of the link between revenues earned by armed groups and the export of ‘conflict minerals’. In particular a critical assumption within the theory of change of the legislation is that mineral revenues cause conflict in the DRC and adjoining regions. Material published by the *Enough Project*, an NGO that played a leading role in advocating for the passage of Section 1502 within the Dodd Frank Act, claims that 3TG minerals are the most lucrative source of revenue to armed groups in Central Africa. Citing their own study, they estimate that armed groups earned roughly \$158 million from conflict minerals in 2008 alone (Enough Project, 2009). Once this stylized fact is established, it becomes reasonable to conclude that limiting US imports of conflict minerals will establish beneficial international norms and perhaps reduce the prevalence of conflict in the DRC and surrounding countries.

The mandatory reporting measure of the Dodd Frank Act to “name and shame” US companies who are engaging in economic activities with conflict minerals is modeled after the Kimberly Process which enacted a certification scheme for diamonds. This mechanism relies on the market, and in particular US consumers, to consider this information when making purchasing choices. Due to the broad and unambiguous agreement that the role US companies play in supporting conflict in the Great Lakes Region of Africa should be reduced, the Dodd Frank Act aims to leverage this attitude with the goal of reducing revenues for armed groups and, in turn, the prevalence of conflict.

Controversy has swirled, however, around the Dodd Frank Act in general, and Section 1502 in particular, since its inception. Critics of the legislation claimed in an open letter published in 2014, that activists and groups pushing to stop the trade of conflict minerals are at risk of “contributing to, rather than alleviating, the very conflict they set out to address.”⁵ Seay (2012) argues that Section 1502 of the Dodd Frank Act is built on a faulty assumption that minerals cause conflict. Although minerals may represent some revenue for armed groups there are numerous other forms of revenue available, such as informal taxation or bribery schemes. Additionally, minerals may not be the root cause of conflict in the region. Rather much of the conflict in the region is due to chronic poverty, socio-economic inequality, or politically-motivated ideological disagreements.

Moreover, the relationship between minerals and conflict is potentially endogenous. It is not necessarily clear that minerals cause conflict. For example, Brunnschweiler and Bulte (2008; 2009) find that mineral resource dependence may be a direct consequence of conflict, rather than a causal factor. Furthermore, it is likely that political institutions play an important role in mediating the relationship between minerals and conflict. Besley and Persson (2010) develop a theoretical model of endogenous state capacity formation and highlight that natural resource abundant countries may under-invest in state capacity formation making themselves prone to conflict and civil war. Finally, Blattman and Miguel (2010) review the empirical evidence finding that low per capita incomes and slow economic growth are also linked to the prevalence of conflict in developing countries.

Given these potential issues with the underlying assumptions of legislations’s theory of change in the DRC and surrounding countries, it is theoretically possible that this policy actually contributes to the very conflict the policy aims to prevent. Requiring reporting of minerals sourced from the DRC and surrounding countries carries a relatively large cost of auditing mineral mines in very remote regions. This may cause US companies, who typically buy minerals sourced in Africa’s Great

⁵The open letter is available online at: <https://ethuin.files.wordpress.com/2014/09/09092014-open-letter-final-and-list.pdf>

Lakes Region, to seek elsewhere for their products. Although advocates of the Dodd Frank Act maintain that the legislation will reduce the resources and ability of armed groups to operate, critics claim that armed groups have numerous revenue streams other than mineral exports. Additionally, jobs supported by the extraction and export of minerals could be eliminated as a consequence of the Dodd Frank Act, potentially creating even deeper poverty and inequality that may be the ultimate motivation and cause of conflicts in the region.

These alternative theories of change provide predictions for the forthcoming empirical evaluation. On one hand, consider the logic of intended consequences. Here the implementation of mandatory reporting requirements leads to less US imports of minerals from mines that financially support armed groups. This, in turn, leads to less revenue earned by armed groups and therefore a diminished ability of armed groups to create conflict. Under this theory the expected impact of the Dodd Frank Act is reduced prevalence of conflict in the covered countries. On the other hand, consider the theory of unintended consequences. Here the implementation of mandatory reporting requirements leads to less US imports of minerals from mines located in the covered countries, in general. This, in turn, leads to less revenue earned by all mines in the region *and* less income earned by laborers who work in the mines. This, in turn, increases poverty and inequality. This theory leads to an increase in the motivation for conflict and the expected impact of the Dodd Frank Act is therefore an increased prevalence of conflict.

These two theories can be partially explained using the theoretical framework developed by Collier and Hoeffler (2004) who show that countries with larger shares of primary commodity exports, such as minerals, are more likely to experience conflict and civil wars. Their theoretical model suggests that conflict and civil wars can be explained by two factors: motive and opportunity. In short, circumstances need to exist in which people both *want* and *are able* to rebel. This model highlights how each of the theories discussed above may be occurring simultaneously. While the theory of intended consequences posits that the Dodd Frank Act will decrease the *ability* of armed groups to finance conflict, the theory of unintended consequences claims that the policy will increase the *motivation* to perpetuate conflict. On net, one effect may outweigh the other, leading to no change in the prevalence of conflict. Or, as argued by Seay (2012) and other critics, armed groups may adjust toward alternative revenue generating activities, which allows for continued *ability* to rebel, while the labor market shock increases the *motivation* to rebel. The net effect is therefore ambiguous and requires empirical investigation.

3 Empirical Framework

Previous research assessing the effect of the Dodd Frank Act on the prevalence of conflict fall into two broad categories. The first category consists of highly detailed political and anthropological fieldwork that is mostly qualitative (Autesserre 2012; Geenen 2012; Radley and Vogel 2015; Vogel and Raeymaekers 2016). This research is informative but ultimately not specifically designed to quantitatively calculate the causal effect of the Dodd Frank Act on the prevalence of conflict in the DRC and surrounding countries. The second category consists of within-country, and more specifically within-DRC, econometric analysis of the effect of the Dodd Frank Act on conflict (Parker and Vadheim 2017), and child mortality (Parker et al. 2016). This research makes an important methodological contribution, in terms of estimating the causal effect of the Dodd Frank Act, but may still suffer from endogeneity issues. Moreover, since the Dodd Frank Act also regulates mineral mines in countries surrounding the DRC, a complete evaluation of this legislation also needs to consider effects in these countries.

This paper adds to both of these strands of the literature by estimating the effect of the Dodd Frank Act on conflict across countries. Following Parker and Vadheim (2017) and Maystadt et al. (2014) I perform analysis at the level of sub-national administrative units. This is a preferable approach as administrative units identify more meaningful topographical boundaries, compared to grid cells of arbitrary size. In practice these difference-in-difference estimates compare the likelihood a conflict event occurs within the second sub-national administrative region in a given month between the DRC and other sub-Saharan African countries not covered by the Dodd Frank Act. In order to estimate the effect on all covered countries, some specifications compare all countries covered by the Dodd Frank Act with other sub-Saharan African countries.

3.1 Data

The primary source of data for this empirical analysis comes from the Armed Conflict Location and Event Data (ACLED) project (Raleigh et al. 2010). ACLED provides geocoded information on conflict events across many developing countries. The full ACLED dataset includes close to 200,000 individual events spanning from 1997 through the present. I use a subset of the ACLED database, which includes events from 38 sub-Saharan African countries from 2004 through 2016.⁶

Countries included in this analysis are the DRC and surrounding countries—as defined by

⁶Following Parker and Vadheim (2017), this analysis begins in 2004 in order to avoid any effects driven by the Second Congo War.

Figure 1: Conflict Events in Africa

Notes: The top panel plots the geographic distribution of conflict events in Africa from 2004 through 2010. The bottom panel plots the geographic distribution of conflict events in Africa from 2011 through 2016. Source: The Armed Conflict Location and Event Data Project (ACLED).

Section 1502 of the Dodd Frank Act—and other sub-Saharan African countries, excluding Sudan, South Sudan, and Somalia.⁷ These countries are excluded due to complications with their own civil wars and state failures. Another reason for excluding both Sudan and South Sudan is South Sudan became a country in the middle of the study period. This complicates identifying consistent geographical areas over time. Figure 1 shows the location of these conflict events across the entire continent of Africa, split apart for years before and after the passage of the Dodd Frank Act.

A second source of data is the GADM database of global administrative areas. GADM provides geocoded information on administrative areas from all countries, at all levels of sub-division. I use the GADM database to construct a set of second sub-national administrative regions within each of the countries included in the analysis. Combining the subset of ACLED data with the GADM set of administrative regions, I construct a monthly panel dataset with information about the prevalence of conflict at the second sub-national administrative region within each country. This panel data includes 156 time periods and 3,671 administrative regions within 38 countries.

Within the panel dataset I construct binary outcome variables that indicate whether or not a given administrative region experienced a conflict within a given month. ACLED codes conflict events into different categories. With this information, I construct five different outcome variables. The first pools all types of conflict together. The second, violence against civilians, is defined directly by ACLED. The third, rebel group battles, is defined by combining ACLED categories: “Battle—Government regains territory”, “Battle—no change of territory”, or “Battle—non-state actor overtakes territory”. The fourth, riots and protests, is defined by combining ACLED categories: “Headquarters or base established”, “Non-violent transfer of territory”, “remote violence”, “Riots/protests”, and “Strategic development”. Finally, the fifth, deadly conflict, is defined as being a conflict event with at least one fatality.

Table 1 shows summary statistics, for months prior to the passage of the Dodd Frank Act, of these variables for the DRC, all covered countries, and all non-covered countries. The third column of Table 1 records the trend of each of these outcomes variables prior to the passage of the Dodd Frank Act. Figure 2 visualizes these trends in these binary outcome variables both before and after the passage of the Dodd Frank Act.

A few details are worth a brief comment, based on Table 1 and the visual representations of this

⁷The countries included in this analysis are as follows: The DRC, Uganda, Rwanda, Burundi, Tanzania, Zambia, Angola, the Republic of Congo, the Central African Republic, Kenya, Ethiopia, Chad, Cameroon, Gabon, Mozambique, Malawi, Botswana, Namibia, Zimbabwe, South Africa, Nigeria, Senegal, Guinea, Sierra Leone, Liberia, Ivory Coast, Ghana, the Gambia, Guinea-Bissau, Togo, Benin, Burkina Faso, Eritrea, Djibouti, Lethoto, Swaziland, Niger, and Mali.

Table 1: Summary Statistics, Pre-Dodd Frank Act

	Mean	Std. Dev.	Trend ^a
Panel A: DRC Only			
(i) Conflict, all types	0.141	0.347	0.000 (0.000)
(ii) Violence against civilians	0.084	0.277	0.001* (0.000)
(iii) Rebel group battles	0.082	0.274	0.000 (0.000)
(iv) Riots and protests	0.050	0.219	-0.000 (0.000)
(v) Deadly conflict	0.072	0.259	0.001* (0.000)
Panel B: All Covered Countries			
(i) Conflict, all types	0.030	0.170	-0.000 (0.000)
(ii) Violence against civilians	0.015	0.123	0.000** (0.000)
(iii) Rebel group battles	0.013	0.114	-0.000*** (0.000)
(iv) Riots and protests	0.010	0.100	-0.000 (0.000)
(v) Deadly conflict	0.015	0.122	-0.000 (0.000)
Panel C: All Non-Covered Countries			
(i) Conflict, all types	0.022	0.148	0.000*** (0.000)
(ii) Violence against civilians	0.010	0.100	0.000*** (0.000)
(iii) Rebel group battles	0.007	0.0814	0.000*** (0.000)
(iv) Riots and protests	0.010	0.097	0.000*** (0.000)
(v) Deadly conflict	0.007	0.085	0.000*** (0.000)

Notes: ^a Pre-Dodd Frank Trend is the linear fit of the given outcome variable prior to the passage of the Dodd Frank Act. Standard errors clustered by the 2nd subnational administrative area in parentheses *** p<0.01, ** p<0.05, * p<0.1.

data in Figures 1 and 2. First, Figure 1 shows that while there is a wide geographic distribution of conflict events across the continent of Africa, these events tend to be clustered in a general region commonly referred to as Africa’s Great Lakes Region. Second, Table 1 reports that although there is a difference in levels, there is very little trend over time in these variables prior to the passage of the Dodd Frank Act. Additionally, there is very little difference in these trends between the DRC, all covered countries, and all non-covered countries. Third, Figure 2 shows that, compared to both the covered and non-covered countries, the trends in the probability of conflict in the DRC is much more volatile. This detail will be accounted for when performing causal inference with a variant of Fisher’s permutation test (Fisher 1935). Finally, in months after the passage of the Dodd Frank Act the trends in the probability of conflict increases considerably for the DRC. This pattern largely persists across all types of conflict.

3.2 Estimation and Identification Strategy

I empirically estimate whether the Dodd Frank Act increased or decreased the prevalence of conflict, in the DRC specifically and in all countries covered by the Dodd Frank Act more generally. Formally, this relationship is specified with the following linear regression model:

$$y_{rct} = \alpha_{rc} + \gamma_t + \beta \cdot \mathbf{1}\{c = DRC\} \cdot \mathbf{1}\{t \geq July\ 2010\} + \epsilon_{rct} \quad (1)$$

The variable y_{rct} represents an outcome variable in administrative area r in country c and in month t . The main outcome of interest is a measure of any type of conflict event. Other outcomes include specific types of conflict such as: violence against civilians, rebel group battles, riots and protests, and deadly conflict. The specification also includes geographic (α_{rc}) and month (γ_t) fixed effects, and an error term (ϵ_{rct}). The coefficient of interest (β) is the difference-in-differences estimate of the effect of the Dodd Frank Act on the prevalence of conflict in the DRC. In this specification the other countries covered by the Dodd Frank Act (e.g. the countries that border the DRC) are excluded from the analysis. From a research design perspective, this is a beneficial feature of the implementation of the Dodd Frank Act. It essentially ensures that there will be little spillover effects from the implementation of the legislation in the DRC to other regions within comparison countries. These results are shown in panel A of Table 1.

As discussed by Cunningham and Shah (2017) and Buchmueller et al. (2011) inference from this difference-in-differences strategy relies on asymptotic assumptions, which may not be reasonable since “treatment” occurs in only one country (e.g. in the specification where we only examine

Figure 2: Conflict Trends by Type

Notes: Each panel refers to the trend in the probability of each of the five outcome variables calculated at the 2nd subnational level within each country. Panel A refers to all conflict. Panel B refers to violence against civilians. Panel C refers to rebel group battles. Panel D refers to riots and protests. Panel E refers to deadly conflict. In each graph, the solid line represents the point estimate when the DRC is “treated”. Probability of conflict computed at the 2nd subnational level in each country within each month from 2004 through 2016. Source: The Armed Conflict Location and Event Data Project (ACLED).

the effects of the Dodd Frank Act in the DRC). To address this issue, I implement a variant of Fisher’s permutation test (Fisher 1935). I re-estimate equation (1) an additional 29 times, each time replacing the DRC with an indicator for one of the other 29 sub-Saharan African countries not covered by the Dodd Frank Act. Next I compare the effect estimate for the DRC with the other 29 placebo estimates. This provides a distribution of effects. Robust effect estimates will consistently be an outlier in these distributions, for all outcome variables. In Figure 3, I graph both the placebo estimates and the DRC estimate for each of the five outcome variables. The vertical dashed lines represent the 5th and 95th percent confidence interval of the distribution of placebo estimates (excluding the estimate from the DRC). The solid line represents the difference-in-differences effect estimate for the DRC.

In some versions of the specification detailed in equation (1), all countries covered by the Dodd Frank Act, that is the DRC plus all surrounding countries, are included in the regression. These specifications estimate the effect of the Dodd Frank Act within all of the covered countries combined. That is the difference-in-difference estimates compare administrative regions in all covered countries to administrative regions in other non-covered sub-Saharan African countries. These results are shown in panel B of Table 1. Concerns stemming from only having one treated unit are not present in the specifications when all countries covered by the Dodd Frank Act are included in the analysis.

A core identifying assumption for the validity of the effect estimates calculated in equation (1) is that conflict in the DRC would have followed a trend along a path similar to other countries in the absence of the Dodd Frank Act. In order to test the validity of this assumption, I estimate equation (2):

$$y_{rct} = \eta_{rc} + \lambda_t + \delta_t \cdot \mathbf{1}\{c = DRC\} \cdot \mathbf{1}\{t = 2005, 2006, 2007, \dots, 2016\} + \xi_{rct} \quad (2)$$

In equation (2) all variables are the same as in equation (1). Outcomes in administrative area r in country c and in month t are regressed on geographic (η_{rc}) and month (λ_r) fixed effects, with an error term (ξ_{rct}). The key difference is in equation (2) δ_t , the coefficient on the difference-in-difference interaction, is a vector that takes on a value for each associated year for months between January 2004 through December 2016. In principle, equation (2) could be estimated with interactions for each month between January 2004 and December 2016. In practice, for ease of exposition, I estimate equation (2) with interactions for each year. This averages the monthly effect estimates over the associated year. Similar with equation (1), in some versions of this specification all countries covered by the Dodd Frank Act are included in the regression. These specifications

aim at estimating the effect of the Dodd Frank Act in all covered countries, rather than only within the DRC. Estimation results calculated using equation (2) are reported graphically in Figures 4 and 5. If the identification strategy of this paper is valid, then effect estimates in time periods prior to July 2010 will be statistically insignificant or relatively small in magnitude.

4 Did the Dodd Frank Act Increase or Decrease Conflict?

The effect of the Dodd Frank Act on the prevalence of conflict in the DRC and surrounding countries is controversial. Advocacy organizations report overwhelming positive effects of the Dodd Frank Act within the DRC. For example, the *Enough Project* published a report in 2016 claiming, “... positive advances corresponding to the stated purpose of Section 1502 [of the Dodd Frank Act]” (Dranginis 2016). These positive advances include, “... increased security for civilians...” and “... a significant reduction in armed group control of mining areas...” (Dranginis 2016). On the other hand numerous accounts associate the Dodd Frank Act with the opposite of it’s intended outcomes (see Seay 2012 for a review). Additionally, more rigorous econometric analysis suggests that, at least in the short run, the Dodd Frank Act may have increased conflict in the Eastern DRC (Parker and Vadheim 2017). As highlighted by *The Washington Post*—and noted at the beginning of this paper—one mechanism for unintended consequence of requiring due diligence and reporting requirements is prominent buyers of minerals shifting away from purchasing minerals from the DRC (Raghavan 2014). In reducing the revenue earning potential of mineral mines, the Dodd Frank Act took away a viable economic alternative to substance agriculture or joining rebel groups for much of the rural population. If these sorts of dynamics persists, there is a real possibility that the Dodd Frank Act may in fact be increasing the prevalence of conflict in Africa’s Great Lakes Region. An outcome that is entirely the opposite of the legislation’s intentions.

Table 2 reports the difference-in-differences effect estimation results from equation (1). Panel A shows results when only examining the effect of the Dodd Frank Act within the DRC, and excluding all other covered countries from the analysis. Column 1 considers all conflict event types pooled together and shows a statistically significant effect indicating an increase in conflict. The magnitude of the effect is also relatively large, representing a 102 percent increase in the probability a conflict event occurs within a given sub-national administrative region. Columns 2 through 5 consider different types of conflict events. The effect estimates are again positive and statistically significant across each of these disaggregated outcomes. Again, the magnitudes of these effects are relatively large. Column 2 shows that violence against civilians increased by 90 percent. Column 3 indicates

Table 2: Effect of Dodd Frank on Conflict

	Conflict, All Types (1)	Violence Against Civilians (2)	Rebel Group Battles (3)	Riots and Protests, (4)	Deadly Conflict (5)
Panel A: DRC Only					
Effect of Dodd Frank	0.143*** (0.023)	0.0756*** (0.016)	0.0627*** (0.016)	0.113*** (0.021)	0.068*** (0.018)
Placebo tests (other countries)					
5th percentile	-0.042	-0.029	-0.010	-0.029	-0.020
95th percentile	0.079	0.026	0.015	0.041	0.051
p-value (two-tailed)	0.13	0.13	0.06	0.13	0.13
Observations	432,432	432,432	432,432	432,432	432,432
Baseline DRC mean	0.140	0.084	0.082	0.050	0.072
Geographic and time FEs	Yes	Yes	Yes	Yes	Yes
R-squared	0.141	0.098	0.084	0.125	0.074
Panel B: All Covered Countries					
Effect of Dodd Frank	0.0009 (0.003)	0.008*** (0.002)	-0.001 (0.001)	0.003 (0.003)	-0.004* (0.002)
Observations	572,676	572,676	572,676	572,676	572,676
Baseline Covered mean	0.030	0.015	0.013	0.010	0.015
Geographic and time FEs	Yes	Yes	Yes	Yes	Yes
R-squared	0.129	0.087	0.076	0.116	0.067

Notes: The dependent variable is a binary variable indicating the existence of a conflict event at the 2nd subnational administrative area within a given month. Standard errors clustered by the 2nd subnational administrative area in parentheses
*** p<0.01, ** p<0.05, * p<0.1.

rebel group battles increased by 76 percent. Column 4 reports a 226 percent increase in riots and protests. Finally, column 5 highlights an increase in deadly conflict of 94 percent.

Panel A also includes the 5th and 95th percentiles of the distribution of the placebo estimates. Importantly, for each of the five outcome variables, the DRC estimate is well outside of this interval. Figure 3 illustrates the results of the permutation tests. Each panel shows a histogram of the placebo estimates for a different outcome variable. The dashed lines represent the 95 percent confidence interval of the placebo effect estimates and the solid line represents the DRC effect estimate. These figures show that for each of these outcomes, the DRC estimate is well outside the 95 percent confidence interval. Note that, particularly in the present context, this is a very demanding test to achieve statistical significance at conventional levels. With 30 countries, it is impossible to achieve statistical significance at the 5 percent level. Achieving significance at the 10 percent level occurs if only if the DRC is ranked first or last in the placebo effect distribution. This occurs only in the case of rebel group battles. For the rest of the outcome variables the DRC effect estimate is ranked second largest in the distribution of placebo estimates.

Panel B of Table 2 reports the difference-in-difference estimates for the effects of the Dodd Frank Act in all covered countries, rather than only within the DRC. Column 1 reports the effect on all types of conflict pooled together. I find a statistically insignificant, but relatively precisely

Figure 3: Placebo Estimates from Permutation Tests, DRC Only

Notes: This figure shows country effects estimated from placebo permutation tests for each column in Table 1. Each panel refers to a placebo test for each of the five outcome variables. Panel A refers to all conflict. Panel B refers to violence against civilians. Panel C refers to rebel group battles. Panel D refers to riots and protests. Panel E refers to deadly conflict. In each graph, the solid line represents the point estimate when the DRC is “treated”. The dashed lines represent the 5th and 95th percentiles.

estimated, null effect. Column 2 shows a statistically significant increase in the probability of violence against civilians within all countries covered by the Dodd Frank Act. The effect size is smaller than the estimated effect on violence against civilians within only the DRC, but is still relatively large. With a baseline mean among the covered countries of 0.015, the effect represents a 53 percent increase in the probability of violence against civilians. Both columns 3 and 4 report statistically insignificant and relatively precisely estimated zero effect estimates. Finally, column 5 shows a marginally significant decrease in the probability of deadly conflict. The magnitude on this estimate represents a 26 percent reduction in the probability of deadly conflict.

Taken together, the effect estimates are more mixed and broadly more equivocal compared to the results only within the DRC. This suggests that within the broad set of countries covered by the Dodd Frank Act there are many other factors that are much more important for predicting conflict than the passage of the legislation. While there is no evidence that the Dodd Frank Act systematically increased the prevalence of conflict in all of these countries combined, there is similarly little evidence that the legislation led to any systematic reduction in the prevalence of conflict.

As previously mentioned a key identifying assumption for the validity of this estimation framework is that conflict in the DRC, or the other covered countries, would not trend differently compared to other sub-Saharan African countries in the absence of the Dodd Frank Act. Effect estimates from equation (2) help explore the validity of this assumption in the present context. If year-specific effect estimates are statistically insignificant or relatively small prior to July 2010, then this suggests evidence in favor of the validity of the identification strategy used in this paper.

Figure 4 reports these year-specific effect estimates for each of the five outcome variables. In Panel A, year-specific effect estimates are statistically insignificant between the years 2006 and 2008. In 2005 and 2009 the estimates are statistically significant but relatively small compared to the effect estimates for years after the passage of the Dodd Frank Act. Specifically, the effects in 2005 and 2009 both have a coefficient smaller than 0.1, whereas beginning in 2011 the effect estimates are twice as large with coefficients roughly around 0.2. This key finding is qualitatively similar across all other outcome variables. Although the effects are strongest in Panel A when all types of conflict are pooled together, Panels B through E each report a statistically significant increase in conflict in years after the passage of the Dodd Frank. This indicates that the overall effect on all types of conflict is not primarily driven by a change in a specific type of conflict. Moreover, with the exception of an apparent lag in effects in 2010—of which only half the year occurred after the

Figure 4: Year Specific Effect Sizes, DRC Only

Notes: Each panel refers to each of the five outcome variables. Panel A refers to all conflict. Panel B refers to violence against civilians. Panel C refers to rebel group battles. Panel D refers to riots and protests. Panel E refers to deadly conflict. In each graph, the dashed line represents when the Dodd Frank Act was signed into US law.

Figure 5: Year Specific Effect Sizes, All Covered Countries

Notes: Each panel refers to each of the five outcome variables. Panel A refers to all conflict. Panel B refers to violence against civilians. Panel C refers to rebel group battles. Panel D refers to riots and protests. Panel E refers to deadly conflict. In each graph, the dashed line represents when the Dodd Frank Act was signed into US law.

passage of the Dodd Frank Act—the effects are relatively stable over time. This indicates that the effects reported in Table 1 are not driven by a dramatic spike in conflict in any one year. Taken together the findings presented in Figure 4 support the validity of the identification strategy for estimating the effect of the Dodd Frank Act on conflict within the DRC.

Alternatively, Figure 5 reports year-specific effect estimates for each of the five outcome variables, when all countries covered by the Dodd Frank Act are included in equation (2). In each of these panels, the effect sizes are considerably smaller than the corresponding effect sizes in Figure 4. This is consistent with the results reported in Panel B of Table 2. Pooling all types of conflict together, in Panel A, the impact estimates prior to the passage of the Dodd Frank Act are statistically significant, but relatively small. In years after the passage of the legislation, the effects indicate a reduction in the prevalence of conflict, in years 2012 through 2014, but then an increase

in the prevalence of conflict in 2015 and 2016. Effect estimates on violence against civilians, reported in Panel B, reports small and statistically insignificant results in years prior to the Dodd Frank Act. This trend continues in the years immediately following, but in 2015 and 2015 there is a statistically significant increase in the probability of violence against civilians. The previous two findings may be related to the fact that the final rules of Section 1502 of the Dodd Frank Act was not officially implemented until May of 2014. In Panels C through E, the results support the finding that factors other than the passage of the Dodd Frank Act predict these types of conflict in the full set of countries covered by the legislation. Similar to the results reported in Panel B of Table 2, there is very little evidence that the Dodd Frank Act systematically increased or decreased the prevalence of conflict within all countries covered by the legislation.

This broad conclusion about the effect of the Dodd Frank Act in all countries covered by the legislation pooled together may hide important heterogeneity. Table 3, presented in the Appendix, shows these country-specific effects among the various countries covered by the Dodd Frank Act. The prevalence of conflict—both in general and in the disaggregated measures—decreased in Angola, the Republic of Congo, Rwanda, Tanzania, and Uganda. On the other hand, similar to the DRC, the prevalence of conflict increased within the Central Africa Republic and Burundi. The magnitudes of each of these effects, however, are substantially smaller than the estimated effects within the DRC. The majority of these country-specific effects, for countries covered by the Dodd Frank Act, are within the 95 percent confidence interval for the distribution of the placebo estimates generated from the permutation test. Therefore, although the effects for each country covered by the Dodd Frank Act are mixed, the effects are strongest within the DRC. This is consistent with the implementation of Section 1502 of the Dodd Frank Act which specifically targeted the DRC, but also regulated minerals exported by surrounding countries.

Overall these results indicate that the Dodd Frank Act increased the prevalence of conflict within the DRC. This result is qualitatively similar when considering all types of conflict pooled together or when considering disaggregated types of conflict. These effect estimates are also relatively large in size. The probability of any type of conflict roughly doubled within the DRC after the passage of the Dodd Frank Act. Disaggregated types of conflict increased by rates between 75 and over 200 percent. This is evidence of substantial unintended consequences of the Dodd Frank Act within the DRC.

When considering all countries covered by the Dodd Frank Act, the estimated effects are much more muted. There is no evidence that the Dodd Frank Act increased all types of conflict within

all of these countries together. There is mixed evidence of an increase in violence against civilians and weaker evidence of a reduction in deadly conflict, however these results seem to be dependent on relatively large year-specific effects. Therefore, although there is little evidence of systematic unintended consequences among all countries covered by the legislation, there is also little evidence the Dodd Frank Act systematically reduced the prevalence conflict either.

5 Robustness Check: Synthetic Control Estimation

An alternative method of analysis equipped to estimate the causal effect of the Dodd Frank Act is synthetic control analysis. Since the synthetic control approach is a generalization of the difference-in-difference estimation strategy it is well suited to serve as a robustness test for the core results in this paper. Unlike the difference-in-difference approach, however, synthetic control analysis uses of subset of comparison countries. Specifically the synthetic control is a convex combination of administrative areas from comparison countries that best match the pre-intervention trend in conflict within the DRC. Therefore, if there is any concern that non-covered sub-Saharan African countries do not form the correct comparison group, this method should address the associated issues.

I follow Abadie et al. (2010; 2015) and use techniques designed to rigorously inform causal inference with synthetic control estimation. The synthetic control method selects the optimal weights, for each of the administrative areas of comparison countries which make up the donor pool, that minimizes the root mean squared prediction error (RMSPE) prior to the treatment period. These weights are then applied to the comparison countries after the treatment, and used to estimate effects and inform causal inference. In the following exercise, I take the trends in each conflict category—for the DRC and other non-covered sub-Saharan African countries—and calculate an 11 month moving average across months. This procedure limits the volatility in the probability of conflict within a given month and helps the synthetic control method more accurately match the pre-treatment trends in each conflict category within the DRC.

Next I perform a placebo test that reassigns the treatment status from the DRC to a country within the donor pool. This test is similar to the variant of Fisher’s (1935) permutation test discussed above and creates a distribution of placebo effects against which to compare the effect estimate for the DRC. In particular, I compare the ratio of the post-Dodd Frank Act RMSPE and the pre-Dodd Frank Act RMSPE. Note that the RMSPE is a measure of the magnitude of the gap in prevalence of conflict between each country and its synthetic comparison. As noted by Abadie

et al. (2015) a relatively large post-intervention RMSPE does not necessarily indicate a relatively large effect of the intervention if the pre-intervention RMSPE is also relatively large. This leads to the rational for using the ratio of the post-Dodd Frank Act RMSPE and the pre-Dodd Frank Act RMSPE. A relatively large ratio indicates that the post-Dodd Frank Act RMSPE is large compared to the pre-Dodd Frank Act RMSPE.

Panel A in Figure 6 shows the synthetic DRC trend before and after the passage of the Dodd Frank Act and compares this trend to the actual probability of conflict within the DRC. Panel B in Figure 6 shows the gap between these two trends over time. Taken together these two figures illustrate the dramatic increase in the prevalence of conflict within the DRC after the passage of the Dodd Frank Act. Specifically, the synthetic control estimation method finds that the passage of the Dodd Frank Act resulted in an increase in the probability of conflict at the second sub-national administrative region within the DRC of roughly 93 percent. This is only slightly smaller than the difference-in-difference effect estimate of 102 percent increase. Next, I apply the synthetic control method to all 29 other sub-Saharan African countries not covered by the Dodd Frank Act. The DRC has the sixth highest ratio of post-Dodd Frank Act RMSPE to pre-Dodd Frank Act RMSPE.

The results are much more equivocal for the various types of conflict, and are reported in Figures 7 through 10 in the Appendix. Panel A in Figure 7 shows the synthetic DRC trend in violence against civilians compared with the actual DRC trend, and Panel B shows the gap in these trends over time. The synthetic control estimate finds a 96 percent increase in the probability of violence against civilians at the second sub-national administrative region within the DRC. Difference-in-differences estimates, shown in Table 2, report a 90 percent increase in the probability of violence against civilians. Similar to the results for all types of conflict pooled together, effect estimates from these two procedures are very similar. However, the DRC is ranked 16th out of 30 in terms of the ratio of post-Dodd Frank Act RMSPE to pre-Dodd Frank Act RMSPE.

The results for the rebel group battles, riots and protests, and deadly conflict are much less robust. Figure 8 illustrates the synthetic control estimates for rebel group battles. The synthetic control estimate is reports a 135 percent increase in the probability of rebel group battles. This estimate is almost twice the size of the difference-in-difference estimate of 76 percent, reported in Table 2. This discrepancy is likely caused by a high amount of variability in the rebel group battles outcome variable. Moreover, the DRC is ranked 19th out of 30 in terms of the pre-post RMSPE ratio. Figure 9 reports the synthetic control estimates for riots and protests, and finds a 166 percent increase in the probability of these events. This compares to a larger difference-

Figure 6: Synthetic Control, All Conflict Types

Notes: Panel A shows results of trends in the probability of conflict, within the DRC and the synthetic DRC, at the second sub-national level within each month from 2004 through 2016. Panel B shows the gap in the probability of conflict at the second sub-national level within each month from 2004 through 2016 between the DRC and the synthetic DRC.

in-differences estimate of a 226 percent increase. Additionally, the pre-post RMSPE ratio for the DRC is ranked 5th out of 30. In this case, given the relatively high RMSPE ratio, the synthetic estimate is likely a more accurate estimate of the true effect. Finally, Figure 10 shows the synthetic control estimates for deadly conflict. In this case, the synthetic control method most poorly fits the data. In fact, the pre-post RMSPE ratio for the DRC is ranked last when deadly conflict is the outcome variable. Nevertheless the synthetic control effect estimate suggests a 33 percent increase in the probability of deadly conflict. This is quite a bit smaller in magnitude from the difference-in-difference estimate of a 94 percent increase in the probability of deadly conflict.

These synthetic control estimates provide a useful robustness check on the primary results reported in this paper. Using a different estimation methodology the effect estimate on all types of conflict pooled together is relatively robust. When looking at specific types of conflict, the effect sizes differ slightly in the case of violence against civilians, and largely in other cases of rebel group battles, riots and protests, and deadly conflict. Nevertheless, the core qualitative result holds between the two estimation strategies. There seems to be a dramatic increase in the prevalence of conflict within the DRC, relative to the prevalence of conflict in comparison countries, after the passage of the Dodd Frank Act.

6 Discussion and Conclusion

This study finds evidence of unintended consequences of the Dodd Frank Act. Difference-in-differences estimates find that the Dodd Frank Act increased the probability of conflict at the second subnational administrative region. For all types of conflict the estimated effect is roughly double, when compared to other sub-Saharan countries not covered by the Dodd Frank Act. These effect estimates are qualitatively similar across all types of conflict including: violence against civilians, rebel group battles, riots and protests, and deadly conflict. Year-specific estimates suggest that these effects persist for all years since the passage of the Dodd Frank Act. Finally, the effect for all types of conflict is robust to synthetic control estimation and associated inferential techniques. The disaggregated conflict types are less robust to synthetic control estimation and inference, but largely support the qualitative result that the Dodd Frank Act dramatically increased the prevalence of conflict within the DRC.

Additionally, when considering all countries covered by the Dodd Frank Act the estimated effects fall in both size and statistical significance. Therefore, there is no evidence that the Dodd Frank Act makes any sort of meaningful change—positively or negatively—in terms of the prevalence

of conflict when pooling all covered countries together. As the DRC-specific analysis highlights, however, pooling all countries covered by the legislation together hides important heterogeneity in the country-specific effects. In some countries the prevalence of conflict increased, and in others the prevalence of conflict decreased, due to passage of the Dodd Frank Act. None of these effects, however, come close to the magnitude of the estimated effects within the DRC.

These results support the notion that minerals may not necessarily cause conflict. Rather conflict may be driven by a host of additional factors such as chronic poverty, socio-economic inequality, and weak political institutions. While policies and norms that push the private sector toward more accountable business practices are likely necessary, they are not sufficient. It seems likely that the Dodd Frank Act, while perhaps forming beneficial international norms regarding natural resource extraction in the context of weak political institutions, has also made life much more difficult for many in Africa's Great Lakes Region. Ultimately, much of the conflict is rooted in years of ethnic tensions and conflicts over rights and freedom. The devastating reality seems to be that the Dodd Frank Act fueled these pre-existing tensions. Unfortunately, good intentions and a policy specifically designed to address the economic factors believed to be associated with conflict has been largely ineffective. This being the case, a more successful version of this legislation will provide development assistance to the mining communities adversely affected by the unintended consequences. Without this assistance, the negative impacts identified by this analysis may threaten to continue in future years effectively perpetuating and deepening Africa's deadliest conflict.

Although this analysis is not designed to rigorously identify the specific mechanisms causing these results, it may be instructive to comment briefly on potential mechanisms. The passage of the Dodd Frank Act and in particular the DRC's response to shut down all mineral exports from 2010 through 2011, may have caused a labor market shock to the mineral industry. Households who rely on income from working in the mineral mines may therefore struggle to find sufficient alternative activities. In many parts of the rural areas in the DRC and surrounding countries the only alternatives to work in mineral mines is subsistence agriculture or joining the militia (Seay 2012). This deepens poverty, perpetuates socio-economic inequality, generates more motivation to perpetuate conflict. Moreover, although the Dodd Frank Act may have levied a shock in revenue earning of armed rebel groups, these groups are able shift to alternative revenue streams. Therefore, by time Section 1502 of the Dodd Frank Act is fully implemented, both the rebounded *ability* and perhaps increased *motivation* of armed groups to cause conflict (Collier and Hoeffler 2004).

A limitation to analysis so far is data quality. Although the ACLED database is widely regarded

as a useful and reliable source of data on conflict events (Raleigh et al. 2010; Weidman 2014; and Maystadt et al. 2014), the present study cannot rule out the possibility that these results are due to some sort of characteristic of the data. Conflict events are difficult to define and quantify. This necessarily generates uncertainty in any result stemming from just one source of data. Simply stated, it could be the case that those who record and code conflict events are biased in some way and the results presented above are spurious. A future robustness check will therefore perform the same analysis using alternative conflict event data sources. One additional data source is the UCDP/PRIO database on armed conflict. Similar to ACLED data, UCDP/PRIO provides geo-referenced conflict data from numerous countries across the globe (Gleditsch et al. 2002). A third data source is the SCAD project which currently provides information about social conflicts from 1990-2015 (Salehyan et al. 2012). Analyzing the robustness of the core results presented above will allow for a good understanding of the dependence of these results on available data.

Building off the present research, future work could focus on understanding what actually causes conflict in the DRC and surrounding countries. It is through understanding these dynamics that truly beneficial public policies with the objective of mitigating conflict in Africa's Great Lakes Region have the possibility of being designed and implemented. Future research could also do well to focus on how to best support and assist those who are adversely impacted by the labor market consequences of economic sanctions.

Appendix

In this section, I will describe the tables and figures in the Appendix. Table 3 reports the country-specific estimates for each of the covered countries under the Dodd Frank Act. This includes the Democratic Republic of Congo (DRC), Angola, Burundi, Central African Republic, Republic of Congo, Rwanda, Tanzania, Uganda, and Zambia. Each of these country-specific estimates are reported within their own panel in Table 3. Additionally, Table 3 also reports the 5th and 95th percentile from the permutation tests, described in Section 3 of the main manuscript.

Figures 7 through 10 show the synthetic control estimates for each of the different types of conflict. Figure 7 reports on violence against civilians. Figure 8 reports on rebel group battles. Figure 9 reports on riots and protests. Finally, Figure 10 reports on deadly conflict. In each of these figures Panel A show the synthetic DRC trend before and after the passage of the Dodd Frank Act and compares this trend to the actual probability of the given type of conflict within the DRC. Panel B shows the gap between these two trends over time.

Table 3: Country-Specific Effects of Dodd Frank on Conflict

	Conflict, All Types (1)	Violence Against Civilians (2)	Rebel Group Battles (3)	Riots and Protests, (4)	Deadly Conflict (5)
Panel A: Democratic Republic of Congo					
Effect of Dodd Frank	0.143*** (0.023)	0.0756*** (0.016)	0.0627*** (0.016)	0.113*** (0.021)	0.068*** (0.018)
Observations	432,432	432,432	432,432	432,432	432,432
R-squared	0.141	0.098	0.084	0.125	0.074
Panel B: Angola					
Effect of Dodd Frank	-0.0308*** (0.00307)	-0.0108*** (0.00143)	-0.00535*** (0.000759)	-0.0229*** (0.00247)	-0.0141*** (0.00110)
Observations	450,060	450,060	450,060	450,060	450,060
R-squared	0.115	0.071	0.042	0.111	0.047
Panel C: Burundi					
Effect of Dodd Frank	0.0339*** (0.00659)	0.0325*** (0.00487)	0.000903 (0.00262)	0.0363*** (0.00624)	0.00503 (0.00342)
Observations	448,812	448,812	448,812	448,812	448,812
R-squared	0.112	0.069	0.040	0.109	0.046
Panel D: Central African Republic					
Effect of Dodd Frank	0.0715*** (0.0143)	0.0601*** (0.0107)	0.0297*** (0.00894)	0.0223** (0.00958)	0.0544*** (0.0109)
Observations	436,020	436,020	436,020	436,020	436,020
R-squared	0.116	0.074	0.045	0.112	0.051
Panel E: Republic of Congo					
Effect of Dodd Frank	-0.0272*** (0.00504)	-0.0112*** (0.00165)	-0.00459*** (0.00121)	-0.0178*** (0.00585)	-0.0133*** (0.00132)
Observations	432,276	432,276	432,276	432,276	432,276
R-squared	0.115	0.071	0.042	0.112	0.047
Panel F: Rwanda					
Effect of Dodd Frank	-0.00351 (0.0144)	0.00452 (0.0118)	-0.00395** (0.00179)	-0.0119** (0.00513)	-0.0156*** (0.00417)
Observations	429,468	429,468	429,468	429,468	429,468
R-squared	0.113	0.071	0.041	0.111	0.047
Panel G: Tanzania					
Effect of Dodd Frank	-0.0216*** (0.00268)	-0.00762*** (0.00132)	-0.00362*** (0.000880)	-0.0182*** (0.00219)	-0.0101*** (0.00132)
Observations	453,336	453,336	453,336	453,336	453,336
R-squared	0.113	0.070	0.041	0.110	0.046
Panel H: Uganda					
Effect of Dodd Frank	-0.0353*** (0.00722)	-0.0163*** (0.00350)	-0.0275*** (0.00478)	-0.00668 (0.00406)	-0.0342*** (0.00456)
Observations	450,996	450,996	450,996	450,996	450,996
R-squared	0.114	0.071	0.045	0.114	0.049
Panel I: Zambia					
Effect of Dodd Frank	-0.00539 (0.00553)	0.00332 (0.00322)	-0.00325** (0.00152)	-0.00621 (0.00514)	-0.0113*** (0.00141)
Observations	436,332	436,332	436,332	436,332	436,332
R-squared	0.112	0.070	0.041	0.109	0.047
Placebo tests (other countries)					
5th percentile	-0.042	-0.029	-0.010	-0.029	-0.020
95th percentile	0.079	0.026	0.015	0.041	0.051
Geographic and time FEs	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is a binary variable indicating the existence of a conflict event at the 2nd subnational administrative area within a given month. Standard errors clustered by the 2nd subnational administrative area in parentheses
*** p<0.01, ** p<0.05, * p<0.1.

Figure 7: Synthetic Control, Violence Against Civilians

Notes: Panel A shows results of trends in the probability of conflict, within the DRC and the synthetic DRC, at the second sub-national level within each month from 2004 through 2016. Panel B shows the gap in the probability of conflict at the second sub-national level within each month from 2004 through 2016 between the DRC and the synthetic DRC.

Figure 8: Synthetic Control, Rebel Group Battles

Notes: Panel A shows results of trends in the probability of conflict, within the DRC and the synthetic DRC, at the second sub-national level within each month from 2004 through 2016. Panel B shows the gap in the probability of conflict at the second sub-national level within each month from 2004 through 2016 between the DRC and the synthetic DRC.

Figure 9: Synthetic Control, Riots and Protests

Notes: Panel A shows results of trends in the probability of conflict, within the DRC and the synthetic DRC, at the second sub-national level within each month from 2004 through 2016. Panel B shows the gap in the probability of conflict at the second sub-national level within each month from 2004 through 2016 between the DRC and the synthetic DRC.

Figure 10: Synthetic Control, Deadly Conflict

Notes: Panel A shows results of trends in the probability of conflict, within the DRC and the synthetic DRC, at the second sub-national level within each month from 2004 through 2016. Panel B shows the gap in the probability of conflict at the second sub-national level within each month from 2004 through 2016 between the DRC and the synthetic DRC.

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