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Linking social heterogeneity and commodity price shocks to civil con icts

José Manuel Giménez Gómez
Yitagesu Zewdu

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Departament d'Economia
www.fcee.urv.es/departaments/economia/public_html/index.html
Universitat Rovira i Virgili
Facultat d'Economia i Empresa
Av. de la Universitat, 1
43204 Reus
Tel.: +34 977 759 811
Fax: +34 977 758 907
Email: sde@urv.cat

CREIP
www.urv.cat/creip
Universitat Rovira i Virgili
Departament d'Economia
Av. de la Universitat, 1
43204 Reus
Tel.: +34 977 758 936
Email: creip@urv.cat

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Linking social heterogeneity and commodity price shocks to civil conflicts

José-Manuel Giménez-Gómez, Yitagesu Zewdu

Universitat Rovira i Virgili, Dep. d'Economia, CREIP
Av.Universitat 1, 43204 Reus, Spain
E-mail address: josemanuel.gimenez@urv.cat;
yitagesuzewdu.zergawu@estudiants.urv.cat

Abstract

Do exogenous economic shocks promote civil conflict directly? Do they affect all the societies alike? Using a large sample panel dataset, the current approach finds that commodity export prices shocks contribute to civil conflict in socially diversified countries. These findings contribute to the existing body literature linking income to conflict by analyzing not only the effect of commodity price shocks on conflict incidence, rather than onsets, but also by examining the joint effect of ethnicity and religious polarization and fractionalization.

Keywords: economic shocks; conflict; polarization; fractionalization; commodity price. *JEL classification:* D74, O11, O17

1. Introduction

Civil conflicts (intrastate turmoil, ranging from an anti-government mass demonstration and general strikes to violent riots and civil wars) have become the most common phenomena throughout the world, particularly in the developing countries, causing incidences of mass fatality and destroying the natural environment, physical infrastructures, human capital, and social and political institutions (Blattman and Miguel, 2010).[1]

As many empirical approaches show, a key factor behind the domestic conflicts is the economic situation (Miguel et al., 2004; Bazzi and Blattman,

[1] 150 large civil wars between 1945 and 2013 (Pettersson and Wallensteen, 2015).

2014; and Musayev et al., 2014, among others). Specifically, undesirable economic phenomena may aggravate ongoing conflicts or initiate a new episode of conflict incidences (Fearon and Laitin, 2003; Collier and Hoeffler, 2004).

Accordingly, a large number of studies have analyzed the impact of income shocks through the variability of commodity prices on domestic conflicts since, usually, the export price index is not affected by the actions of an individual country, and the commodity prices are more volatile than any other industrial product (Varangis et al., 2004; Kinda et al., 2016). In addition, note that the commodity price downfall affects not only the whole economy, but also the political performance of countries. An issue that becomes extremely important in the developing countries, whose Gross Domestic Products (GDPs) are predominantly dependent on primary commodity exports.

Nonetheless, the literature does not provide a unique relationship between economic shocks and domestic conflicts. Particularly, three possible channels explain that not only negative commodity price shocks, but also positive commodity price shocks may provoke civil wars. On the one hand, Collier and Hoeffler (2004) and Miguel et al. (2004) provide cross-country evidence about the negative relationship between growth shocks and the risk of civil war. They argue that wages represent the opportunity cost of insurrection, considering that conflict and production are alternative choices (Fearon and Laitin, 2003, among others). On the other hand, Fearon and Laitin (2003); Brinkerhoff (2005); Brückner and Ciccone (2010) and Dube and Vargas (2013) analyze the weakness of the state when controlling the territory downturns in the international price of its main export commodities occur, and they find that these shocks are followed by the outbreak of civil wars. Finally, Besley and Persson (2008) and Bazzi and Blattman (2014) consider the state as a prize (i.e., state prize motives), which hypothesises the higher the prices of exported commodities the greater the likelihood of internal conflict.

Besides the economic factors, social identity intolerance (ethnic or religious hostilities) also plays a central role in civil conflicts, especially in socially fragmented developing countries (Caselli and Coleman, 2013; Mitra and Ray, 2014): the struggle for control of economic resources among different interest groups may trigger either inter-ethnic or inter-religious grievances. In this regard, Fearon and Laitin (2003) identify that, between 1945 and 1999, about 51% of civil wars originated by way of ethnic conflicts.

Hence, ethnic and religious differences promote more conflicts than clashes

based on socioeconomic or class diversity (Ganepola and Thalaysingam, 2004; Lujala et al., 2005; Weinstein, 2006; Blattman and Miguel, 2010). Furthermore, Esteban and Ray (2016) argue that a "substantial share of conflict can take place in economically similar groups. Even though the conflict is over economic resources, the deriving cleavage is non-material hence it is social identity".

In this regard, although several papers study the effects of ethnolinguistic and/or religious fractionalization and polarization (the two most used indices to measure fragmentation) on civil conflicts and growth (see for instance, Alesina et al., 2003; Forsberg, 2008; Desmet et al., 2012; Esteban et al., 2012; Papyrakis and Raveh, 2014), the joint impact of commodity export shocks and ethnic diversity is not analyzed deeply. Particularly, Bazzi and Blattman (2014), using price shocks of 65 globally traded commodities and 118 developing countries from 1957 to 2007, find no evidence linking commodity price shocks to conflict ethnically polarized countries. Contrarily, Janus and Riera-Crichton (2015), using six categories of export commodities and import price shocks for 160 countries from 1970 to 2009, find a correlation between ethnic polarization and conflict.[2]

Since a groups identity may play a key role in triggering civil conflicts where the social heterogeneity is conspicuous, and there is no evidence about the joint effect of economic shocks with ethnic and religious diversity on domestic conflicts, the current approach analyzes the impact of commodity price shocks on intrastate conflicts in ethnically and religiously diversified societies. Our baseline specification uses conflict incidence rather than conflict onset because we find that incidence is more robust for measuring outbreaks of new conflicts. Specifically, using a large sample of commodity exports among emerging and developing economies (mainly non-OECD member), our analysis yields the following main findings.

Firstly, we observe the effects of commodity price shocks and social diversities on the outbreak of civil conflict incidences. Using both aggregated and disaggregated commodities, we find out significant relationships between

[2]Bazzi and Blattman (2014) and Janus and Riera-Crichton (2015) differ due to (i) the lagged values: while the former tested the effects of commodity price shocks during one year and the two preceding years, the latter test price shocks using the three preceding years; and, (ii) the level of ethnic diversity: Bazzi and Blattman (2014) studied the effects of price shocks in ethnically polarized countries, but not in countries with intermediate ethnic diversity, which is covered by Janus and Riera-Crichton (2015).

civil conflicts and price shocks with social heterogeneity. Furthermore, these results remain valid within different income levels and regions.

Secondly, we obtain that not only did income decrease, but also prices which are increased by export commodities are associated with civil conflicts, i.e., both negative and positive commodity price shocks and the pre-existence of social heterogeneity affect the likelihood of civil conflict incidences in the sample countries under analyze.

Finally, the robustness and statical significance of the index of ethnic polarization is obtained, telling us that commodity prices shocks tend to increase the probability of civil conflicts in developing countries with an intermediate level of ethnic diversity. The reminder of the distributional indices (ethnic fractionalization and religious polarization and fractionalization) have a decreasing effect during a general price changes, but have an increasing effect for income declining cases.

The remainder of this paper is organized as follows: Section 2 discuses so-called social diversity and distributional indices that indicate the measures of social heterogeneity. Section 3 describes the data and the empirical approach. Section 4 presents the main results and examines robustness along several dimensions. Section 5 provides Instrumental Variables Estimations. Finally, Section 6 concludes. Appendices present technical specifications and regression results.

2. Social diversity and conflict

In the casual relationship between economy and conflict, the existence of large and unfair inequalities in the resource distribution generates social tension and political unrest, not only in poor economies but also in the developed economies. Furthermore, social diversity serves as a basic structural foundation for potential conflict, but its conceptual understanding may differ according to the differences among the individuals we consider, such as ethnicity, race, gender, language, religion, and geographical area. Among all of them, the social group formations along ethnic, linguistic, religious, or cultural lines are usually attached to causes of social fragmentation and civil conflicts. In fact, as Reynal-Querol (2002) notes, countries with high ethnicity and religious cleavages are more vulnerable to being involved in intense conflict than those countries with conflicting claims on resources. Additionally, more than one half of the civil conflicts during the post-World War II have been based on ethnic fragmentation (Fearon and Laitin, 2003), hence

the likelihood of engaging in civil conflict due to exogenous economic shocks is high in countries where the social structure lies in ethnic and religious diversity.

To measure social diversity, the most commonly used indices are the fractionalization and polarization, which have been used as a central variable in several quantitative analyses, including quality of governance (Easterly and Levine, 1997; La Porta et al., 1999); economic growth (García Montalvo and Reynal-Querol, 2002; Alesina et al., 2003; Papyrakis and Raveh, 2014; Montalvo and Reynal-Querol, 2005); and ethnic conflict (Fearon and Laitin, 2003; Campos and Kuzeyev, 2007; Forsberg, 2008; Bhavnani and Miodownik, 2009; Desmet et al., 2012 Esteban et al., 2012).

The classical measure of social diversity is the **fractionalization** index **FRAC**, which originates with Hirschman (1964), and it deals with the likelihood that two randomly chosen people will be a part of different groups. Initially, Mira (1964) also develops this index for Ethno-Linguistic Fractionalization using the Herfindahl concentration formula from data compiled in a global survey of ethnic groups. Formally, if $\{n_1, n_2, ...n_m\}$ denotes the share of the population belonging to a (religious or ethnic) group m, then

$$FRAC = \sum_{i=1}^{N} n_i(1 - n_i) = 1 - \sum_{i=1}^{N} n_i^2, \tag{1}$$

which can be interpreted as the probability of selecting two individuals at random with different ethnic (or religious) groups.

In aiming to capture how conflictual a society is, Esteban and Ray (1994) introduced the **polarization** index **P**, which is based on the inter-group perceived distances d_{ij} as well group size. Formally,

$$P = \sum_{i=1}^{m}\sum_{j=1}^{m} n_i^2 n_j d_{ij}. \tag{2}$$

Unlike fractionalization, the polarization index measures the existence of deep cleavages in a society. Indeed, the polarization index attains its maximum value when the population is divided into two equal-sized group at some maximum distance from each other, while the fractionalization index obtains its maximum value when every individual has his or her own group, and each group is different from the rest (Esteban and Ray, 2011).

In the current approach, we use the **RQ polarization** measure proposed by García Montalvo and Reynal-Querol (2002), where the inter-group distance is binary, i.e., d_{ij}=1 if $i \neq j$ and 0 otherwise. In doing so, polarization is characterized by the normalized distance of a particular distribution of ethnic and religious groups from a bimodal distribution. Formally,

$$RQ = \sum_{i=1}^{m} n_i^2(1 - n_i). \tag{3}$$

As Montalvo and Reynal-Querol (2005) argue, in order to compute the ethnic or religious P index, the distances among all different ethnic or religious groups has to be computed, which will be a very difficult process. Hence, with the RQ index, García Montalvo and Reynal-Querol (2002) propose to assume that the absolute distance between two groups is equal.

Finally, note that there are a multitude of contextual usages of these distributional indices in the body of literature. Esteban and Ray (1994, 1999) studied, through the polarization index, the link between the level and pattern of social conflict (such as the generation of social tensions, revolution, and revolt or social unrest in general) with the distribution of a set of characteristics (such as wealth, ethnicity, religion, and political ideology) over a population. Easterly and Levine (1997) show that ethnic diversity has a direct negative effect on economic growth. Keefer and Knack (2002) envisage how social polarization reduces the security of property and contract rights and, through this channel, reduces growth. Alesina et al. (2003), using alternative data, confirm that there is a negative correlation between ethnic, linguistic and religious fractionalization and economic growth, quality of government and policies, and GDP per capita. Montalvo and Reynal-Querol (2005) present empirical evidence that ethnic and religious polarization has significant and negative effect on economic development. Woo (2005) show how a fiscal instability channel negatively links social polarization and growth. Campos and Kuzeyev (2007) find that dynamic ethnic fractionalization is negatively related to economic growth. Østby (2008) shows that social polarization and horizontal social inequality are positively related to conflict outbreak. Esteban and Ray (2011) also obtain a positive result that both ethnic and religious polarization have a significant effect on conflict. Desmet et al. (2012) also demonstrate that deeply-rooted linguistic cleavages may limit the integration of markets, and prevent economic growth. By the same token, there are several other studies that reinforce the direct relation of

polarization with income inequality, social diversity and generation of social tensions (Seshanna and Decornez, 2003; Duclos et al., 2004; Wang and Wan, 2015, among others).

3. The empirical approach

We analyze the effect/impact of social heterogeneity and commodity price shocks on the incidence of civil conflicts. For the independent variable, together with the export price shocks, we use the distributional indices, and domestic conflict indicators. In addition, we have institutional quality indices and other control variables that are commonly used in the literature such as GDP per capita, Gini indexes, population size, foreign aid per capita, geographical factors, among others. The detailed description and data sources for all these variables are included in Appendix A.

3.1. ***Conflict***

Conflict is a very extensive and comprehensive subject matter in the social sciences. Nonetheless, since we are interested in analyzing the impact of commodities price shocks on the political stability of a nation, we deal with domestic violent conflicts. Specifically, by the Uppsala Conflict Data Program (UCDP/PRIO) definition, an armed conflict is "a contested incompatibility that concerns government and/or territory where the use of armed force between two parties, of which at least one is the government of a state, results in at least 25 battle-related deaths" in one calender year(Pettersson and Wallensteen, 2015). Note that, this definition of conflict is highly associated with violent conflict that results in death tolls, a minimum 25-dead threshold per year and per dyad (consists of two conflicting primary parties).[3]

In the analysis, we consider conflict incidence rather than onset incidence. The conflict incidence is an indicator variable that is 1 if there is a conflict in t, and 0 otherwise. Therefore, the conflict incidence indicated 1 possibly because of the outbreak of a new episode of conflict or the continuation of the existing conflict. On the other hand, conflict onset is an indicator variable that captures conflict outbreak. The onset in year t is 1 if there is a conflict in t but there was no conflict in $t-1$; 0 if there is no conflict in t and $t-1$; and not defined if there was conflict in $t-1$. This measurement of conflict has

[3] http://www.pcr.uu.se/research/ucdp/definitions/.

limitations. For instance, it is distinguishable whether a conflict event has a new fresh cause or it is the continuation of a previous fight. Furthermore, as Esteban et al. (2012) argue, the threshold definition of "onset" is "far from a sharp concept: it is arguably no difference from a year of "incidence", though to be sure, the factors that contribute to the outbreak of a conflict do not coincide with the ones that keep feeding it". Therefore, we use, in all our specifications, the measure of conflict incidence in order to avoid the aforementioned shortcomings.

Accordingly, we use the data in the UCDP Monadic Conflict Onset and Incidence Dataset (which contains a country-year version of the UCDP/PRIO Armed Conflict Dataset (ACD) v.4-2015), codes for each country and the years from 1946 to 2014. The UCDP/PRIO database offers a yearly binary indicator, whether peace or a violent conflict occurred between named non-state armed actors and government forces that directly killed at least 25 people as thresholds. In the categorization scheme of the earlier versions of the UCDP/PRIO, ACD the intensity variable contained three categories: minor, intermediate and war.[4] However, in the new version of this database, the intensity variable is coded into two categories. "Minor", conflicts, estimated to have killed an average of between 25 and 999 individuals per year; and "War" conflicts or civil wars, that are estimated to have killed at least $1,000$ individuals in a given year (Pettersson and Wallensteen, 2015). We take both "minor" and "war" thresholds of the UCDP/PRIO dataset as a dependent variable in order to estimate the effect of price shocks in the framework of social heterogeneity.

For robustness check purpose, we also consider the impact of price shocks on conflict intensity and civil wars. Conflict intensity measures the magnitude of the armed conflicts. The UCDP/PRIO "Armed Conflict Dataset" describes conflict intensity by defining the level of conflict episodes that satisfy the minimum (UCDP/PRIO 25 deaths per year) and war (UCDP/PRIO $1,000$ deaths per year). For intensity, the dataset assigned a value of 0 for "peace", for conflict events that qualify as UCDP/PRIO 25 deaths at the minimum and under UCDP/PRIO $1,000$ deaths at the maximum, the dataset was assigned a value of 1, and events that recorded as UCDP/PRIO

[4]In the old versions of UCDP/PRIO, "minor" conflicts threshold estimated more than 25 battle-related deaths in a given year; "intermediate" the category was defined as "more than 25 battle-related deaths but fewer than $1,000$ per year" and, "war" whereby at least $1,000$ people per year are killed.

1,000 (and above) death are assigned 2. In addition, we contemplated the impact of commodity price shocks and social heterogeneity on civil wars. We obtain the civil war data from the Center for Systemic Peace, dataset. The dataset computed "Major Episodes of Political Violence" (MEPV), which gives the magnitude scores of episode(s) of civil warfare involving that state in that year. It scales 1 (lowest) and 10 (highest) for each MEPV (Marshall, 2010). As magnitude scores for multiple MEPV are summed, we recode and assign a value of 1 for presence of civil war, but 0 denotes zero episodes.

3.2. ***Commodity Price shocks***

As aforementioned, the commodity net export price shocks are taken as a proper indicator of exogenous economic shock, related to civil conflict. In doing so, data on world market commodity price indices and commodity export and import values are collected for 57 globally traded commodities, mainly extracted from the International Financial Statistics (IFS) database. Additionally, we also take price data from Global Financial Data (GFD) For the missing price data, we have obtained data directly from Bazzi and Blattman (2014). The data for net export value (export minus import) was primarily extracted from the United Nations Commodity Trade Statistics Database (UN Comtrade) according to the SITC1 system as organized in 2015.[5] Finally, for multiple price series commodities, we use the average price; and, in order to fill in the missing values, we use the UN International Trade Statistics Yearbooks and Regional Statistical Yearbooks.

With these data, and following Deaton et al. (1995); Dehn (2000); Musayev et al. (2014) and Kinda et al. (2016), we construct the price shocks index as follows. At the first step, we develop a geometrically weighted price index for each year and country (Deaton et al., 1995):

$$PI_{i,t} = \sum_{j=1}^{n} \Pi P_{j,t}^{w_{i,j}},$$

where $PI_{i,t}$ is the commodity price index in country i for year t; $P_{j,t}$ is the world price of commodity j at time t; and $w_{i,j}$ is the country-specific weighting of the commodity at the base year (the share of commodity j in total exports).

[5] Whereby, the individual UN member countries gathered data from national and international sources via the United Nations Statistics Division.

At the second step, following Musayev et al. (2014), and Kinda et al. (2016), we take the mid-point of the sample period (1990) as the baseline. The total net export value of all commodities for which the country is a net exporter is calculated for each country. Then the individual 1990 net export values for each commodity are divided by this total in order to achieve 1990 country-commodity specific weights, $w_{i,j}$ (when all years are not available, we take the nearest five years).

$$w_{i,j} = \frac{P_j Q_{ij}}{\sum_{j=1}^{n} P_j Q_{ij}},$$

where Q_{ij} denotes the export volume of commodity j at the base year. As Musayev et al. (2014) state, although the purpose is to capture the price shocks rather than quantity movements, at the same time, due to the difference between abundant and scarce resource countries, it is critical to hold volumes constant. Hence, this approach has several advantages: the index does not capture any resource discoveries or any other quantity shocks after the base year; the index does not capture any post base year temporary volume shocks other than which may have occurred in the base year itself; and, it avoids possible endogeneity problems that may arise in the event of a volume response to price changes.

Finally, we follow Kinda et al. (2016) in order to measure the price shocks as the estimated residuals of an econometric model of the logarithm of commodity price regressed on its lagged values (up to three) and quadratic time trend.[6] This approach helps to make the price shock indices stationary and removes predictable elements from the stationary process,

$$lnPI_{i,t} = \alpha_{i,0} + \alpha_{i,1} t + \sum_{p}^{n} \theta_{i,p} lnPI_{i,t-p} + \varepsilon_{i,t},$$

3.3. ***Measure of Heterogeneity***

Ethnic and religious fractionalization, as well as polarization indices, are our core independent variables. Hence, our analysis is based on the dataset

[6] While we compared the linear time trend and the quadratic time trend, we found the liner time trend fitted the price indices better. Hence, we use the liner price index in our regression.

developed by Montalvo and Reynal-Querol (2005), who use various sources for both ethnic and religious diversity. On the one hand, the religious dataset is constructed from two main sources. The primary source is "L'Etal des Religious Dans le Monde (ET)", which provides relevant information to the calculation of indices of diversity, and "The Statesman's Yearbook (ST)" is used as a supplementary source. Accordingly, the dataset considers almost all kinds of religious from the biggest religious groups to to the small collectives religious groups. On the other hand, for the ethnolinguistic diversity dataset, the basic source is the "World Christian Encyclopaedia (WCE)", which presents classifications in the form of ethnolinguistic.

The Montalvo and Reynal-Querol (2005) ethnolinguistic diversity dataset is mainly distinguished from the commonly used ethnic diversity index in the literature (Alesina et al., 2003; Fearon and Laitin, 2003) since they have followed the Vanhanen (1999) perception. On the one hand, the Montalvo and Reynal-Querol (2005) is distinguished from the Alesina et al. (2003) dataset on the level of disaggregation of ethnic groups, i.e., while the formers follows the Vanhanen (1999) approach to identify the relevant level of disaggregation, the latter dataset captures the more disaggregated level. On the other hand, the Montalvo and Reynal-Querol (2005) approach diverges from the Fearon and Laitin (2003) dataset by the measures of distances among groups. Although the measurement of group distances is a very strenuous process, Fearon and Laitin (2003) propose that the measuring should be a continual work in progress by with respect to the expertise of specific countries, whereas Montalvo and Reynal-Querol (2005) do not contemplate the distance between groups. Therefore, we use the Montalvo and Reynal-Querol (2005) dataset for distributional indices because the dataset consolidates both ethnic and religious indexes of the fractionalization and the polarization measures.

3.4. ***Additional Independent Variables***

Additionally, we use other variables depending on the specific estimation under analysis: log population (POP); log GDP per capita ($GDPPC$); log foreign aid per capita, Index, Gini Index, institutional quality indicators including regime-type such as a democracy and autocracy, political rights and civil liberty as well as the geographical factors such as mountainous and noncontiguous. (See Appendix A).

VARIABLES	N	mean	sd	min	max
Ethnic Polarization	3,738	0.00304	0.350	-1.876	2.102
Ethnic Fractionalization	3,738	0.00576	0.329	-1.722	2.000
Religious Polarization	3,738	0.0147	0.364	-2.325	2.451
Religious Fractionalization	3,738	0.00832	0.225	-1.334	1.705
Price Shocks	3,738	3.03e-10	0.582	-2.489	2.732
Civil war	3,780	0.122	0.396	0	3
Civil conflict incidence	4,005	0.218	0.413	0	1
Civil conflict intensity	4,005	0.287	0.587	0	2
Ln.Real GDP Per Capita	4,005	3.001	0.600	1.761	4.750
Ln.Population	4,005	6.900	0.733	5.205	9.135
Gini Index	3,581	3,613	10,013	60	186,710
Ln.Foreign aid per capita	3,834	38.89	57.12	-50.79	722.7
Mountainous	4,005	15.35	20.24	0	74.50
Noncontiguous	4,005	0.101	0.302	0	1
Democracy	3,915	0.438	0.496	0	1
Autocracy	3,870	0.557	0.497	0	1
Executive	3,870	0.567	0.496	0	1
Political Rights	4,005	0.573	0.495	0	1
Civil liberty	4,005	0.565	0.496	0	1

Table 1: **Summary Statistics.** Full definition of the variables and the variable measurement annexed.

3.5. ***Sample Size***

The availability of data from different sources and for different variables, grievously limited the size of our sample. We studied 89 non-OECD member countries and 57 exportable primary commodities over the period of 1970-2014. We have a total of 3,649 number of observations. Our analysis starts by considering several indicators for the incidence of conflict and then we deal with the conflict intensity and civil war pattern.

3.6. ***The Empirical Conflict Model***

In order to measure the effect of exogenous economic shocks and social heterogeneity on the intrastate conflict, we regress conflict incidence in the baseline specification. The price shocks and the interaction terms with different measures of ethnic and religious diversity are the main explanatory variables. Similarly to Janus and Riera-Crichton (2015), the baseline estimation model is as follows,

$$C_{jt} = \alpha + \beta S_{j(t-1)} + \gamma S_{j(t-1)} \times (P_j + F_j) + \mu_j + \tau_t + \rho_j t + \varepsilon_{jt}, \qquad (4)$$

where C_{jt} is an indicator of the conflict event in country j at year t. $S_{j(t-1)}$ is the deviation of the price index from its conditional mean with up to three

years lag from the past price index. We augment the basic conflict regression model by adding two variables: ethnic (religious) Polarization (P_j) and ethnic (religious) fractionalization (F_j), which can capture the effect of a country's social composition. Since Bazzi and Blattman (2014) and Janus and Riera-Crichton (2015) consider lagged terms of shock is as a better predictor of conflict; we use up to three-year lagged shocks instead of contemporary shocks. μ_j and τ_t are the country and year fixed effects, ρ_{jt} is the country-specific time trends, and ε_{jt} is an idiosyncratic error term. The econometric justification for using a year fixed effect is aimed at eliminating any potential bias from the co-movement of global shocks and global conflicts, and cluster standard errors by country; and the use of a country-specific time trend accounts for secular changes in conflict risk that may vary across countries and offers a flexible way to incorporate import price shocks (Bazzi and Blattman, 2014). In all regressions, we use robust standard errors clustered at the country level to control for serial correlation.

4. Results

4.1. Baseline Specification

The preceding literature provides heterogeneous results regarding the impacts of income shocks on civil conflicts. In particular, Bazzi and Blattman (2014) and Janus and Riera-Crichton (2015) show different effects of the commodity export price shocks on civil wars in relation to social diversity. Accordingly, Bazzi and Blattman (2014) conclude that in countries with ethnic heterogeneity, price declines have no clear effect on civil war onset; whereas, Janus and Riera-Crichton (2015) show that commodity terms of trade declines result in civil war with intermediate ethnic diversity.

The present paper, somehow follows the evidence that given by the approach of Janus and Riera-Crichton (2015), but it differs from the previous literature by two main aspects. Firstly, we test the effect of commodity price shocks on conflict incidence, rather than civil war or conflict onset. Secondly, we study the effects of commodity price shocks in relation to the social diversity by considering ethnic and religious diversity, instead of focusing only on ethnic identity.

Besides the conflict incidence, we also use civil war and conflict intensity measurements as an alternative dependent variable to capture the effect of the price shocks on civil wars in specific cases. The main analysis focuses on how income variation and social heterogeneity impact civil conflicts, hence

we use the interaction between commodity price shocks and indexes of social diversity (i.e., ethnic and religious fractionalization and polarization). Hereinafter, we compute p values in parentheses using robust standard errors adjusted for clustering at a country level. Moreover, each model is estimated while controlling for country-specific time trend, year and country fixed effects.

The baseline specification in Table 2 displays the effects of economic shocks and social diversity in the developing countries. Each column of the table contains the lagged commodity price shocks (ΔPS) and we continually add distributional indices interaction with a variable of price shocks. Primarily, our analyses is based on the Montalvo and Reynal-Querol (2005) measure of distributional indices. Hence, columns 2 to 5 employ the interaction between price shocks and ethnic polarization, price shocks and ethnic fractionalization, price shocks and religious polarization and price shocks and religious fractionalization, respectively. Additionally, in columns 6 and 7 we add the commonly used Fearon and Laitin (2003) ethnic polarization index and ethnic fractionalization index in order to see the alternative measures of ethnic diversity.

In column 1, we simply regress civil conflict incidence on the lagged of commodity price shocks. Although the coefficient has the expected sign, it is insignificant. This result confirms the findings of Bazzi and Blattman (2014) and Janus and Riera-Crichton (2015) that commodity price shocks are a weak predictor of civil conflicts when used as a stands-alone. However, in column 2, we add an interaction between the lagged commodity price shocks and ethnic polarization (ΔPSEP). The statistically significant effect implicates that in the countries where the ethnic diversity is polarized, a standard deviation change in countries' net export commodity prices is associated with an increase in the probability of civil conflict incidences about 0.14 percentage points, ceteris paribus. In a similar vein, in column 5 we find the same effect of the commodity price shocks on civil conflicts using the Fearon and Laitin (2003) index of ethnic polarization interaction with the lagged commodity price shocks (ΔPSEPf). Accordingly, a standard deviation change of net export commodity price is predicted to increase the likelihood of civil conflict risks by approximately by 0.029 percentage points, holding all other variables at their means.

In contrast, for highly fragmented countries (ethnic diversity high) the shocks to the commodity prices are associated with a decreased the probability of civil conflicts. Table 2 column 3 estimates an interaction between

the lagged commodity price shocks and ethnic fractionalization (ΔPSEF). The finding implies that a unit commodity price change decreases the likelihood of civil conflicts by 0.09 percent. Likewise, in column 7 we introduce the Fearon and Laitin (2003) index of ethnic fractionalization (ΔPSEFf) as an alternative. Hence a new finding is that the interaction between ethnic fractionalization and the lagged commodity price changes decrease the portability of civil conflict risks. Meanwhile, in Table 2 the subsequent two columns (4 and 5) estimate the effect of interaction terms of the lagged price shocks and religious polarization (ΔPSRP); and religious fractionalization (ΔPSRF), respectively. The statically significant results of the religious diversity manifest that the net export commodity price shocks have decreasing effect on the probability of civil conflict incidences.

Taking into account the aforementioned baseline specification, in relation to the net export commodity price shocks, both religious and ethnic diversity affects, either by increasing or decreasing the portability of civil conflicts. In particular, the findings show that where ethnic diversity reaches the polarized level, a general commodity price shock increases the probability of civil conflicts. This prediction fits with the findings in the body of literature that correlates an intermediate ethnic distribution with the portability of civil conflicts. Esteban and Ray (1999) show, through a behavioral model, that a two-point symmetric distribution of population maximizes conflicts. Specifically, in the "bipolar" distribution of ethnic polarization, where a large ethnic minority (close to 50 percent) faces an ethnic majority, the probability of civil conflicts gets to a high level (Garcia-Montalvo and Reynal-Querol, 2004). Dealing with the effect of ethnic polarization, Janus and Riera-Crichton (2015), and Esteban et al. (2012), among others, also show an increasing effect of ethnic polarization on the likelihood of civil conflicts.

Note that in the baseline specification, we consider the general case of the price shocks, i.e., negative and positive price changes together. In other terms, results in Table 2 do not specify any particular effect of income decline on the likelihood of civil conflicts linking to social diversity. In our sample, the distribution of the positive and the negative values in price shocks index is almost equivalent. Hence, to explore the implication further, we consider the effect of income decline and income raise on civil conflict risks by limiting our observation distinctly to the negative price shocks and positive price shocks. This approach enables to explain the three aforementioned stylized channels of conflicts that are related with income variations. Moreover, the approach

VARIABLES	C.Incid	C.Incid	C.Incid	C.Incid	C.Incid	C.Incid	C.Incid
ΔPS_{t-1}	0.00702	-0.0862***	0.0515**	0.0618***	0.0591***	-0.00615	0.0464**
	(0.0138)	(0.0264)	(0.0223)	(0.0187)	(0.0181)	(0.0166)	(0.0212)
$\Delta PSEP_{t-1}$		0.163***					
		(0.0390)					
$\Delta PSEF_{t-1}$			-0.0883**				
			(0.0350)				
$\Delta PSRP_{t-1}$				-0.112***			
				(0.0243)			
$\Delta PSRF_{t-1}$					-0.177***		
					(0.0362)		
$\Delta PSEPf_{t-1}$						0.287*	
						(0.163)	
$\Delta PSEFf_{t-1}$							-0.0699**
							(0.0278)
Constant	0.825***	0.825***	0.825***	0.822***	0.822***	0.825***	0.827***
	(0.0618)	(0.0617)	(0.0619)	(0.0622)	(0.0620)	(0.0618)	(0.0619)
Observations	3,649	3,649	3,649	3,649	3,649	3,649	3,649
R-squared	0.482	0.484	0.483	0.484	0.484	0.482	0.482
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	YES	YES	YES	YES	YES	YES	YES

Table 2: **The effect of ethnolinguistic and religious heterogeneity and Price Shocks on conflict Incidence: Main Results.** Linear Portability Model estimates with robust standard errors clustered by country in parentheses. All regressions include country and year fixed effects, and country specific time trends. Notation: *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

identifies which channel is linked with the index of social heterogeneity.

In doing so, Table 3, Panel A, column 2 shows that although the interaction term between the lagged commodity price shocks and ethnic polarization (ΔPSEP) has the expected sign, it is not significant. On the other hand, in columns 3 to 5 income declines are associated with increasing the probability of civil conflicts, where the social heterogeneity of the analyzed countries are characterized by ethnic and religious fractionalization, and also by religious polarization. Quantitatively, while a standard diversion declines in the commodity price, the likelihood of civil conflict increases by 0.11 percentage points in the case of ethnic fractionalization interacting with the lagged of commodity price shocks (ΔPSEF). Whereas, the interaction between the lagged commodity price shocks and religious polarization (ΔPSRP), as well as the interaction between the lagged commodity price shocks and religious fractionalization (ΔPSRF) imply that every standard deviation decreasing in the net export commodity prices, increases the probability of civil conflict

in 0.90 and 0.91 percentage points, respectively.

When the commodity price is decreasing in commodity-dependant countries, it significantly affects the household's income, overall livelihoods, and government revenue. Particularly, low-income social groups with their limited resilience are the most vulnerable to shocks. In this sense, the literature commonly has linked income fluctuations with the opportunity cost of fighting (Fearon and Laitin, 2003). Deteriorated socioeconomic situations may motivate individuals to increase their benefits by engaging in rebellion, which intensifies conflicts. Hence, in such societies the opportunity cost of engaging in conflict is small (see for instance, Hirshleifer, 1995; Miguel et al., 2004; Dal Bó and Dal Bó, 2011). Our findings in columns 3 to 5 support the hypothesis of "opportunity cost" as a possible channel of conflict in relation with income decline.

In addition, decreasing income in relation to negative commodity price shocks may directly affect the state capacity by lowering government revenue.[7] This internal situation may push the government to adjust the budgets in order to accommodate revenue shortfall. This also indirectly affects the economic growth of a country through balancing macro-economic variables, as well as through increasing the government expenditure on pro-poor programs etc. Hence, a weak state capacity limits the government to address public demands, and to resolve recurrent social antagonisms. Such weak conditions may result in weaker security, and erosion of social cohesion and institutional quality. Results in Table 3, Panel A confirm this hypothesis of "weakening state capacity" as a civil conflict channel setting with decreasing income.

On the other hand, Table 3, panel B reports findings for positive commodity price shocks. In column 2, a positive price shock is related to a significantly high possibility of civil conflicts in ethnically polarized countries. The interaction between the lagged commodity price and ethnic polarization (ΔPSEP) implies that if the standard deviation is increasing in commodity price raises, then the probability of civil conflicts is about 0.26 percentage points. While we compare the magnitude of conflicts by taking into consider-

[7] With regard to the impact of adverse commodity price shocks Kinda et al. (2016) show that negative shocks to commodity prices lower GDP growth, government revenues and savings, while the shocks increase debt in foreign currency and unemployment. Such economic slowdown and unemployment, combined with savings withdrawal, etc., jeopardize the government capacity.

ation sizes of coefficients with respect to (ΔPSEP), we find a larger coefficient in the case of a positive price shocks (0.396), than in the general case (0.163).

This finding affirms the "state prize" hypothesis as a channel of conflict relating to price shocks. In other words, our finding justifies that an instant increase in the rent that is controlled by a weak state can become a source of political destabilization in ethnically polarized countries by motivating insurgent groups (i.e., ethnic groups that are bereft of the power) to capture the state power. In addition, the positive shocks may channel conflicts in relation to the pre-existing structure of social status. Typically, there could be ethnic, religious or geographic-specific products. This can be dictated by environment, type of soil, nature of livelihood and type of production culture of a specific society. We can consider, for instance, capital-intensive and labor-intensive type of production, and so on (Abidoye and Calì, 2015; Dube and Vargas, 2013). If, suddenly, the price of some commodities of a specific production sector goes up significantly, then, some ethnic or religious groups may be much richer in contrast to other groups. In this regard, Mitra and Ray (2014) find that in India the Hindu attacks against Muslims systematically follow a period of differential wealth growth among the Muslims. Hence, the conflict may be due to the heterogeneity of products as one of the ethnic groups may make enough money from the positive shock to buy arms to use in the next season.

Finally, the social heterogeneity index has a divergent effect on civil conflicts in relation to changes in the commodity prices. Our findings show that the magnitude of increase or decrease on conflicts is determined by the type of commodity price shocks interacting with the ethnic and religious diversity indices.

4.2. ***Robustness Checks***

We analyze some variations in order to test the robustness of the baseline in Table 2. We primarily focus on the use of additional control variables. Furthermore, we check the robustness of our findings using alternative dependent variables such as civil war and conflict intensity, control for low-income economies, control for regional dummies and desegregating the commodity price shocks into specific commodity categories.

In Table 4, we use additional control variables to examine the effect of commodity price shocks and social heterogeneity on civil conflicts. Throughout the columns, we add the lagged controls such as **population, real GDP**

Panel A: Negative Shocks							
VARIABLES	C.Incid	C.Incid	C.Incid	C.Incid	C.Incid	C.Incid	C.Incid
ΔPS_{t-1}	0.0134	0.0638	0.0940*	0.0790*	0.0744*	-2.35e-05	0.0207
	(0.0296)	(0.0607)	(0.0535)	(0.0428)	(0.0415)	(0.0427)	(0.0529)
$\Delta PSEP_{t-1}$		-0.0952					
		(0.0921)					
$\Delta PSEF_{t-1}$			-0.179*				
			(0.0996)				
$\Delta PSRP_{t-1}$				-0.131**			
				(0.0623)			
$\Delta PSRF_{t-1}$					-0.208**		
					(0.0993)		
$\Delta PSEPf_{t-1}$						0.260	
						(0.465)	
$\Delta PSEFf_{t-1}$							-0.0134
							(0.0819)
Constant	0.656***	0.649***	0.645***	0.640***	0.644***	0.657***	0.656***
	(0.133)	(0.133)	(0.133)	(0.133)	(0.133)	(0.133)	(0.133)
Observations	1,381	1,381	1,381	1,381	1,381	1,381	1,381
R-squared	0.514	0.515	0.516	0.516	0.516	0.514	0.514
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	YES	YES	YES	YES	YES	YES	YES
Panel B: Positive Shocks							
VARIABLES	C.Incid	C.Incid	C.Incid	C.Incid	C.Incid	C.Incid	C.Incid
ΔPS_{t-1}	-0.0464	-0.280***	-0.121*	-0.0341	-0.0395	-0.0722*	-0.0858
	(0.0335)	(0.0897)	(0.0689)	(0.0653)	(0.0607)	(0.0402)	(0.0627)
$\Delta PSEP_{t-1}$		0.396***					
		(0.133)					
$\Delta PSEF_{t-1}$			0.142				
			(0.109)				
$\Delta PSRP_{t-1}$				-0.0207			
				(0.0817)			
$\Delta PSRF_{t-1}$					-0.0189		
					(0.114)		
$\Delta PSEPf_{t-1}$						0.554	
						(0.394)	
$\Delta PSEFf_{t-1}$							0.0671
							(0.0823)
Constant	0.740***	0.717***	0.743***	0.740***	0.740***	0.746***	0.739***
	(0.164)	(0.162)	(0.163)	(0.165)	(0.165)	(0.169)	(0.163)
Observations	1,358	1,358	1,358	1,358	1,358	1,358	1,358
R-squared	0.528	0.531	0.529	0.528	0.528	0.528	0.528
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	YES	YES	YES	YES	YES	YES	YES

Table 3: **The effect of ethnolinguistic and religious heterogeneity and Negative Price Shocks on conflict Incidence**, Linear Probability Model estimates with robust standard errors clustered by country are in parentheses. All regressions include country and year fixed effects, and country-specific time trends. Notation: *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

per capita, Gini index, foreign aid per capita, institutional and governance indicators: institutionalized democracy, institutionalized autocracy, lack of executive constraints, lack of civil liberties, and lack of political rights. Moreover, we use geographical controls including mountainous terrain and "noncontiguity" (i.e., whether a country has regions separated by land or water). These controls have been widely used in the literature (see, for instance, Fearon and Laitin, 2003; Collier and Hoeffler, 2004; Montalvo and Reynal-Querol, 2005; Blattman and Miguel, 2010; Brückner and Ciccone, 2010; Esteban et al., 2012; Nunn and Qian, 2012; Janus and Riera-Crichton, 2015). The inclusion of all these additional explanatory variables does not change the quantitative results that we have in the baseline specification. Therefore, these results show that our findings are robust. Indeed, most of the control variables are statistically significant with the expected signs. For instance, the real GDP per capita has the expected decreasing effect on the probability of civil conflicts, as countries with higher income are less exposed for civil conflicts even in conditions of economic shocks.

Table 5, presents alternative measures of political instability. Columns 1 to 4 report a non-binary measure of conflict intensity. Accordingly, we find homogeneous effect of the price changes to the conflict intensity as we have in the baseline specification. The interaction term between the lagged commodity price shocks and ethnic polarization increases the likelihood of civil conflicts, but ethnic fractionalization, religious polarization and religious fractionalization interacting with the lagged commodity price shocks decrease the likelihood of civil conflict intensity. Once again, in Table 5 columns 5 to 8 we have an identical effect of the commodity price shocks on the probability of civil wars, as with the baseline results. In general, in the case of ethnic polarization we have an increasing effect, but for ethnic fractionalization, religious polarization and fractionalization the decreasing impacts hold as being more the case.

Within the developing and emerging country group, economies with higher income may be less conflict-prone in response to commodity price shocks. On the other hand, considering that countries with less income are more likely to respond to price changes, **as a robustness check, we focus on a sample with low-income economies to examine how sensitive they are**

for economic shocks.[8] In spite of a significant drop in the sample size, the results in Table 6 remain statistically significant and confirm that our baseline findings are robust. In column (1, commodity price changes increases the likelihood of civil conflicts in the countries where ethnic diversity is polarized. Furthermore, the coefficients associated with the interaction between price shocks and ethnic polarization are higher than those in Table 2. Quantitatively, one standard deviation change in the commodity price index is estimated to increase the probability of civil conflicts by 0.16 percentage points in the low-income countries where the level of ethnic heterogeneity is polarized. The rest of the columns also keep to hold the significance and the signs that we obtain in Table 2.

Further, in our robustness check process, **we test whether our findings are driven by particular regions that might usually be deemed as conflictual**. Table 7 reports the results we obtain by adding three regional dummies including Africa, Asia and Latin America. The results appear unanimously significant, while keeping the signs we have in the baseline specification. This indicate that the effects of social heterogeneity and commodity price shocks on civil conflicts do not affect their specificity with respect to particular region.

Finally, we test the robustness of the baseline findings for **specific commodity groups**. Table 8 deals with the effect subcategories of commodity shocks. Accordingly, we classified the types of commodities into three subcategories: agricultural, mineral and energy commodities. This classification helps to distinguish the effect of labor-intensive (agricultural products), and capital-intensive (minerals and energy products) on conflicts. In doing so, we test whether our findings in the baseline specification depend on the type of the commodity. Panel A presents the agricultural commodities price shocks and their effects on a domestic conflict in relation to social heterogeneity. Unlike other commodities in the sample, almost all countries export agricultural commodities. However, any of the estimation results show a

[8]The cut-off levels for low-income and high-income countries are taken to be as in DeJong and Ripoll (2006) and Musayev et al. (2014), where the income economies classification are as the threshold as defined by World Bank's income measures. The resulting income definition applies to the following categories: low-half income countries are those with real per capita GDP less than $5,499$ USD and the higher-half income countries are those with real per capita GDP above $5,500$ USD. In this paper, the classifications are based on the beginning sample income rankings.

significant effect on civil conflicts. Throughout the columns, whether relating to agricultural commodities price changes or in the case of interaction between the social heterogeneity indexes, agricultural price changes do not influence the probability of civil conflicts. On the other hand, in panel B we have estimation results for mineral commodities. In column 2, we find that the interaction between ethnic polarization and the lagged price changes to mineral commodities is statistically significant. Accordingly, one standard deviation change in the mineral commodity change increases the probability of civil conflicts by about 0.15 percentage points in countries where ethnic diversity is polarized. Nevertheless, in panel C we find no significant result for energy commodities price changes and for interaction terms.

5. Instrumental Variables Estimates for Income changes and Civil Conflicts

Aiming at compute the main findings in Section 4, we estimate the effect of income changes on civil conflicts using a two stage equation instrumental variables approach. For instance, Miguel et al. (2004) estimate in the first-stage, the relationship between income growth and rainfall growth and Brückner and Ciccone (2010) wrote on the relationship between income growth and price change, in the second stage, both estimate the impact of income growth on the incidence of violence conflicts. Likewise, Janus and Riera-Crichton (2013) estimate the effect of income growth on civil war instrumenting the growth of GDP per capita with growth rate of the commodity terms of trade. Following similar approaches, we also estimate the impact of income changes on the incidence of civil conflicts. Accordingly, we instrument change rate of real GDP per capita with the lagged net export commodity price changes. Unlike previous authors, we show that the effect of price changes in combination with the index of social heterogeneity. We use two-stage least squares (IV-2SLS), which is usually preferred in the case of a dichotomous explanatory variable. Moreover, since the linear IV model permits it we include country and year fixed effects with all estimations.

Table 9 reports the IV estimation results for civil conflict incidences. In panel B the first-stage relationship between price change and income change is statistically significant and positive across specifications at various confidence level to the inclusion of social diversity indeces interacting with price changes. On the other hand, the interaction terms of price changes and social heterogeneity indeces affect the income growth which interacts with ethnic

and religious diversity in strongly positive and remarkably uniform manner throughout the specifications.

Panel A shows the second stage estimation results on the effects of income growth and income growth interacting with ethnic and religious polarization and fractionalization on civil conflict incidences. In column 1, we regress civil conflict incidence on the instrumented value of growth, and we found a statistically insignificant result. However, in column 2, we estimate the effect of ethnic polarization by interacting with the unterminated value of growth. A standard deviation change in growth is associated with about 5.9 percentage points increases in the likelihood of civil conflict incidences in the countries where ethnic diversity is polarized. In column 3 to 5, we study the effect of ethnic fractionalization, religious polarization and religious fractionalization interacting with the instrumented income changes, subsequently. Likewise, with the baseline specification results, the portability of civil conflict incidences decreases their associating growth changes with ethnic fractionalization and religious diversity. Quantitatively, each a standard deviation change in the interaction term of the instrumented growth change and ethnic fractionalization, religious polarization and religious fractionalization decreases the likelihood of civil conflicts by 4.05, 5.88, and 6.4 percentage points, respectively. In column 7, we also find an indistinguishable result for the alternative Fearon and Laitin (2003) measure of ethnic fractionalization. Hence, a standard deviation change in the interaction between ethnic fractionalization and the instrumented growth change decreases the likelihood of civil conflict risks by approximately 4.46 percentage points.

6. Conclusion

This paper analyzes the joint effect of exogenous economic shocks and the pre-existence of social heterogeneity in political instability and civil conflicts. In doing so, we use a sample of 57 net exports globally tradable commodities among 89 emerging and developing countries over the period 1970-2014. For the measures of social heterogeneity, we mainly employ the Montalvo and Reynal-Querol (2005) indexes of ethnolinguistic polarization and fractionalization as well as religious polarization and fractionalization. Meanwhile, as an alternative, we also use the Fearon and Laitin (2003) ethnic polarization and fractionalization indexes.

Our empirical findings show that shocks to commodity prices affect the likelihood of civil conflicts in the countries under analysis. In fact, the im-

pacts of these shocks on conflicts determined by the nature of social diversity.

In particular, the more polarized ethnicity is the society, the greater the adverse effect of price changes on the probability of civil conflicts. This investigation has illustrated that price shocks have an increasing impact on the likelihood of civil conflicts, where ethnic diversity is characterized by a bimodal distribution (polarization). Furthermore, this effects remains robust in the case of positive shocks to the commodity prices.

Meanwhile, commodity price shocks have a mixed effect on the probability of civil conflicts in relation to ethnic fractionalization, religious polarization and fractionalization measure of social diversity. On the one hand, general changes in commodity prices have a decreasing effect on the probability of civil conflicts. On the other hand, commodity price decline of the commodity prices is associated with an increasing effect on the likelihood of civil conflict risks in relation to these three indexes of social diversity.

It is noteworthy that in the Montalvo and Reynal-Querol (2005) measure of religious diversity, there is a high degree of correlation between religious fractionalization and polarization (0.95) which creates a problem of multicollinearity if they are used together. Even though we consider them separately, estimation results show that the similar effects of the two indexes. This indicates that the Montalvo and Reynal-Querol (2005) religious diversity has its limitations. This problem mainly emanates from the categorization of the religious groups. In other words, they opt for merging all Christians into one group when computing religious polarization in some African countries. This turns out to be a problem of equidistant: the distance between Protestants and Muslims in these countries is much larger than between Protestants and Catholics. But this is not the case in Northern Ireland. Another case is that Sunnis and Shi'as are both Muslim groups. Moreover, the violence of the opposition between the two branches of Islam has not been the same through time. Hence, this flaw tells the need to have alternative religious polarization and fractionalization indexes which address these shortcomings.

Finally, it is noteworthy that the findings have significant policy implications. A better understanding of the transmission channels through which adverse commodity price shocks affect the civil conflicts is essential for adopting policy measures to prevent destructive civil wars in the developing countries. Policy makers may need to focus on building national economy resilience in order to overcome the adverse impact of shocks to commodity prices. In addition, enhancing state capacity and improving institutional qualities will enable countries to prevent the threat of violent conflicts and wars which

follow from fluctuating income. Furthermore, social heterogeneity affects the political stability of the countries. In particular, the results shows that ethnic polarization has positive effects on increasing the probability of civil conflicts. Hence, adopting policy frameworks that promote economic equality, social justice and cultural integrity between social groups helps to establish mutual understanding which results in harmony, peace and security.

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References

Abidoye, B. O., Calì, M., 2015. Income shocks and conflict: evidence from nigeria. World Bank Policy Research Working Paper (7213).

Alesina, A., Devleeschauwer, A., Easterly, W., Kurlat, S., Wacziarg, R., 2003. Fractionalization. Journal of Economic growth 8 (2), 155–194.

Bazzi, S., Blattman, C., 2014. Economic shocks and conflict: Evidence from commodity prices. American Economic Journal: Macroeconomics 6 (4), 1–38.

Besley, T. J., Persson, T., 2008. The incidence of civil war: Theory and evidence. Tech. rep., National Bureau of Economic Research.

Bhavnani, R., Miodownik, D., 2009. Ethnic polarization, ethnic salience, and civil war. Journal of Conflict Resolution 53 (1), 30–49.

Blattman, C., Miguel, E., 2010. Civil war. Journal of Economic Literature, 3–57.

Brinkerhoff, D. W., 2005. Rebuilding governance in failed states and post-conflict societies: core concepts and cross-cutting themes. Public administration and development 25 (1), 3–14.

Brückner, M., Ciccone, A., 2010. International commodity prices, growth and the outbreak of civil war in sub-saharan africa*. The Economic Journal 120 (544), 519–534.

Campos, N. F., Kuzeyev, V. S., 2007. On the dynamics of ethnic fractionalization. American Journal of Political Science 51 (3), 620–639.

Caselli, F., Coleman, W. J., 2013. On the theory of ethnic conflict. Journal of the European Economic Association 11 (s1), 161–192.

Collier, P., Hoeffler, A., 2004. Greed and grievance in civil war. Oxford economic papers 56 (4), 563–595.

Dal Bó, E., Dal Bó, P., 2011. Workers, warriors, and criminals: social conflict in general equilibrium. Journal of the European Economic Association 9 (4), 646–677.

Deaton, A., Miller, R. I., et al., 1995. International commodity prices, macroeconomic performance, and politics in Sub-Saharan Africa. International Finance Section, Department of Economics, Princeton University.

Dehn, J., 2000. Commodity Price Uncertainty and Shocks : Implications for Economic Growth (May).

DeJong, D. N., Ripoll, M., 2006. Tariffs and growth: an empirical exploration of contingent relationships. The Review of Economics and Statistics 88 (4), 625–640.

Desmet, K., Ortuño-Ortín, I., Wacziarg, R., 2012. The political economy of linguistic cleavages. Journal of development Economics 97 (2), 322–338.

Dube, O., Vargas, J. F., 2013. Commodity price shocks and civil conflict: Evidence from colombia. The Review of Economic Studies 80 (4), 1384–1421.

Duclos, J.-Y., Esteban, J., Ray, D., 2004. Polarization: concepts, measurement, estimation. Econometrica 72 (6), 1737–1772.

Easterly, W., Levine, R., 1997. Africa's growth tragedy: policies and ethnic divisions. The Quarterly Journal of Economics, 1203–1250.

Esteban, J., Mayoral, L., Ray, D., 2012. Ethnicity and conflict: An empirical study. American Economic Review 102 (4), 1310–1342.

Esteban, J., Ray, D., 1994. On the measurement of polarization 62 (4), 819–851.

Esteban, J., Ray, D., 1999. Conflict and distribution. Journal of Economic Theory 87 (2), 379–415.

Esteban, J., Ray, D., 2011. A model of ethnic conflict. Journal of the European Economic Association 9 (3), 496–521.

Esteban, J., Ray, D., 2016. Development and conflict. Annual Review of Economics 8 (1).

Fearon, J. D., Laitin, D. D., 2003. Ethnicity, insurgency, and civil war. American political science review 97 (01), 75–90.

Forsberg, E., 2008. Polarization and ethnic conflict in a widened strategic setting. Journal of Peace Research 45 (2), 283–300.

Ganepola, V., Thalaysingam, P., 2004. Poverty and conflict. A Review of Literature.

García Montalvo, J., Reynal-Querol, M., 2002. Why ethnic fractionalization? polarization, ethnic conflict and growth. Polarization, Ethnic Conflict and Growth (September 2002). UPF Economics and Business Working Paper (660).

Garcia-Montalvo, J., Reynal-Querol, M., 2004. Ethnic polarization, potential conflict, and civil wars. Potential Conflict, and Civil Wars (July 2004).

Hirschman, A. O., 1964. The paternity of an index. The American Economic Review 54 (5), 761–762.

Hirshleifer, J., 1995. Anarchy and its breakdown. Journal of Political Economy, 26–52.

Janus, T., Riera-Crichton, D., 2013. Economic shocks, civil war and ethnicity. working paper.

Janus, T., Riera-Crichton, D., 2015. Economic shocks, civil war and ethnicity. Journal of Development Economics 115, 32–44.

Keefer, P., Knack, S., 2002. Polarization, politics and property rights: Links between inequality and growth. Public choice 111 (1-2), 127–154.

Kinda, T., Mlachila, M., Ouedraogo, R., 2016. Commodity price shocks and financial sector fragility.

La Porta, R., Lopez-de Silanes, F., Shleifer, A., Vishny, R., 1999. The quality of government. Journal of Law, Economics, and organization 15 (1), 222–279.

Lujala, P., Gleditsch, N. P., Gilmore, E., 2005. A diamond curse? civil war and a lootable resource. Journal of Conflict Resolution 49 (4), 538–562.

Marshall, M. G., 2010. Major episodes of political violence (mepv) and conflict regions, 1946–2008. Center for Systemic Peace.

Miguel, E., Satyanath, S., Sergenti, E., 2004. Economic shocks and civil conflict: An instrumental variables approach. Journal of political Economy 112 (4), 725–753.

Mira, A. N., 1964. Moscow: Miklukho-maklai ethnological institute at the department of geodesy and cartography of the state geological committee of the soviet union.

Mitra, A., Ray, D., 2014. Implications of an economic theory of conflict: Hindu-muslim violence in india. Journal of Political Economy 122 (4), 719–765.

Montalvo, J. G., Reynal-Querol, M., 2005. Ethnic diversity and economic development. Journal of Development economics 76 (2), 293–323.

Musayev, V., et al., 2014. Commodity price shocks, conflict and growth: The role of institutional quality and political violence. Tech. rep., University Library of Munich, Germany.

Nunn, N., Qian, N., 2012. Aiding conflict: The impact of us food aid on civil war. Tech. rep., National Bureau of Economic Research.

Østby, G., 2008. Polarization, horizontal inequalities and violent civil conflict. Journal of Peace Research 45 (2), 143–162.

Papyrakis, E., Raveh, O., 2014. An empirical analysis of a regional dutch disease: the case of canada. Environmental and Resource Economics 58 (2), 179–198.

Pettersson, T., Wallensteen, P., 2015. Armed conflicts, 1946–2014. Journal of Peace Research 52 (4), 536–550.

Reynal-Querol, M., 2002. Ethnicity, political systems, and civil wars. Journal of Conflict Resolution 46 (1), 29–54.

Seshanna, S., Decornez, S., 2003. Income polarization and inequality across countries: an empirical study. Journal of Policy Modeling 25 (4), 335–358.

Vanhanen, T., 1999. Domestic ethnic conflict and ethnic nepotism: A comparative analysis. Journal of Peace Research 36 (1), 55–73.

Varangis, P., Varma, S., dePlaa, A., Nehru, V., 2004. Exogenous shocks in low income countries: Economic policy issues and the role of the international community. Inwent (2005 DebtSustainability, External Shocks and Financing Instruments in LICs, International policy W orkshop.

Wang, C., Wan, G., 2015. Income polarization in china: Trends and changes. China Economic Review 36, 58–72.

Weinstein, J. M., 2006. Inside rebellion: The politics of insurgent violence. Cambridge University Press.

Woo, J., 2005. Social polarization, fiscal instability and growth. European Economic Review 49 (6), 1451–1477.

Appendix A

Here, we provide definitions of all variables used throughout the paper.

1. Definitions of major variables
   (a) Different measures of Conflict
      i. UCDP/PRIO Armed Conflict Dataset defined "armed conflict" as a contested incompatibility that concerns government and/or territory where the use of armed force between two parties, of which at least one is the government of a state, results in at least 25 battle-related deaths. In this study we consider incidences, new conflicts in a year, and intensity from UCDP Monadic Conflict Onset and Incidence Dataset.

      ii. Incid. Incidence of intrastate conflict. The UCDP dataset coded 1 in all country-years with at least one active conflict/ conflict-dyad (a dyad consists of two conflicting primary parties and at least one of the primary parties must be the government of a state).
      iii. Intensity . The UCDP dataset defines the intensity level of conflicts in a country-year bases. Two different intensity levels are coded. 1: minor armed conflict/conflict-dyad, which result in at list 25 deaths; and 2: as war for battle-related deaths of at least $1,000$ per year per incompatibility.
      Armed Conflict and Intervention (ACI) Datasets organize "Major Episodes of Political Violence" data of conflicts. Major episodes of political violence are defined by the systematic and sustained use of lethal violence by organized groups that results in at least 500 directly related deaths over the course of the episode. Episodes are coded for time span and magnitude and are assigned to one of seven categories of armed conflict. We consider only civil war (CIVWAR). The dataset designated each episode that spans a certain number of years ("inclusive years") and is judged to have been of a certain, general "magnitude of societal-systemic impact". The conflict episodes range from 0 (no violence) to 10 (war). The magnitude scores are considered consistent and comparable across categories and cases, that is, approximating a ratio scale. We give a value equal to 1 for all levels of violence war, 0 otherwise.

   (b) Main distributional measures
      i. ETHFRAC and RELFRAC. Index of ethnic and religious fractionalization, respectively, which measure the probability that two randomly selected individuals in a country will belong to different ethnic or religious groups.
      The is index defined as:
      $FRAC = \sum_{i=1}^{N} n_i(1 - n_i) = 1 - \sum_{i=1}^{N} n_i^2$,
      Where Π_i is the proportion of people who follow religion i or belong to ethnic group i.

ii. ETHPOL and RELPOL. Ethnic and religious polarization indexes that measure the normalized distance of a particular distribution of ethnic and religious groups, respectively, from a bimodal distribution. Data for both ethnic and religious polarization and fractionalization indexes are obtained from Montalvo and Reynal-Querol (2005).
MRQ defined both ETHPOL and RELPOL as:

$$RQ = 1 - \sum_{i=1}^{N} (\frac{0.5 - \pi_i}{0.5})^2 \pi_i = 4 \sum_{i=1}^{N} \sum_{i \neq j} \pi^2 i \pi_j$$

Alternatively, we used Fearon and Laitin (2003) groupings of ethnic farctionalization and polarization indexes. However, we use $\delta = 0.05$, as defined by Esteban et al. (2012).

EFf. Ethnic fractionalization, which is defined as $F = \sum_{i=1}^{N} n_i(1 - n_i)$, where n_i is the population share of group i and m is the number of groups.

EPf. Ethnic polarization computed by Esteban et al. (2012) as $\sum_{i=1}^{m} \sum_{j=1}^{m} n_{i_2} n_j k_{ij}$ where $k_{ij} = 1 - s_{ij}^{0.05}$ and s_{ij}, are degree of similarity between two languages i and j, given by the ratio of the number of common branches to the maximum possible number (15 for the entire tree)Esteban et al. (2012).

2. Main control Variables
   (a) Governance and Institutional variables
      i. AUTOCR. Institutionalized Autocracy. The data source of of this variable is Polity IV dataset version 2013. In Polity IV dataset autocracy takes values 0-10 scale, with 10 signifying extreme autocracy. AUTOCR takes a value equal to 1 for autocracy dummy if the score is greater than or equal to 6, otherwise 0.
      ii. CVLIB. Civil liberty (lack of liberty). The data source of this variable is Freedom House (2016)[9], which considers a 1-7 scale (7 indicates the lowest level of liberties). We establish a dummy by using the following technique, whereby a country receiving a score lower than four would then receive value 1 as civil liberty dummy and 0 otherwise.
      iii. DEMOC. Institutionalized Democracy. The data source of of this variable is Polity IV dataset version 2013. In Polity IV dataset democracy ranges from 0 (the lowest) to 10 (the highest) scale. DEMOC takes a value of 1 if the score is higher than or equal to 4 and 0 otherwise.
      iv. EXCONST. Executive constraints (i.e., lack of). The data source of this variable is Polity IV dataset version 2013. It is defined on a 1-7 scale

[9]https://freedomhouse.org/report-types/freedom-world

(1 indicates minimum constraints). We established a dummy using the following technique,whereby a country receiving a score greater than four would then receive value 1 for the EXCONST dummy and 0 otherwise.

v. CVLIB. Civil liberty (i.e., lack of liberty). The data source of this variable is Freedom House (2016)[10], which consider a 1-7 scale (7 indicates the lowest level of liberties). We recode this variable into a time-invariant dummy in the following way: first, the percentage of years in the sample for which a country received a score smaller than four was calculated. Then, if this percentage was smaller than 40 percent, a country received a value 1 throughout all of the sample(i.e, indicates lack of civil liberty).

vi. POLRIGHTS. (i.e., Lack of) political rights. The data source is Freedom House (2016) [11], which considers a $1-7$ scale (1 indicates most free). We recode this variable into a time-invariant dummy in the following way: first, the percentage of years in the sample for which a country received a score smaller than four was calculated. Then, if this percentage was smaller than 40 percent, a country received a value 1 in all of the sample (i.e., indicates lack of freedom).

(b) Other control variables

i. FAID. Foreign Aid Per capita for each year. Source: World Bank Database.

ii. GDPPC. Log of real GDP per capita corresponding to each year. Data source is the World Bank Database(2016).

iii. Gini Index. Gini index measures the extent to which the distribution of income corresponding to each year. Data sourceis the World Bank Database (2016).

iv. MOUNT. Percent mountainous terrain. The data sources is Fearon and Laitin (2003), who use the codings of geographer A.J. Gerard.

v. NCONT. Noncontiguous states, referring to countries with territory holding at least 10,000 people and separated from the land area containing the capital city either by land or by 100 kilometers of water. Source: Fearon and Laitin (2003).

vi. POP: Log of population each year. Source: the World Bank Database (2016).

[10] https://freedomhouse.org/report-types/freedom-world

[11] https://freedomhouse.org/report-types/freedom-world

Appendix B: List of commodities

Code	Commodity	Code	Commodity	Code	Commodity
1	Aluminium	23	Lead	45	Silver
2	Asbestos	24	Linseed oil	46	Sisal
3	Bananas	25	Live cattle	47	Soybean oil
4	Barley	26	Live poultry	48	Soybeans
5	Beef	27	Live sheep	49	Sorghum
6	Cashews	28	Live swine	50	Sugar
7	Coal	29	Lumber	51	Sunflower Oil
8	Cocoa	30	Maize	52	Swine
9	Coconut copra oil	31	Manganese	53	Tea
10	Coffee	32	Natural gas	54	Tin
11	Copper	33	Nickel	55	Tobacco
12	Copra	34	Olive oil	56	Wheat
13	Cotton	35	Oranges	57	Wool
14	Diamond	36	Palm oil	58	Zinc
15	Fish	37	Pepper		
16	Fishmeal	38	Petroleum		
17	Gold	39	Phosphates		
18	Groundnut	40	Poultry		
19	Groundnut oil	41	Pulp		
20	Hides	42	Rice		
21	Iron ore	43	Rubber		
22	Jute	44	Shrimp		

Appendix C: List of countries

Code	Country	Code	Country	Code	Country
1	Afghanistan	31	Gabon	61	Panama
2	Algeria	32	Gambia	62	Papua New Guinea
3	Angola	33	Ghana	63	Paraguay
4	Argentina	34	Guatemala	64	Peru
5	Bahamas, The	35	Guinea	65	Philippines
6	Bahrain	36	Guyana	66	Rwanda
7	Bangladesh	37	Haiti	67	Saudi Arabia
8	Barbados	38	Honduras	68	Senegal
9	Benin	39	India	69	Sierra Leone
10	Bolivia	40	Indonesia	70	Singapore
11	Botswana	41	Jamaica	71	Solomon Islands
12	Brazil	42	Jordan	72	Somalia
13	Burundi	43	Kenya	73	South Africa
14	Cameroon	44	Kuwait	74	Sri Lanka
15	Central African Republic	45	Liberia	75	Syrian Arab Republic
16	Chad	46	Madagascar	76	Sudan
17	China	47	Malaysia	77	Tanzania
18	Colombia	48	Malawi	78	Thailand
19	Comoros	49	Mali	79	Togo
20	Congo, Republic.	50	Malta	80	Trinidad and Tobago
21	Costa Rica	51	Mauritania	81	Tunisia
22	Cte d'Ivoire	52	Mauritius	82	Turkey
23	Cyprus	53	Morocco	83	Uganda
24	Democratic Republic of the Congo	54	Mozambique	84	United Arab Emirates
25	Dominican Republic	55	Nepal	85	Uruguay
26	Ecuador	56	Nicaragua	86	Venezuela, RB
27	Egypt	57	Niger	87	Yemen, Republic
28	El Salvador	58	Nigeria	88	Zambia
29	Ethiopia	59	Oman	89	Zimbabwe
30	Fiji	60	Pakistan		

Appendix D: Results of Estimations

VARIABLES	C.Incid	C.Incid	C.Incid	C.Incid	C.Incid	C.Incid	C.Incid
ΔPS_{t-1}	0.00893	-0.0791***	0.0542**	0.0613***	0.0593***	-0.0115	0.0401*
	(0.0151)	(0.0275)	(0.0241)	(0.0216)	(0.0208)	(0.0175)	(0.0234)
$\Delta PSEP_{t-1}$		0.151***					
		(0.0416)					
$\Delta PSEF_{t-1}$			-0.0960***				
			(0.0361)				
$\Delta PSRP_{t-1}$				-0.112***			
				(0.0278)			
$\Delta PSRF_{t-1}$					-0.178***		
					(0.0414)		
$\Delta PSEPf_{t-1}$						0.409**	
						(0.207)	
$\Delta PSEFf_{t-1}$							-0.0611**
							(0.0296)
Population$_{t-1}$		-0.133	-0.152	-0.158	-0.161	-0.142	-0.150
		(0.150)	(0.150)	(0.150)	(0.150)	(0.150)	(0.150)
GDP Per capita$_{t-1}$		-0.105**	-0.103**	-0.101**	-0.102**	-0.105**	-0.104**
		(0.0475)	(0.0475)	(0.0473)	(0.0473)	(0.0476)	(0.0475)
Gini Index$_{t-1}$		-8.63e-06***	-8.94e-06***	-8.64e-06***	-8.64e-06***	-8.95e-06***	-8.88e-06***
		(1.44e-06)	(1.60e-06)	(1.44e-06)	(1.44e-06)	(1.63e-06)	(1.59e-06)
Foreign aid$_{t-1}$		-0.000126	-0.000132	-0.000117	-0.000115	-0.000131	-0.000124
		(0.000109)	(0.000109)	(0.000109)	(0.000108)	(0.000110)	(0.000109)
Democracy$_{t-1}$		0.169	0.161	0.126	0.135	0.163	0.132
		(0.197)	(0.197)	(0.200)	(0.199)	(0.199)	(0.197)
Autocracy$_{t-1}$		0.0947*	0.0675	0.0694	0.0750	0.0631	0.0963*
		(0.0512)	(0.0504)	(0.0499)	(0.0500)	(0.0509)	(0.0512)
Political Rights$_{t-1}$		-0.174	-0.187	-0.176	-0.177	-0.189*	-0.179
		(0.106)	(0.117)	(0.115)	(0.115)	(0.112)	(0.114)
Excons$_{t-1}$		0.203	0.235	0.213	0.211	0.236	0.206
		(0.188)	(0.188)	(0.192)	(0.191)	(0.191)	(0.188)
Civil Liability$_{t-1}$		0.451***	0.499***	0.482***	0.486***	0.479***	0.483***
		(0.0996)	(0.107)	(0.103)	(0.103)	(0.101)	(0.104)
Mount$_{t-1}$		0.0113***	0.0109**	0.0107**	0.0109**	0.0117***	0.0105**
		(0.00431)	(0.00448)	(0.00442)	(0.00442)	(0.00442)	(0.00445)
Ncount$_{t-1}$		1.030***	1.071***	1.070***	1.080***	1.074***	1.071***
		(0.232)	(0.233)	(0.233)	(0.233)	(0.232)	(0.233)
Constant	2.031**	0.741	0.848	0.930	0.931	0.758	0.874
	(0.925)	(0.939)	(0.939)	(0.939)	(0.939)	(0.940)	(0.937)
Observations	3,079	3,071	3,071	3,071	3,071	3,071	3,071
R-squared	0.486	0.484	0.483	0.485	0.485	0.483	0.483
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	YES	YES	YES	YES	YES	YES	YES

Table 4: **Results with additional control variables:** Liner Probability Model estimates with robust standard errors clustered by country in parentheses. All regressions include country and year fixed effects, and country-specific time trends. Notation: *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

VARIABLES	C.intensity	C.intensity	C.intensity	C.intensity	Civil war	Civil war	Civil war	Civil war
$\Delta PSEP_{t-1}$	-0.592**	0.375	0.142	0.0826	-0.0520**	0.0369*	0.0352*	0.0274
	(0.279)	(0.245)	(0.206)	(0.203)	(0.0259)	(0.0208)	(0.0209)	(0.0198)
$\Delta PSEP_{t-1}$	0.826*				0.0943**			
	(0.459)				(0.0381)			
$\Delta PSEF_{t-1}$		-0.958***				-0.0686*		
		(0.328)				(0.0384)		
$\Delta PSRP_{t-1}$			-0.613**				-0.0670**	
			(0.270)				(0.0306)	
$\Delta PSRF_{t-1}$				-0.833*				-0.0855**
				(0.450)				(0.0434)
Population$_{t-1}$	-3.866*	-3.904*	-3.932*	-3.964*	0.157	0.154	0.151	0.151
	(2.311)	(2.318)	(2.316)	(2.316)	(0.153)	(0.153)	(0.152)	(0.153)
GDP Per capita$_{t-1}$	0.0864	0.139	0.127	0.117	-0.225***	-0.223***	-0.222***	-0.223***
	(0.441)	(0.442)	(0.439)	(0.439)	(0.0441)	(0.0439)	(0.0438)	(0.0439)
Gini Index$_{t-1}$	-8.98e-05***	-9.53e-05***	-9.10e-05***	-9.19e-05***	-6.05e-06***	-6.22e-06***	-6.05e-06***	-6.08e-06***
	(1.71e-05)	(1.69e-05)	(1.67e-05)	(1.68e-05)	(1.24e-06)	(1.32e-06)	(1.24e-06)	(1.26e-06)
Foreign aid$_{t-1}$	-0.00703	-0.00678	-0.00679	-0.00677	-4.13e-05	-4.38e-05	-3.49e-05	-3.61e-05
	(0.00507)	(0.00504)	(0.00504)	(0.00506)	(0.000121)	(0.000120)	(0.000121)	(0.000121)
Democracy$_{t-1}$					0.0289	0.0241	0.00281	0.0100
					(0.0469)	(0.0465)	(0.0473)	(0.0466)
Autocracy$_{t-1}$					0.00120	-0.0156	-0.0139	-0.0106
					(0.0323)	(0.0322)	(0.0317)	(0.0319)
Political Rights$_{t-1}$					-0.0205	-0.0298	-0.0225	-0.0229
					(0.0243)	(0.0204)	(0.0197)	(0.0198)
Excons$_{t-1}$					0.0226	0.0438	0.0289	0.0289
Civil Liability$_{t-1}$	1.515***	2.095***	1.728***	1.750***	-0.0642***	-0.0319*	-0.0443**	-0.0430**
	(0.540)	(0.591)	(0.516)	(0.517)	(0.0237)	(0.0193)	(0.0190)	(0.0188)
Mount$_{t-1}$	0.699	0.707	0.679	0.697	0.0114***	0.0110***	0.0108***	0.0109***
			(665.2)	(8,357)	(0.00342)	(0.00342)	(0.00342)	(0.00342)
Ncount$_{t-1}$	2.821	2.943	3.095	2.978	0.0684	0.0829	0.0792	0.0827
				(103,308)	(0.242)	(0.241)	(0.241)	(0.241)
Constant cut1	-12.02	-11.83	-12.55	-12.55				
				(72,570)				
Constant cut2	-9.649	-9.464	-10.19	-10.19				
				(72,581)				
					(0.0413)	(0.0408)	(0.0403)	(0.0402)
Constant					-0.378	-0.366	-0.318	-0.326
					(0.925)	(0.923)	(0.922)	(0.923)
Observations	3,153	3,153	3,153	3,153	2,998	2,998	2,998	2,998
R-squared					0.395	0.395	0.396	0.395
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	YES	YES	YES	YES	YES	YES	YES	YES

Table 5: **Results of Conflict Intensity and Civil war:** Notes: Columns 1-4 ordered logit; columns 5-6 Liner Probability Model estimates with robust standard errors clustered by country in parentheses. All regressions include country and year fixed effects, and country-specific time trends. Notation: *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

VARIABLES	C.Incid	C.Incid	C.Incid	C.Incid	C.Incid	C.Incid
ΔPS_{t-1}	-0.127***	0.0552*	0.0564**	0.0528**	-0.0285	0.0269
	(0.0360)	(0.0311)	(0.0264)	(0.0255)	(0.0205)	(0.0288)
$\Delta PSEP_{t-1}$	0.215***					
	(0.0566)					
$\Delta PSEF_{t-1}$		-0.114***				
		(0.0427)				
$\Delta PSRP_{t-1}$			-0.129***			
			(0.0346)			
$\Delta PSRF_{t-1}$				-0.198***		
				(0.0504)		
$\Delta PSEPf_{t-1}$					0.635**	
					(0.278)	
$\Delta PSEFf_{t-1}$						-0.0583*
						(0.0350)
Population$_{t-1}$	-0.0575	-0.0640	-0.0745	-0.0783	-0.0603	-0.0680
	(0.181)	(0.181)	(0.181)	(0.181)	(0.181)	(0.181)
GDP Per capita$_{t-1}$	-0.109**	-0.108**	-0.107*	-0.109**	-0.110**	-0.109**
	(0.0552)	(0.0551)	(0.0548)	(0.0549)	(0.0552)	(0.0552)
Gini Index$_{t-1}$	-8.91e-06***	-9.31e-06***	-9.04e-06***	-9.04e-06***	-9.35e-06***	-9.32e-06***
	(1.51e-06)	(1.74e-06)	(1.57e-06)	(1.57e-06)	(1.80e-06)	(1.75e-06)
Foreign aid$_{t-1}$	-0.000184	-0.000183	-0.000174	-0.000168	-0.000181	-0.000182
	(0.000139)	(0.000139)	(0.000138)	(0.000138)	(0.000140)	(0.000140)
Democracy$_{t-1}$	-0.181	-0.196*	-0.201*	-0.197*	-0.195*	-0.192*
	(0.111)	(0.111)	(0.111)	(0.111)	(0.111)	(0.111)
Autocracy$_{t-1}$	0.454**	0.422*	0.386*	0.399*	0.416*	0.415*
	(0.221)	(0.222)	(0.224)	(0.223)	(0.223)	(0.220)
Political Rights$_{t-1}$	-0.170*	-0.188	-0.173	-0.174	-0.196*	-0.176
	(0.103)	(0.117)	(0.115)	(0.115)	(0.112)	(0.114)
Excons$_{t-1}$	-0.152	-0.112	-0.100	-0.108	-0.109	-0.108
	(0.134)	(0.135)	(0.135)	(0.135)	(0.134)	(0.135)
Civil Liability$_{t-1}$	0.440***	0.505***	0.482***	0.486***	0.481***	0.483***
	(0.0992)	(0.109)	(0.103)	(0.104)	(0.0998)	(0.104)
Mount$_{t-1}$	0.0128***	0.0127***	0.0124***	0.0125***	0.0126***	0.0127***
	(0.00120)	(0.00120)	(0.00119)	(0.00119)	(0.00120)	(0.00120)
Ncount$_{t-1}$	1.400***	1.467***	1.433***	1.446***	1.426***	1.455***
	(0.248)	(0.256)	(0.252)	(0.253)	(0.251)	(0.252)
Constant	0.0669	0.0611	0.181	0.196	0.0858	0.104
	(1.293)	(1.293)	(1.292)	(1.292)	(1.293)	(1.294)
Observations	2,425	2,425	2,425	2,425	2,425	2,425
R-squared	0.474	0.473	0.474	0.475	0.473	0.472
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	YES	YES	YES	YES	YES	YES

Table 6: **Results to low income economies:** Liner Probability Model estimates with robust standard errors clustered by country in parentheses. All regressions include country and year fixed effects, and country-specific time trends. Notation: *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

VARIABLES	C.Incid	C.Incid	C.Incid	C.Incid	C.Incid	C.Incid
ΔPS_{t-1}	-0.0791***	0.0542**	0.0613***	0.0593***	-0.0115	0.0401*
	(0.0275)	(0.0241)	(0.0216)	(0.0208)	(0.0175)	(0.0234)
$\Delta PSEP_{t-1}$	0.151***					
	(0.0416)					
$\Delta PSEF_{t-1}$		-0.0960***				
		(0.0361)				
$\Delta PSRP_{t-1}$			-0.112***			
			(0.0278)			
$\Delta PSRF_{t-1}$				-0.178***		
				(0.0414)		
$\Delta PSEPf_{t-1}$					0.409**	
					(0.207)	
$\Delta PSEFf_{t-1}$						-0.0611**
						(0.0296)
Population$_{t-1}$	-0.133	-0.152	-0.158	-0.161	-0.142	-0.150
	(0.150)	(0.150)	(0.150)	(0.150)	(0.150)	(0.150)
GDP Per capita$_{t-1}$	-0.105**	-0.103**	-0.101**	-0.102**	-0.105**	-0.104**
	(0.0475)	(0.0475)	(0.0473)	(0.0473)	(0.0476)	(0.0475)
Gini Index$_{t-1}$	-8.63e-06***	-8.94e-06***	-8.64e-06***	-8.64e-06***	-8.95e-06***	-8.88e-06***
	(1.44e-06)	(1.60e-06)	(1.44e-06)	(1.44e-06)	(1.63e-06)	(1.59e-06)
Foreign aid$_{t-1}$	-0.000126	-0.000132	-0.000117	-0.000115	-0.000131	-0.000124
	(0.000109)	(0.000109)	(0.000109)	(0.000108)	(0.000110)	(0.000109)
Democracy$_{t-1}$	0.169	0.161	0.126	0.135	0.163	0.132
	(0.197)	(0.197)	(0.200)	(0.199)	(0.199)	(0.197)
Autocracy$_{t-1}$	0.0947*	0.0675	0.0694	0.0750	0.0631	0.0963*
	(0.0512)	(0.0504)	(0.0499)	(0.0500)	(0.0509)	(0.0512)
Political Rights$_{t-1}$	-0.174	-0.187	-0.176	-0.177	-0.189*	-0.179
	(0.106)	(0.117)	(0.115)	(0.115)	(0.112)	(0.114)
Excons$_{t-1}$	0.203	0.235	0.213	0.211	0.236	0.206
	(0.188)	(0.188)	(0.192)	(0.191)	(0.191)	(0.188)
Civil Liability$_{t-1}$	0.451***	0.499***	0.482***	0.486***	0.479***	0.483***
	(0.0996)	(0.107)	(0.103)	(0.103)	(0.101)	(0.104)
Mount$_{t-1}$	0.0131***	0.0131***	0.0129***	0.0130***	0.0130***	0.0131***
	(0.00110)	(0.00109)	(0.00109)	(0.00109)	(0.00109)	(0.00109)
Ncount$_{t-1}$	1.008***	1.044***	1.042***	1.055***	1.058***	1.039***
	(0.261)	(0.261)	(0.261)	(0.261)	(0.261)	(0.261)
Constant	0.607	0.675	0.731	0.748	0.645	0.674
	(1.038)	(1.038)	(1.038)	(1.038)	(1.037)	(1.036)
Observations	3,071	3,071	3,071	3,071	3,071	3,071
R-squared	0.484	0.483	0.485	0.485	0.483	0.483
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	YES	YES	YES	YES	YES	YES
Regional Dummy	YES	YES	YES	YES	YES	YES

Table 7: **Results with Regional Dummies:** Liner Probability Model estimates with robust standard errors clustered by country in parentheses. All regressions include country and year fixed effects, and country-specific time trends. Notation: *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Panel A	Agricultural Commodities						
VARIABLES	C.Incid	C.Incid	C.Incid	C.Incid	C.Incid	C.Incid	C.Incid
ΔPS_{t-1}	0.0135	-0.0205	0.0710*	0.0228	0.0218	0.0111	0.0183
	(0.0194)	(0.0534)	(0.0384)	(0.0313)	(0.0290)	(0.0237)	(0.0348)
$\Delta PSEP_{t-1}$		0.0556					
		(0.0915)					
$\Delta PSEF_{t-1}$			-0.115				
			(0.0742)				
$\Delta PSRP_{t-1}$				-0.0183			
				(0.0551)			
$\Delta PSRF_{t-1}$					-0.0276		
					(0.0772)		
$\Delta PSEPf_{t-1}$						0.0296	
						(0.289)	
$\Delta PSEFf_{t-1}$							-0.00959
							(0.0457)
Constant	-0.856	-0.0331	-0.0253	-0.0310	-0.0308	-0.0305	-0.0307
	(0.539)	(0.0371)	(0.0369)	(0.0368)	(0.0368)	(0.0368)	(0.0368)
Observations	3,613	3,613	3,613	3,613	3,613	3,613	3,613
R-squared	0.461	0.461	0.461	0.461	0.461	0.461	0.461
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	YES	YES	YES	YES	YES	YES	YES
Panel B	Mineral Commodities						
ΔPS_{t-1}	-0.0180	-0.103***	-0.0245	-0.00733	-0.00921	-0.0297*	-0.0116
	(0.0123)	(0.0346)	(0.0264)	(0.0231)	(0.0210)	(0.0162)	(0.0211)
$\Delta PSEP_{t-1}$		0.143***					
		(0.0526)					
$\Delta PSEF_{t-1}$			0.0124				
			(0.0417)				
$\Delta PSRP_{t-1}$				-0.0212			
				(0.0327)			
$\Delta PSRF_{t-1}$					-0.0292		
					(0.0480)		
$\Delta PSEPf_{t-1}$						0.231	
						(0.147)	
$\Delta PSEFf_{t-1}$							-0.0115
							(0.0300)
Constant	0.498***	0.503***	0.499***	0.496***	0.497***	0.500***	0.498***
	(0.0956)	(0.0950)	(0.0954)	(0.0960)	(0.0960)	(0.0952)	(0.0957)
Observations	2,337	2,337	2,337	2,337	2,337	2,337	2,337
R-squared	0.516	0.518	0.516	0.516	0.516	0.517	0.516
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	YES	YES	YES	YES	YES	YES	YES
Panel C	Energy Commodities						
ΔPS_{t-1}	-0.0174	0.00740	-0.00509	-0.00338	-0.0103	-0.00104	0.00259
	(0.0249)	(0.0490)	(0.0426)	(0.0419)	(0.0385)	(0.0277)	(0.0313)
$\Delta PSEP_{t-1}$	-0.0411						
		(0.0708)					
$\Delta PSEF_{t-1}$			-0.0253				
			(0.0696)				
$\Delta PSRP_{t-1}$				-0.0224			
				(0.0596)			
$\Delta PSRF_{t-1}$					-0.0189		
					(0.0812)		
$\Delta PSEPf_{t-1}$						-0.297	
						(0.361)	
$\Delta PSEFf_{t-1}$							-0.0392
							(0.0469)
Constant	0.596***	0.596***	0.595***	0.596***	0.596***	0.596***	0.596***
	(0.120)	(0.120)	(0.120)	(0.120)	(0.120)	(0.120)	(0.120)
Observations	1,148	1,148	1,148	1,148	1,148	1,148	1,148
R-squared	0.504	0.504	0.504	0.504	0.504	0.505	0.505
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	YES	YES	YES	YES	YES	YES	YES

Table 8: **Results for subcategories of commodities:** Liner Probability Model estimates with robust standard errors clustered by country in parentheses. All regressions include country and year fixed effects, and country-specific time trends. Notation: *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Panel A IV Estimation	C.Incid	C.Incid	C.Incid	C.Incid	C.Incid	C.incid	C.incid		
Growth	0.268	-1.342*	0.880	0.669	0.543	-1.860	0.819		
	(0.532)	(0.752)	(0.650)	(0.685)	(0.680)	(3.304)	(0.605)		
GrowthEP		3.343***							
		(1.191)							
GrowthEF			-2.275**						
			(1.096)						
GrowthRP				-2.450***					
				(0.716)					
GrowthRF					-4.066***				
					(1.241)				
GrowthEPf						7.480			
						(10.02)			
GrowthEFf							-1.934**		
							(0.974)		
Constant	0.272	-2.093	1.952	4.645***	4.066**	-7.284	2.226		
	(1.091)	(1.734)	(1.424)	(1.543)	(1.642)	(9.876)	(1.622)		
Observations	3,649	3,649	3,649	3,649	3,649	3,649	3,649		
R-squared	0.458	0.198	0.353	0.192	0.087	-2.022	0.337		
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Year FE	YES	YES	YES	YES	YES	YES	YES		
Underidentification test:									
(Kleibergen-Paap rk LM statistic)	12.046	12.266	8.376	9.712	8.124	0.803	8.067		
Chi-sq P-val	0.0005	0.0005	0.0038	0.0018	0.0044	0.3703	0.0045		
Weak identification test: (Kleibergen-Paap rk Wald									
F statistic)	11.488	5.841	3.970	4.680	3.849	0.386	3.826		
Maximum IV size	10%	15%	20%	25%					
Stock-Yogo weak ID test critical values 1 variable	16.38	8.96	6.66	5.53					
Stock-Yogo weak ID									
test critical values 2 variables	7.03	4.58	3.95	3.63					
Panel B First-Stage Estimation	Growth	Growth	Growth	Growth	Growth	GrowthEP	GrowthEF	GrowthRP	GrowthRF
ΔPS_{t-1} 0.0262***	0.0290*	0.0266**	0.0205**	0.0226***	-0.0141	-0.0123*	-0.0196***	-0.0115***	
	(0.00772)	(0.0151)	(0.0118)	(0.00877)	(0.00869)	(0.00944)	(0.00635)	(0.00399)	(0.00636
$\Delta PSEP_{t-1}$		-0.00499				0.0466***			
		(0.0203)				(0.0157)			
$\Delta PSEF_{t-1}$			-0.000965				0.0384***		
			(0.0193)				(0.0133)		
$\Delta PSRP_{t-1}$				0.0116				0.0490***	
				(0.0135)				(0.0111)	
$\Delta PSRF_{t-1}$					0.0121				0.0450***
					(0.0217)				(0.0122)

Table 9: **Instrumental Variable Estimate** Robust standard errors clustered by country in parentheses. All regressions include country and year fixed effects. Notation: *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.