This mine is mine!
How minerals fuel conflicts in Africa

Online appendix

Nicolas Berman* Mathieu Couttenier† Dominic Rohner‡ Mathias Thoenig§

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*Aix-Marseille University (Aix-Marseille School of Economics), CNRS, EHESS, Graduate Institute Geneva and CEPR. E-mail: nicolas.berman@univ-amu.fr.

†University of Geneva (previously: University of Lausanne). E-mail: mathieu.couttenier@unige.ch

‡Department of Economics, University of Lausanne and CEPR. E-mail: dominic.rohner@unil.ch.

§Department of Economics, University of Lausanne and CEPR. E-mail: mathias.thoenig@unil.ch.

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A Additional data description

A.1 Additional information on variables used

Structure of the dataset. The structure of the dataset we use in Sections 4 and Section 6 of the manuscript is a full grid of Africa divided in sub-national units of 0.5×0.5 degrees latitude and longitude (which means around 55×55 kilometers at the equator). This is the exact same level of aggregation as the one used in the PRIO-GRID, which allows us to easily include cell-specific information from this dataset. We use this level of aggregation rather than administrative boundaries to ensure that our unit of observation is not endogenous to conflict events. To each cell we assign a country based on the end-of-the-period boundaries. The country which represents the largest share of the cell's area is assigned to this cell.

Conflict Data. We use the Armed Conflict Location and Event dataset (Raleigh, Linke and Dowd, 2014) which contains information on the geo-location of conflict events in all African countries. We focus on the 1997-2010 period which overlaps with our mines data. We use ACLED v3 (http://www.acleddata.com/wp-content/uploads/2014/acled_with_prio.zip) as it contains cells identifiers which allows to directly match the data with PRIO-GRID and to use its standard grid of 0.5×0.5 degree cells. In ACLED data, the unit of observation is the "event". We have information about the date (precise day most of the time), longitude and latitude of conflict events within each country. These events are obtained from various sources, including press accounts from regional and local news, humanitarian agencies or research publications. ACLED records all political violence, including violence against civilians, rioting and protesting within and outside a civil conflict, without specifying a battle-related deaths threshold.

A unique feature of the ACLED dataset is that it contains information about the type of events, about the characteristics of the actors on both sides of the conflicts, and about the outcome of conflicts. For instance, we know in particular if the event was a battle, the names of the groups involved, and who won the battle.[1] We shall make use of this information when testing for the channels of transmission. The presence of this detailed information as well as the more exhaustive character of the ACLED are the main reason why we chose to use this dataset, rather than the UCDP-GED dataset. The latter records only events pertaining to conflicts reaching at least 25 battle-related deaths per year, and does not include information on battle events outcomes. We however use this alternative dataset in our robustness analysis.

The latitude and longitude associated with each event define a geographical "location". ACLED contains information on the precision of the geo-referencing of the events. The geo-precision is at least the municipality level in more than 95% of the cases, and is even finer (village) for more than 80% of the observations. We keep only events which are geolocalized with the finer precision level for our analysis. We also drop duplicated events, i.e. events for which all the ACLED variables' content (precise date, location, actors, description, etc.) is the same for several observations – in this case we keep only one observation for the event. This drops 1.7% of events.

[1] Eight different types of events are included in ACLED: battle with no changes in territory; battle with territory gains for rebels; battle with territory gains for the government; establishment of a headquarter; non violent activity by rebels; rioting; violence against civilians; non violent acquisition of territory. Actors are classified according to the following typology: government or mutinous force; rebel force; political militia; ethnic militia; rioters; protesters; civilians; outside / external force (e.g. UN).

We aggregate the data by year and 0.5×0.5 degree cell. We construct a dummy variable which equals one if at least one conflict happened in the cell during the year, which we interpret as cell-specific *conflict incidence*. This is our main dependent variable throughout the paper. Alternatively, we compute a variable containing the number of events observed in the cell during the year, which we label *conflict intensity*. We also show that our results are robust to modeling cell-specific conflict onset and ending separately.

Mines data. To each *cell-year*, we merge information on mines from *Raw Material Data* (RMD – IntierraRMG). For more information see http://www.snl.com/Sectors/metalsmining/Default.aspx. The data contain information on the location of mining companies around the world since 1980. For each year, we know the name of the mine, whether it is active or not, the specific minerals produced and the total production (in volume) for each of them. In some case the production data is missing but we nevertheless know if the mine is active or not. We also have information on the type of extraction method (open cast, underground, alluvial), the end-of-period number of employees (which contains many missing values), and the age of the mine. All this information is used in section 4.5 of the paper. Finally, we also know the names and types (foreign, domestic, public or private owned) of the companies owning the mines. This information is used in the last section of the paper.

Main minerals. We use the RMD data to identify active mining areas, and the type of minerals they produce. For each cell k, we define M_{kt}, a dummy variable which equals one if a least one *active* mine is recorded in the cell during year t. As an alternative measure we also compute the number of mines. To determine the main mineral produced by the cell we make use of the information on production by mine and mineral provided in the RMD dataset. First, given that production is provided in volumes with different units of measurement, we convert it into tons and then to value using 1997 prices to avoid endogeneity. Second, we compute the total production value of the minerals produced in the cell over the 1997-2010 period. In our data, 280 cells contain mines producing one or several minerals. For 21 of them we do not have price data for any of the minerals and therefore cannot define a main mineral.[2] For 215 cells, we have price data for all minerals, and the main mineral can be straightforwardly defined as the mineral with the highest production value. In the remaining 44 cells, minerals for which we have the price co-exist with minerals for which we do not. In most cases however, we can identify the main mineral produced by looking at the names of the mines. For instance, the cell with the PRIO-GRID identifier 88974 produces both gold (price data available) and uranium oxide (price data unavailable) but the latter is produced only in mines named "Freegold Gold mine" and "Harmony/Free Stage UG Gold mine", which main mineral is clearly gold. Therefore, whenever the name of a mine producing a mineral for which we do not have price data contains the name of a mineral for which we do have price data, we define the mineral contained in the name of the mine as the main mineral produced by the mine. This allows us to identify the main mineral even in some cells for which we do not have price data for some mines. In total, we are able to identify the main mineral in

[2] We have price data for 14 minerals: Bauxite (aluminum), Coal, Copper, Diamond, Gold, Iron, Lead, Nickel, Platinum (and Palladium/PGMs, i.e. Platinum Group Metals), Phosphate, Silver, Tantalum (Coltan), Tin and Zinc. We do not have price data for the following minerals: Antimony, Chromite, Cobalt, Lithium, Manganese, Tungsten, Uranium, Zirconium.

237 cells out of 280 (85%). The table below summarizes the share of cells producing each of the main minerals.

Table A.1: Main minerals

Main mineral	# cells	Share cells (%)
aluminum	4	1.69
coal	32	13.50
copper	27	11.39
diamond	40	16.88
gold	83	35.02
iron	14	5.91
lead	2	0.84
nickel	5	2.11
phosphate	7	2.95
platinum	10	4.22
silver	1	0.42
tantalum	2	0.84
tin	2	0.84
zinc	8	3.38
All	237	100

Some statistics about the main minerals. First, for 70% of the cells only one mineral is produced over our period of study. Second, for 85% of the cells, the main mineral is stable over the entire period. Third, the main mineral represents 96% of the total production over the period on average (84% when excluding single mineral cells).

Mineral prices. For all commodities but diamond and coltan, we use information on the world price of the minerals from the World Bank Commodities prices dataset (http://databank.worldbank.org/data/databases/commodity-price-data). Real prices are measured in constant 2005 USD. We also add composite diamond prices from Rapaport (http://www.diamonds.net/Reports/) and tantalum (coltan) US market unit values from the U.S. geological survey (http://minerals.usgs.gov/minerals/pubs/historical-statistics/#tantalum).

Other mineral-specific data. In section 4.5 we use Energy requirements in kWh/t by mineral from USGS (2011), employees and production figures are from RMD (IntierraRMG, 2013) and an alternative measure of open-cast mining using alternative data from Hargreaves and Fromson (1983). We also add data on metal-specific average cost data for all African mines from http://www.minecost.com and metal-specific concentration in ore from Philipps and Edwards (1976).

Other cell-specific variables. Our dataset is merged with PRIO-GRID v2 (Tolefsen, Strand and Buhaug, 2012, found at http://grid.prio.org) which contains a number of additional cell-specific variables which we use in our robustness analysis. These include in particular information on climate (temperature and rainfall), GDP and population (included in PRIO-GRID but originally from G-econ), as well as distances between the cell's centroid and international borders and to the capital city. Finally, we add information on satellite nighttime lights data from the National Oceanic and Atmospheric Administration (2010) (http://ngdc.noaa.gov/eog/) and data on the presence of non-indigenous groups in the cell from Cederman, Buhaug and Rod (2009) (in particular, we use the list of ethnic groups and information on their location from Cederman, Buhaug and Rod (2009), and drawing on a variety of sources, we code for each ethnic group whether it is INDIGENOUS in a given country or not, i.e. settled in a place for several centuries).

Country-specific data. In section 4.4 we study how the effect of mineral price variations on conflict varies with countries' characteristics. We use the *ICRG Indicator of Quality of Government* from International Country Risk Guide (2013); the *Government Effectiveness*, *Rule of Law*, *Control of Corruption*, *Voice and Accountability* indexes from the WGI ("Worldwide Governance Indicators") dataset (Kaufmann, Kraay, and Mastruzzi, 2013). GOVERNMENT EFFECTIVENESS captures "perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies". RULE OF LAW captures "perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence". VOICE AND ACCOUNTABILITY measures "perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media". CONTROL OF CORRUPTION is constructed based on "perceptions of corruption, conventionally defined as the exercise of public power for private gain." We also use the democracy score of Polity IV (2013), which relates to governance and civil servant behavior, as well as political representation and free elections, and the GINI index from the Standardized World Income Inequality Database (Solt, 2014). All these variables are taken from the Quality of Governance (QOG) dataset (Dahlberg, Dahlstrom, Petrus and Teorell, 2013, available at http://www.qog.pol.gu.se). Finally, ethnic and religious fractionalization or polarization are from Reynal-Querol (2014) (www.econ.upf.edu/~reynal/data_web.htm). In section 6 we use data on colonial links between countries from the CEPII gravity dataset (http://www.cepii.fr).

Ethnic homelands. In section 5.1 we use the geo-coordinates of ethnic homelands from the "Georeferencing of ethnic groups" (GREG) dataset (Weidmann, Rod and Cederman, 2010). GREG includes the geographical location of ethnic groups, based on the "Soviet Atlas Narodov Mira" from 1964.

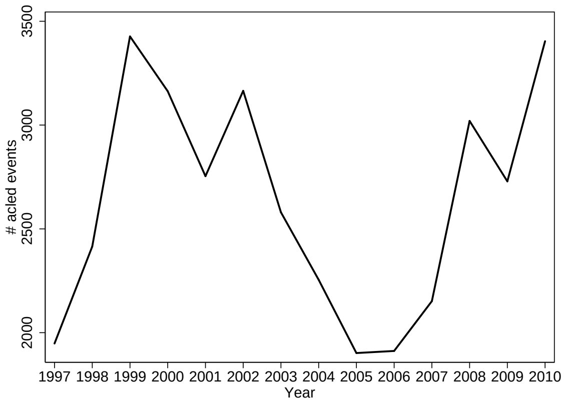
Port-level corruption. In the online appendix, section P, we use a proxy of port-level corruption constructed from bilateral trade data. More precisely, we compute the ratio of the import quantities declared by the country over the quantities declared by the rest of the World as exports to that country in the 5 years before the start of the period (1992-1996). The data on imports and exporters quantities declarations come from UN-COMTRADE (http://comtrade.un.org/).

Transparency initiative. In section 6, data on firms' membership to the "International Council on Mining and Metals" (ICMM) come from the ICMM website (http://www.icmm.com). Data on countries' membership to the "Extractive Industries Transparency Initiative" (EITI) come from Papyrakis, Rieger and Gilberthorpe (2016). Finally, countries' and minerals' membership to the "Mineral Certification Scheme of the International Conference on the Great Lakes Region (GLR)" come from http://www.pacweb.org/en/regional-certification.

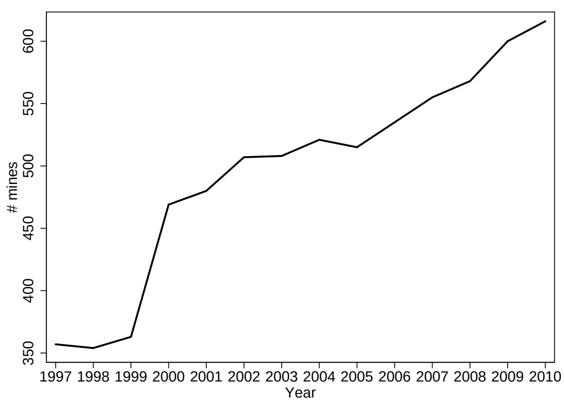
A.2 Trends in conflict and mining

Figure A.1: Time trends of mining and conflict

(a) Number of conflict events (ACLED)

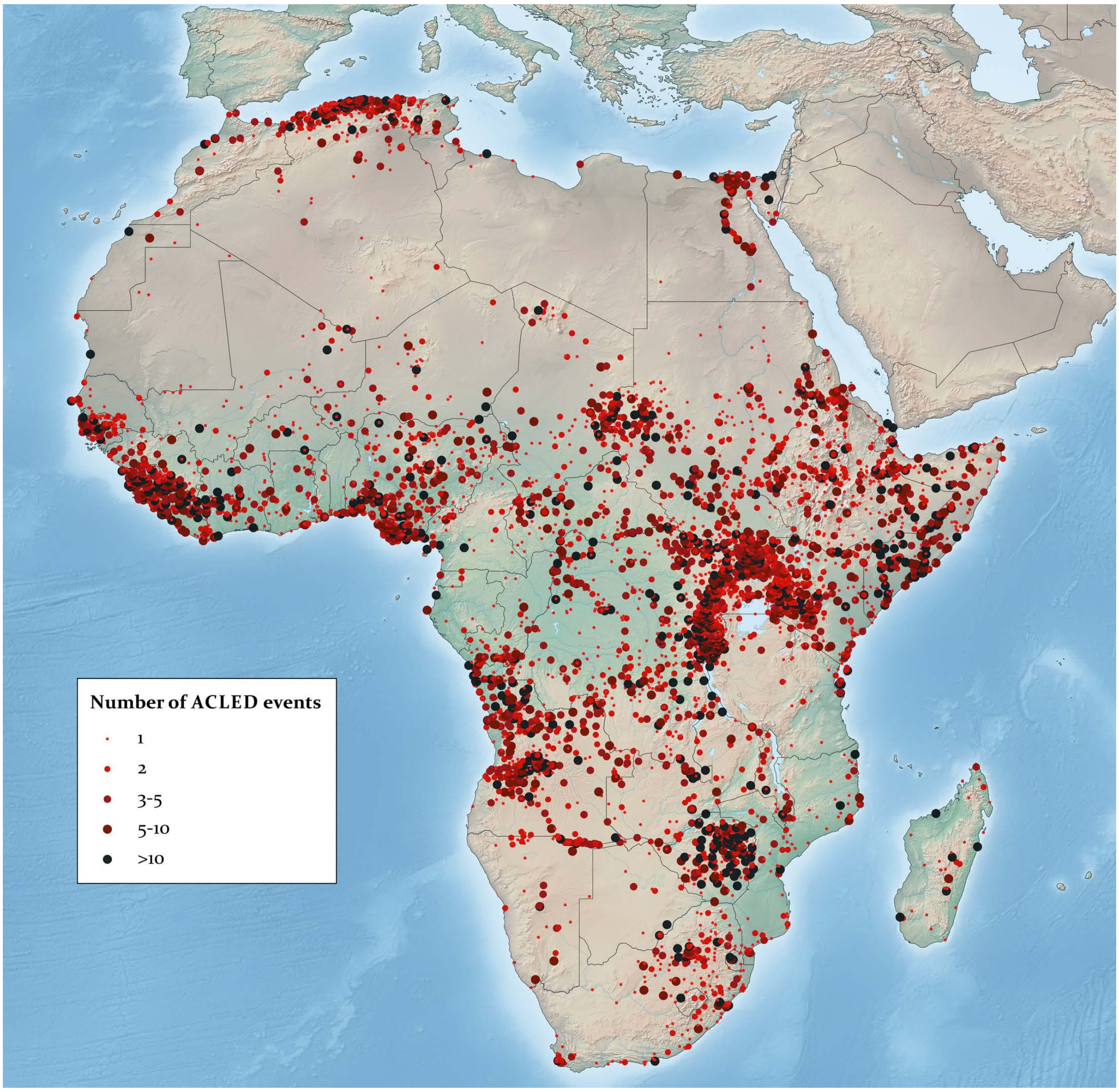


(b) Number of active mines (RMD)



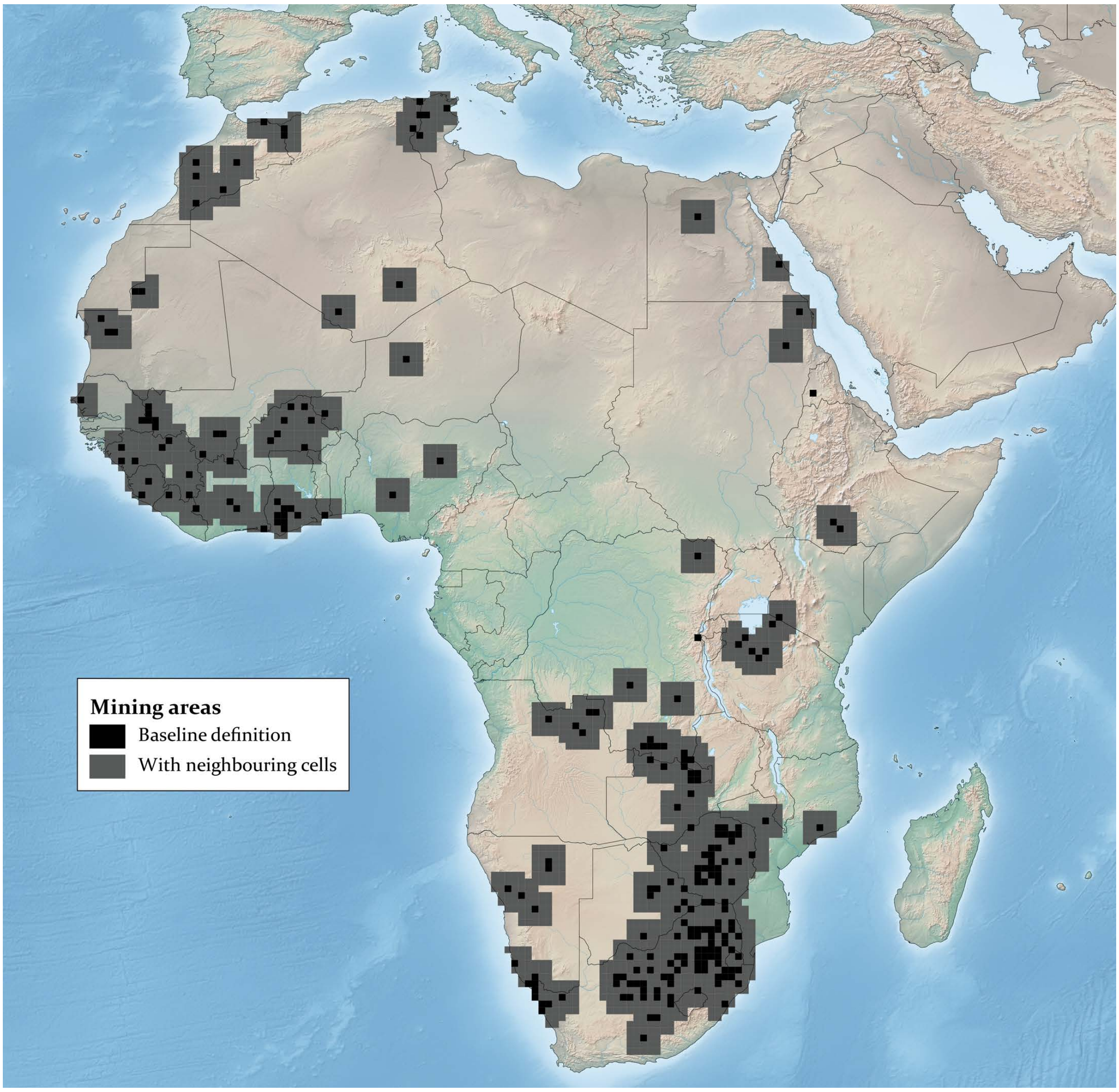
A.3 Maps

Figure A.2: Conflict events



Geo-location of conflict from the Armed Conflict Location and Event dataset (ACLED, 2014).

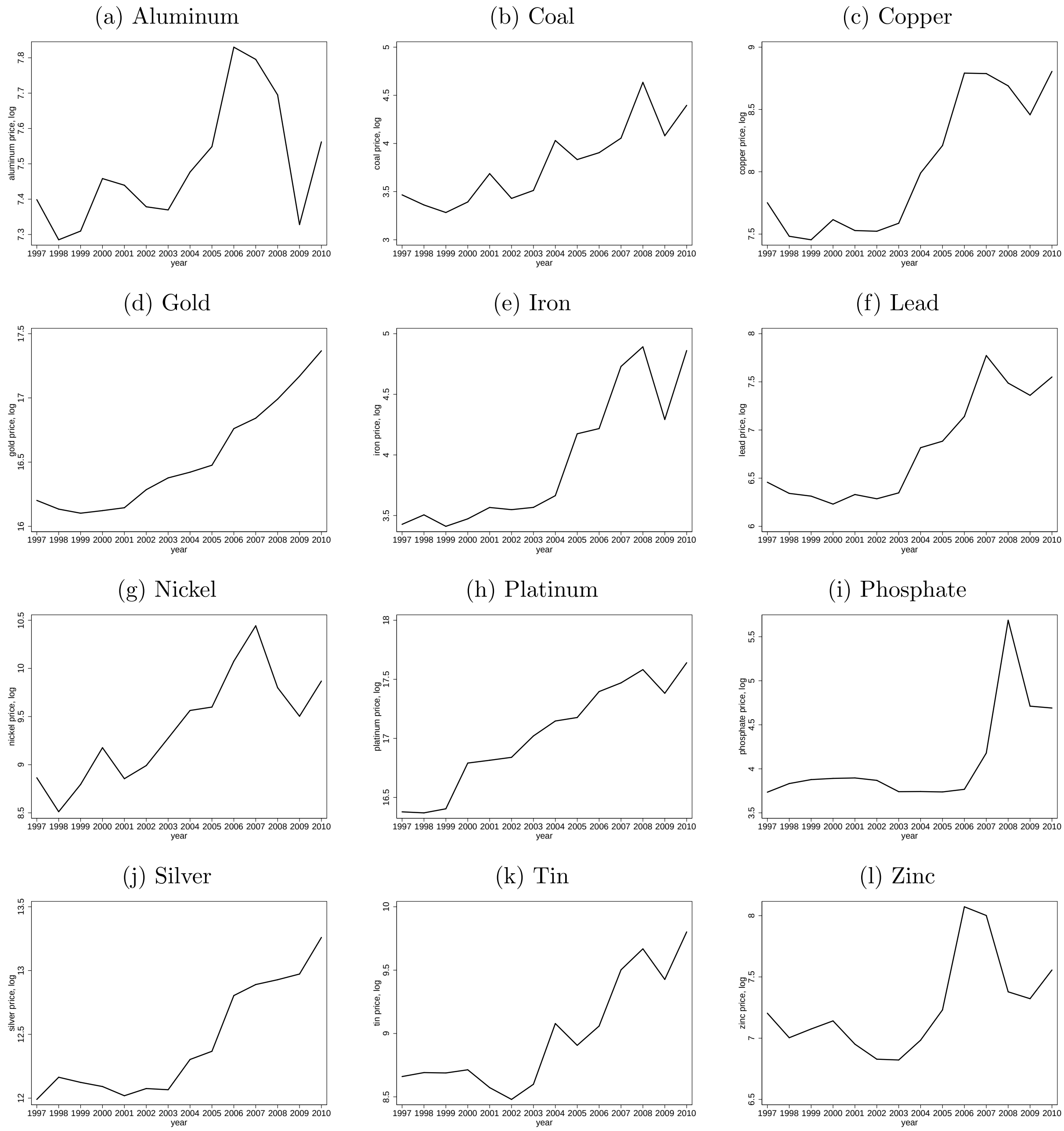
Figure A.3: Mining areas



Geo-location of active mining areas from *Raw Material Data*.

A.4 Mineral prices

Figure A.4: Mineral prices (log scale)



Source: World Bank.

A.5 Country-level descriptive statistics

Our final sample contains 52 countries and 14 minerals. Tables A.2 and A.3 contain additional country-level descriptive statistics. On average, around 50 conflict events and 10 active mines are recorded each year in each country. Only four countries display no conflict events over the entire period, the Republic Democratic of Congo is the country with the highest number of events (almost 300 events on average by year over the period), while small countries like Burundi, Gambia and Rwanda display the highest share of cells affected by conflict incidence over the period. In 20 countries no active mine is recorded. The highest numbers of mines are recorded in South Africa and Zimbabwe, but these are highly concentrated, as in both cases mining areas represent less than 20% of the cells. Note that – except in the case of South Africa – the countries contained in our sample are typically small producers of the minerals from a world perspective: the average market share of a country-mineral is around 6.5% (the median at 2.9%), and drops to 4.5% when we exclude South Africa (and the median to 1.6%).

Table A.2: Descriptive statistics: country-level

	Obs.	Mean	S.D.	1st Quartile	Median	3rd Quartile
# conflicts / year	52	50.59	72.77	4.8	17.57	66.79
# mines / year	52	9.54	38.80	0.00	1.04	4.82

Source: Authors' computations from ACLED and RMD data from 1997 to 2010.

Table A.3: Summary statistics

Country	Share of cells with		Average #		Country	Share of cells		Average # of	
	mines	conflicts	mines	conflicts		mines	conflicts	mines	conflicts
Algeria	0.01	0.04	11	103	Liberia	0.03	0.23	0	53
Angola	0.01	0.08	6	172	Libya	0	0.00	0	2
Benin	0	0.03	0	2	Madagascar	0.00	0.02	1	24
Botswana	0.03	0.01	14	3	Malawi	0	0.10	0	7
Brukina Faso	0.03	0.03	1	9	Mali	0.01	0.01	4	7
Burundi	0	0.89	0	211	Marocco	0.05	0.03	19	10
Cameroon	0	0.03	0	10	Mauritania	0.01	0.00	5	1
Cape Verde	0	0	0	0	Mauritius	0	0	0	0
Central African Rep.	0	0.06	0	29	Mozambique	0.01	0.03	3	18
Chad	0	0.03	0	28	Namibia	0.03	0.02	20	13
Comoros	0	0	0	0	Niger	0.00	0.01	1	17
Congo, Dem. Rep.	0.01	0.08	20	278	Nigeria	0.01	0.15	2	145
Congo, Rep.	0	0.05	0	33	Rwanda	0.13	0.52	1	40
Djibouti	0	0.15	0	3	Senegal	0.02	0.11	2	28
Egypt	0.00	0.03	1	37	Sierra Leone	0.04	0.34	1	90
Equatorial Guinea	0	0.10	0	2	Soa Tome and Principe	0	0	0	0
Eritrea	0	0.09	0	15	Somalia	0	0.14	0	257
Ethiopia	0.01	0.08	2	72	South Africa	0.15	0.05	277	74
Gabon	0	0.02	0	3	Sudan	0.00	0.05	2	118
Gambia. The	0	0.58	0	5	Swaziland	0.25	0.27	1	5
Ghana	0.10	0.04	15	7	Tanzania	0.01	0.02	5	21
Guinea	0.07	0.09	6	32	Togo	0.06	0.09	1	7
Guinea-Bissau	0	0.23	0	14	Tunisia	0.05	0.03	5	5
Ivory Coast	0.02	0.09	3	62	Uganda	0	0.34	0	112
Kenya	0.01	0.18	1	136	Zambia	0.03	0.03	12	44
Lesotho	0.08	0.10	1	1	Zimbabwe	0.16	0.23	55	268

Source: Authors' computations from ACLED and RMD data from 1997 to 2010. *Share of cells* (with mines or conflicts) is the country average of yearly share of cells with active mines or conflict incidence, respectively. *Average #* (of mines or conflicts) is the country average number of active mines or conflict events, respectively.

B Minerals and conflicts: Correlations

Table A.4 displays the results of the correlation between mining and conflict at the local level. In columns (1)-(2), we consider a pure cross-sectional specifications. The dependent variable takes the value 1 if at least 1 conflict event is observed in the cell over the period. The explanatory variable is either a dummy coding for the presence of at least 1 mine in the cell over the period (col. 1), or the average number of mines observed in the cell during the period (col. 2). In both cases, a positive association with conflict is found.

In columns (3) to (6) we use the full panel. The dependent variable is cell-level conflict incidence, and the mining variable is either a discrete variable equal to the number of *active* mines, or a binary variable coding for the presence of at least one active mine. Column (3) includes a vector of country×year fixed-effects that filter out all countrywide time-varying characteristics affecting violence and activity of mines – e.g. a war-induced collapse of central state and property rights. We find that in a given country-year, conflict is more likely to occur in mining areas. The presence of one or more mines is associated with a 8.2 percentage points increase in conflict probability.

Part of the correlation could be spuriously driven by omitted time-invariant cell-specific characteristics such as the local determinants of state capacity, property rights enforcement or political instability (e.g. ethnic cleavages). In order to control for this source of unobserved heterogeneity, we include cell fixed-effects in the remaining columns. Estimates are still positive and significant at the 10% level. In term of magnitude, the within-cell estimates correspond to half of their between-cell counterparts confirming that part of the correlation in column (3) is driven by time-invariant cell characteristics. The opening of a mine in a given cell is associated with a 3.4 percentage points increase in conflict probability in this cell.

Table A.4: Conflicts and mines: Correlations

	(1)	(2)	(3)	(4)	(5)	(6)
Estimator	LPM		LPM			
Dep. var.	Conflict Incidence		Conflict Incidence			
Sample	Cross-section		Panel			
At least 1 mine over 1997-2010	0.178					
	(0.021)					
average # mines		0.043				
		(0.014)				
mine > 0			0.082	0.034	0.034	
			(0.007)	(0.019)	(0.019)	
# mines						0.007
						(0.003)
ln precipitation					0.000	0.000
					(0.001)	(0.001)
average temperature					0.001	0.001
					(0.002)	(0.002)
Country FE	Yes	Yes	No	No	No	No
Country×year FE	No	No	Yes	Yes	Yes	Yes
Cell FE	No	No	No	Yes	Yes	Yes
Observations	10335	10335	144594	144594	144481	144481

LPM estimations. Conley (1999) standard errors in parentheses, allowing for spatial correlation within a 500km radius and for infinite serial correlation. Dependent variable is conflict incidence, which takes the value 1 in columns (1)-(2) if at least one conflict event is observed in the cell over the period (during the year in columns (3)-(6)). mine > 0 is a dummy taking the value 1 if at least 1 mine is active in the cell in year t. # mines is the number of active mines in the cell in year t.

C Spatial spillovers

This section provides some additional evidence that conflicts diffuse spatially following mining shocks. In columns (1) and (2) of Table A.5, we include the number of neighbouring cells in conflict in our baseline estimations (Table 2, columns (2) and (4)) without instrumenting. We find positive spillovers of conflicts. This variable is however endogeneous, as jointly determined with the LHS variable (the "Manski" reflection problem).

We therefore perform 2SLS estimations following Bramoulle, Djebbari and Fortin (2009). In columns (3) to (6), we instrument the neighbouring cells in conflict term, either with the mineral shocks in the neighbouring cells of degrees 1 and 2 (columns (3) and (4)) or with conflicts in neighbours of degree 2 (columns (5) and (6)). In all cases the local effect of mineral price variations survives, and spatial spillovers from neighbouring cells are found to be strongly significant. However, results of columns (3) and (4) need to be interpreted with caution as the validity condition of the 2SLS is likely to be violated: mineral price variations in neighbouring cells could have a direct effect on conflict, for instance if there is measurement error in the actual surface of mining areas. The results of columns (5) and (6) are suggestive of the presence of spatial spillovers of conflicts, but they are not directly related to mineral extraction. For these reasons, the methodologies presented in section 5.1 (based on ethnic homelands of rebel groups and changes in territories) are our preferred ways of looking at the spatial diffusion of conflicts through mineral extraction.

Table A.5: Conflicts and mineral prices: conflicts in neighbouring cells

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. var.	Conflict incidence					
Sample	$\mathbb{V}(M_{kt}) = 0$	All	$\mathbb{V}(M_{kt}) = 0$	All	$\mathbb{V}(M_{kt}) = 0$	All
Estimator	OLS		2SLS			
Instrument			Prices of main mineral of neighbouring cells		Conflicts in neighbours of degree 2	
ln price × mines > 0	0.057		0.041		0.032	
	(0.020)		(0.024)		(0.018)	
ln price × mines > 0 (ever)		0.035		0.026		0.019
		(0.011)		(0.014)		(0.011)
# neighbouring cells in conflict (1 degree)	0.047	0.046			0.124	0.125
	(0.005)	(0.005)			(0.005)	(0.005)
# neighbouring cells in conflict (2 degrees)			0.046	0.043		
			(0.007)	(0.007)		
Country×year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cell FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	137914	139412	137914	139412	137914	139412

LPM estimations. Standard errors clustered by country in parentheses. mine > 0 is a dummy taking the value 1 if at least 1 mine is active in the cell in year t. mines > 0 (ever) is a dummy taking the value 1 if at least 1 mine is recorded in the cell at any point over the 1997-2010 period. $\mathbb{V}(M_{kt}) = 0$ means that we consider only cells in which the mine dummy takes always the same value over the period. ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells. In columns (3) to (4) # neighbouring cells of degree 2 in conflict is instrumented by the prices of the main minerals produced in the first and second degree neighbouring cells. In columns (5) and (6) # neighbouring cells of degree 1 in conflict is instrumented by # neighbouring cells of degree 2 in conflict.

D Mineral prices and conflicts: onset and ending

Our focus on conflict incidence reflects our interest in explaining the general presence of conflict. A higher conflict incidence can be due to either more conflicts breaking out or due to existing conflicts lasting longer. Hence, in the civil war literature, a number of papers focus on civil war outbreaks (onsets) and endings separately. In the context of our spatially disaggregated data, conflict exhibits only little persistence (more than 75% of events do not last more than two years) and therefore this exercise has a limited scope. Tables A.6 and A.7 displays the results. We find that our variable of interest both significantly increases the risk of conflict onset, and reduces the likelihood of conflict ending, although the coefficient is less precisely estimated for conflict ending. This suggests that the higher conflict incidence due to mines is both due to more local conflicts breaking out and to existing conflicts lasting longer.

Table A.6: Conflicts and mineral prices: conflict onset

	(1)	(2)	(3)	(4)	(5)	(6)
Estimator	LPM					
Dep. var.	Conflict onset					
Sample	All	$\mathbb{V}(M_{kt}) = 0$		All	$\mathbb{V}(M_{kt}) = 0$	
mine > 0	0.059					0.028
	(0.063)					(0.026)
ln price main mineral	-0.014					0.024
	(0.023)					(0.011)
ln price × mines > 0	0.060	0.066	0.047		0.075	0.028
	(0.029)	(0.022)	(0.023)		(0.024)	(0.018)
ln price × mines > 0 (neighbouring cells)			0.018			
			(0.005)			
ln price × mines > 0 (ever)				0.038		
				(0.013)		
Country×year FE	Yes	Yes	Yes	Yes	No	No
Year FE	No	No	No	No	Yes	Yes
Cell FE	Yes	Yes	Yes	Yes	Yes	No
Neighbour-pairs FE	No	No	No	No	No	Yes
Observations	136565	135268	121742	136658	135268	16515

LPM estimations. Conley (1999) standard errors in parentheses, allowing for spatial correlation within a 500km radius and for infinite serial correlation. Conflict onset is a dummy taking the value 1 if the cell experiences a conflict event in t conditional on no conflict occurring in $t-1$, and is coded as missing if a conflict occurred in $t-1$. mine > 0 is a dummy taking the value 1 if at least 1 mine is active in the cell in year t. mines > 0 (ever) is a dummy taking the value 1 if at least 1 mine is recorded in the cell at any point over the 1997-2010 period. mines > 0 (neighbouring cells) is a dummy taking the value 1 if at least 1 mine is recorded in neighbouring cells of degree 1 and 2 in year t. $\mathbb{V}(M_{kt}) = 0$ means that we consider only cells in which the mine dummy (or dummies in column (3)) takes always the same value over the period. Column (6) is run on a sample containing only mining cells and their immediate neighbouring cells. In columns (1) to (5), ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells. In column (6) ln price main mineral takes the same value for the mining cell and its immediate neighbours. Estimations (1) and (6) include controls for the average level of mineral world price interacted with the mine dummy.

Table A.7: Conflicts and mineral prices: conflict ending

	(1)	(2)	(3)	(4)	(5)	(6)
Estimator	LPM					
Dep. var.	Conflict ending					
Sample	All	$\mathbb{V}(M_{kt}) = 0$		All	$\mathbb{V}(M_{kt}) = 0$	
mine > 0	-0.008					-0.016
	(0.179)					(0.082)
ln price main mineral	0.027					-0.000
	(0.118)					(0.049)
ln price × mines > 0	-0.176	-0.120	-0.159		-0.086	-0.066
	(0.120)	(0.064)	(0.067)		(0.057)	(0.045)
ln price × mines > 0 (neighbouring cells)			-0.019			
			(0.048)			
ln price × mines > 0 (ever)				-0.120		
				(0.051)		
Country×year FE	Yes	Yes	Yes	Yes	No	No
Year FE	No	No	No	No	Yes	Yes
Cell FE	Yes	Yes	Yes	Yes	Yes	No
Neighbour-pairs FE	No	No	No	No	No	Yes
Observations	17447	17192	15373	17482	17192	3668

LPM estimations. Conley (1999) standard errors in parentheses, allowing for spatial correlation within a 500km radius and for infinite serial correlation. Conflict ending is a dummy taking the value 1 if the cell experiences no conflict event in t conditional on a conflict occurring in $t-1$, and is coded as missing if no conflict occurred in $t-1$. mine > 0 is a dummy taking the value 1 if at least 1 mine is active in the cell in year t. mines > 0 (ever) is a dummy taking the value 1 if at least 1 mine is recorded in the cell at any point over the 1997-2010 period. mines > 0 (neighbouring cells) is a dummy taking the value 1 if at least 1 mine is recorded in neighbouring cells of degree 1 and 2 in year t. $\mathbb{V}(M_{kt}) = 0$ means that we consider only cells in which the mine dummy (or dummies in column (3)) takes always the same value over the period. Column (6) is run on a sample containing only mining cells and their immediate neighbouring cells. In columns (1) to (5), ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells. In column (6) ln price main mineral takes the same value for the mining cell and its immediate neighbours. Estimations (1) and (6) include controls for the average level of mineral world price interacted with the mine dummy.

E Alternative Dataset on Violence: UCDP-GED

We complement our sensitivity analysis on violence measurement using an alternative conflict database with geo-coded information from UCDP-GED, namely the Conflict Data Program Geo-referenced Events Dataset (Sundberg, Lindgren, and Padskocimaite (2010)). The UCDP-GED focuses on deadly incidents associated with civil wars (i.e. more than 25 conflict-related casualties in a given year), as identified by the UCDP-PRIO Armed Conflict Database.

The results are displayed in Table A.8. In Columns (1) and (2) we replicate with our baseline specifications (col. (2) and (4) of Table 2) with a measure of conflict incidence based on UCDP-GED events. A striking feature relates to the dramatic sample size reduction by nearly one half, the reason being that only countries experiencing more than 25 conflict-related casualties in a given year are included in the UCDP-GED sample. Unsurprisingly, the coefficients of interest loose their statistical significance. For the sake of comparison we replicate in columns (3) and (4) the baseline specifications (with ACLED events) on the same subsample of countries. Here too we observe a deterioration of statistical significance confirming that it relates to the drastic sample size reduction and not to the nature of the UCDP-GED events. To alleviate this problem we combine the two datasets in columns (5)-(6). More precisely, we code violent events with UCDP-GED for country-year cells that are covered by this dataset and for other country-year cells, we use ACLED events. This coding procedure restores the initial sample size. Statistical significance is also restored. In columns (7) and (8) we check that the previous finding is not entirely driven by ACLED events. For this purpose we create two mutually exclusive dummies coding for country-year cells covered respectively by UCDP-GED and ACLED that we interact with our main explanatory variable. Reassuringly, the two coefficients of the triple interaction terms are positive, statistically significant and of similar magnitudes, showing that the results of the two previous columns are not solely driven by ACLED events. In sum, this indicates that our main findings are robust to the use of the alternative UCDP-GED dataset.

Table A.8: Robustness: UCDP-GED dataset

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Estimator	LPM							
Conflict (dep. var.)	UCDP		ACLED		Combined			
Sample	UCDP		UCDP		All		All	
Condition	$\mathbb{V}(M_{kt}) = 0$	None	$\mathbb{V}(M_{kt}) = 0$	None	$\mathbb{V}(M_{kt}) = 0$	None	$\mathbb{V}(M_{kt}) = 0$	None
ln price × mines > 0	-0.009		0.042		0.053			
	(0.025)		(0.024)		(0.022)			
× ACLED sample							0.049	
							(0.022)	
× UCDP sample							0.041	
							(0.022)	
ln price × mines > 0 (ever)		0.005		0.035		0.032		
		(0.016)		(0.021)		(0.013)		
× ACLED sample								0.030
								(0.013)
× UCDP sample								0.027
								(0.013)
Country×year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cell FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	91849	92636	91849	92636	142296	143864	142296	143864

LPM estimations. Conley (1999) standard errors in parentheses, allowing for spatial correlation within a 500km radius and for infinite serial correlation. mine > 0 is a dummy taking the value 1 if at least 1 mine is active in the cell in year t. mines > 0 (ever) is a dummy taking the value 1 if at least 1 mine is recorded in the cell at any point over the 1997-2010 period. ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells. $\mathbb{V}(M_{kt}) = 0$ means that we consider only cells in which the mine dummy takes always the same value over the period. Estimations (1)-(4) are run on the sub-sample of country-years covered in UCDP-GED. In columns (5)-(8), the dependent variable is conflict incidence from UCDP-GED for the countries covered by this dataset and conflict incidence from ACLED for the rest of the sample. The ACLED sample variable is a dummy which equals 0 if an observation is in the UCDP-GED sample, and 1 otherwise. The UCDP sample variable is 0 when the ACLED sample variable is 1, and vice versa.

F Standard-errors

In this section we allow for various levels of cross-sectional spatial correlation and cell-specific serial correlation. Remember that in all tables of the manuscript we allow as benchmark the serial correlation to be present for an infinite horizon (i.e. 100,000 years), and a spatial radius of 500 kilometers. In Table A.9, we replicate Table 2 but allow alternatively for spatial correlation of 100 or 1000 kilometers, and for a serial correlation over 1 or 5 years or an infinite horizon. We also provide an alternative treatment, where we simply cluster the standard errors at the country-level. In all cases, the standard errors are such that our coefficients of interest remain statistically significant at conventional levels.

Table A.9: Standard errors

	(1)	(2)	(3)	(4)	(5)	(6)
Estimator	LPM					
Dep. var.	Conflict incidence					
Sample	All	$\mathbb{V}(M_{kt}) = 0$		All	$\mathbb{V}(M_{kt}) = 0$	
mine > 0	0.112					0.048
Spatial: 100km; Time: Infinite	(0.062)					(0.064)
Spatial: 1000km; Time: Infinite	(0.065)					(0.064)
Spatial: 100km; Time: 1 year	(0.055)					(0.030)
Spatial: 100km; Time: 5 years	(0.056)					(0.043)
Country level	(0.066)					(0.063)
ln price main mineral	-0.029					0.028
Spatial: 100km; Time: Infinite	(0.032)					(0.018)
Spatial: 1000km; Time: Infinite	(0.032)					(0.019)
Spatial: 100km; Time: 1 year	(0.026)					(0.016)
Spatial: 100km; Time: 5 years	(0.026)					(0.019)
Country level	(0.017)					(0.015)
ln price × mines > 0	0.086	0.072	0.060		0.085	0.108
Spatial: 100km; Time: Infinite	(0.035)	(0.019)	(0.022)		(0.021)	(0.041)
Spatial: 1000km; Time: Infinite	(0.035)	(0.020)	(0.021)		(0.025)	(0.041)
Spatial: 100km; Time: 1 year	(0.029)	(0.017)	(0.019)		(0.018)	(0.026)
Spatial: 100km; Time: 5 years	(0.029)	(0.017)	(0.018)		(0.022)	(0.035)
Country level	(0.016)	(0.022)	(0.024)		(0.022)	(0.050)
ln price × mines > 0 (neighbouring cells)			0.021			
Spatial: 100km; Time: Infinite			(0.006)			
Spatial: 1000km; Time: Infinite			(0.006)			
Spatial: 100km; Time: 1 year			(0.005)			
Spatial: 100km; Time: 5 years			(0.006)			
Country level			(0.009)			
ln price × mines > 0 (ever)				0.045		
Spatial: 100km; Time: Infinite				(0.013)		
Spatial: 1000km; Time: Infinite				(0.014)		
Spatial: 100km; Time: 1 year				(0.011)		
Spatial: 100km; Time: 5 years				(0.011)		
Country level				(0.011)		
Country×year FE	Yes	Yes	Yes	Yes	No	No
Year FE	No	No	No	No	Yes	Yes
Cell FE	Yes	Yes	Yes	Yes	Yes	No
Neighbour-pairs FE	No	No	No	No	No	Yes
Observations	143754	142282	124474	143850	142282	17360

LPM estimations. mine > 0 is a dummy taking the value 1 if at least 1 mine is active in the cell in year t. mines > 0 (ever) is a dummy taking the value 1 if at least 1 mine is recorded in the cell at any point over the 1997-2010 period. mines > 0 (neighbouring cells) is a dummy taking the value 1 if at least 1 mine is recorded in neighbouring cells of degree 1 and 2 in year t. $\mathbb{V}(M_{kt}) = 0$ means that we consider only cells in which the mine dummy (or dummies in column (3)) takes always the same value over the period. Column (6) is run on a sample containing only mining cells and their immediate neighbouring cells. In columns (1) to (5), ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells. In column (6) ln price main mineral takes the same value for the mining cell and its immediate neighbours. Estimations (1) and (6) include controls for the average level of mineral world price interacted with the mine dummy.

G Instrumenting mining activity

In the baseline, to address endogenous mining openings and closings, we restrict the sample to cells with either permanently active mine over the sample period or, alternatively, to cells where at least in one year a mine was active during the sample period. In the appendix of the manuscript, Table 8 displays alternative definitions of mining activity, to further ensure that our results are not driven by endogenous opening/closing of mines (i.e. variations in the mining dummy over time). An alternative methodology to address these endogeneity concerns is to instrument world prices × actual mines, using world prices × historical mines as instrument, which is what we do in the current online appendix, section G.

Table A.10 displays the results. In the first panel the first stage results are displayed while in the second panel the second stage coefficients are reported. Column (1) corresponds to the baseline specification of column (2) of Table 2. The interaction of current price times the presence of a historical mine (before 1997) is an extremely strong predictor of the interaction of the current price times the actual permanent presence of a mine, yielding a coefficient of close to 1, significant at the 1 percent level. The instrumented world prices × actual mines variable of interest is highly significant in the second stage with a coefficient close to the one in the benchmark of Table 2. Column (2) of Table A.10 similarly corresponds to column (4) of Table 2, while column (3) of Table A.10 instruments the variable of interest of column (6) of the baseline Table 2. In both of these columns of Table A.10 the results of the corresponding columns of Table 2 continue to hold.

Column (4) of Table A.10 follows an alternative and complementary approach. Here we use the price of a given main mineral as instrument for the opening of a mine in a given cell. The underlying logic is that when a mineral yields a higher price on international markets it is more worthwhile to exploit a given mining site that otherwise may not be economically viable. In the second stage, the impact of an open mine on conflict is investigated. All coefficients have the expected sign: In the first stage a higher price of a mineral indeed strongly predicts the likelihood of having an open mine, while in the second stage an active mine tends to increase the conflict incidence (missing, however, conventional thresholds of statistical significance). While the result of column (4) constitutes a useful robustness check, it has to be taken with a grain of salt, as the exclusion restriction imposes that price shocks should only affect the conflict incidence through the mechanism of greater likelihood of an operating mine (i.e. the extensive margin). To the extent that the amount produced (i.e. the intensive margin) may also be impacted by prices and may also affect conflict, one could think of challenges to the exclusion restriction.

Table A.10: Alternative definitions of mining areas: 2SLS

	(1)	(2)	(3)	(4)
Estimator		2SLS		
Sample	$\mathbb{V}(M_{kt}) = 0$	All	$\mathbb{V}(M_{kt}) = 0$	All
First stage	ln **price** × **mines** > 0			**mines** > 0
ln price × mines > 0 (before 1997)	0.999	0.981	0.939	
	(0.002)	(0.006)	(0.454)	
ln price main mineral				0.106
				(0.049)
Second stage		**Conflict incidence**		
mine > 0			0.046	0.409
			(0.067)	(0.254)
ln price main mineral			0.029	
			(0.020)	
ln price × mines > 0	0.074		0.105	
	(0.023)		(0.061)	
ln price × mines > 0 (ever)		0.051		
		(0.020)		
Cell FE	Yes	Yes	No	Yes
Neighbourhood FE	No	No	Yes	No
Country×year FE	Yes	Yes	No	Yes
Year FE	No	No	Yes	No
Observations	142282	143754	17346	143754

Conley (1999) standard errors in parentheses, allowing for spatial correlation within a 500km radius and for infinite serial correlation in column (3), and clustered by country otherwise. Columns (1), (2) and (3) are the equivalent of columns (2), (4) and (6) of our baseline Table 2, except that the interaction term between the mine dummy and the price of the mineral is instrumented by an interaction term between a pre-period mine dummy and mineral prices. Column (1): mine > 0 is a dummy taking the value 1 if at least 1 mine is active in the cell in year t, and we consider only cells in which the mine dummy takes always the same value over the period. Column (2): mine takes the value 1 if an active mine was observed in the cell at any point over the 1997-2010 period. Column (3) is run on a sample containing only mining cells and their immediate neighbouring cells. In columns (1) and (2), ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells. In column (3) ln price main mineral takes the same value for the mining cell and its immediate neighbours. Estimation (3) include controls for the average level of mineral world price interacted with the mine dummy. Column (4) instruments the time-varying, contemporaneous mine dummy with the world price of the main mineral produced in the cell.

H Mineral prices and conflicts: dropping large players

A threat to our identification strategy could consist in potential reverse causality from local violence to world prices. In particular, it is conceivable that the occurrence or the anticipation of a conflict in a major producer country could lead to an increase in the world prices of the relevant minerals. To address this concern, we drop mining cells belonging to countries that are top-10 world producers of the main mineral produced in the cell. In Table A.11 below we replicate our baseline Table 2 on this restricted sample with no large producer countries. The baseline results prove robust to removing large players, with the coefficient of interest being statistically significant in all columns, and quantitatively close to our baseline estimates.

Table A.11: Conflicts and mineral prices: dropping large players

	(1)	(2)	(3)	(4)	(5)	(6)
Estimator	LPM					
Dep. var.	Conflict incidence					
Sample	All	$\mathbb{V}(\mathrm{M}_{kt}) = 0$		All	$\mathbb{V}(\mathrm{M}_{kt}) = 0$	
mine > 0	0.138					0.004
	(0.088)					(0.081)
ln price main mineral	-0.025					0.028
	(0.040)					(0.019)
ln price × mines > 0	0.076	0.057	0.044		0.071	0.117
	(0.042)	(0.020)	(0.023)		(0.027)	(0.055)
ln price × mines > 0 (neighbouring cells)			0.020			
			(0.006)			
ln price × mines > 0 (ever)				0.034		
				(0.017)		
Country×year FE	Yes	Yes	Yes	Yes	No	No
Year FE	No	No	No	No	Yes	Yes
Cell FE	Yes	Yes	Yes	Yes	Yes	No
Neighbour-pairs FE	No	No	No	No	No	Yes
Observations	142784	141846	127656	142880	141846	16770

LPM estimations. Conley (1999) standard errors in parentheses, allowing for spatial correlation within a 500km radius and for infinite serial correlation. mine > 0 is a dummy taking the value 1 if at least 1 mine is active in the cell in year t. mines > 0 (ever) is a dummy taking the value 1 if at least 1 mine is recorded in the cell at any point over the 1997-2010 period. mines > 0 (neighbouring cells) is a dummy taking the value 1 if at least 1 mine is recorded in neighbouring cells of degree 1 and 2 in year t. $\mathbb{V}(\mathrm{M}_{kt}) = 0$ means that we consider only cells in which the mine dummy (or dummies in column (3)) takes always the same value over the period. Column (6) is run on a sample containing only mining cells and their immediate neighbouring cells. In columns (1) to (5), ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells. In column (6) ln price main mineral takes the same value for the mining cell and its immediate neighbours. Estimations (1) and (6) include controls for the average level of mineral world price interacted with the mine dummy.

I Mineral prices and conflicts: subsets of minerals

In our baseline results, we exclude diamonds due to the impossibility of assigning a reliable world price in this case. Indeed, there is a large heterogeneity in diamond quality across mines and the price series for different qualities can move in opposite directions over time. Having no information on the quality of diamonds, we preferred to exclude diamonds from our baseline estimates in order to limit measurement error. We also excluded coltan (tantalum), as no world price was available – only a price based on the US market. In Table A.12 we include back these minerals as a robustness check. For diamonds we use a generic price index from Rapaport (2012), while for coltan we use data from the US Geological survey. The results are very close to our baseline estimates, with our coefficient of interest being statistically significant in all columns, and of a similar size as in the baseline Table 2.

Further, in Table A.13 we show more generally that our results are not driven by a particular subset of minerals. We exclude each mineral separately from our set of minerals and we replicate the estimate of column (2) of Table 2. The coefficient of interest is positive and significant at the 1 percent level in all columns, and is of similar magnitude throughout the table.

Table A.12: Conflicts and mineral prices: adding diamonds and tantalum

	(1)	(2)	(3)	(4)	(5)	(6)
Estimator	LPM					
Dep. var.	Conflict incidence					
Sample	All	$\mathbb{V}(\mathrm{M}_{kt}) = 0$		All	$\mathbb{V}(\mathrm{M}_{kt}) = 0$	
mine > 0	0.043					0.048
	(0.046)					(0.065)
ln price main mineral	-0.025					0.028
	(0.032)					(0.019)
ln price × mines > 0	0.072	0.059	0.060		0.069	0.108
	(0.035)	(0.019)	(0.021)		(0.023)	(0.041)
ln price × mines > 0 (neighbouring cells)			0.021			
			(0.006)			
ln price × mines > 0 (ever)				0.039		
				(0.013)		
Country×year FE	Yes	Yes	Yes	Yes	No	No
Year FE	No	No	No	No	Yes	Yes
Cell FE	Yes	Yes	Yes	Yes	Yes	No
Neighbour-pairs FE	No	No	No	No	No	Yes
Observations	144452	142674	127974	144452	142674	17360

LPM estimations. Conley (1999) standard errors in parentheses, allowing for spatial correlation within a 500km radius and for infinite serial correlation. mine > 0 is a dummy taking the value 1 if at least 1 mine is active in the cell in year t. mines > 0 (ever) is a dummy taking the value 1 if at least 1 mine is recorded in the cell at any point over the 1997-2010 period. mines > 0 (neighbouring cells) is a dummy taking the value 1 if at least 1 mine is recorded in neighbouring cells of degree 1 and 2 in year t. $\mathbb{V}(\mathrm{M}_{kt}) = 0$ means that we consider only cells in which the mine dummy (or dummies in column (3)) takes always the same value over the period. Column (6) is run on a sample containing only mining cells and their immediate neighbouring cells. In columns (1) to (5), ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells. In column (6) ln price main mineral takes the same value for the mining cell and its immediate neighbours. Estimations (1) and (6) include controls for the average level of mineral world price interacted with the mine dummy.

Table A.13: Conflicts and mineral prices: dropping each mineral separately

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Estimator	LPM											
Dep. var.	Conflict incidence											
Sample	$\mathbb{V}(M_{kt}) = 0$											
Mineral dropped	aluminum	coal	copper	gold	iron	lead	nickel	phosphate	platinum	silver	tin	zinc
ln price × mines > 0	0.073	0.072	0.066	0.076	0.082	0.071	0.064	0.073	0.069	0.072	0.074	0.070
	(0.020)	(0.020)	(0.020)	(0.025)	(0.022)	(0.020)	(0.020)	(0.021)	(0.020)	(0.020)	(0.020)	(0.020)
Country×year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cell FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	142268	142296	142142	141764	142184	142282	142240	142198	142226	142282	142268	142240

LPM estimations. Conley (1999) standard errors in parentheses, allowing for spatial correlation within a 500km radius and for infinite serial correlation. These estimations are analogous of columns (2) of table 2 but exclude each mineral separately from the regressions. mine > 0 is a dummy taking the value 1 if at least 1 mine is active in the cell in year t. $\mathbb{V}(M_{kt}) = 0$ means that we consider only cells in which the mine dummy (or dummies in column (3)) takes always the same value over the period. ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells.

J Mineral prices and conflicts: Fixed effects logit estimator

Table A.14 replicates our baseline specifications using a fixed effects logit estimator. Our results are very similar to our baseline estimates. The LPM is however our preferred estimator as it allows for a more straightforward interpretation of the coefficients and does not suffer from certain econometric problems due to the inclusion of both cell and country×year fixed effects. Note that the estimations displayed in Table A.14 include year dummies instead of country×year dummies for two reasons: First, because the logit estimator fails to reach convergence when including country×year dummies; second, because the inclusion of two different large sets of fixed effects in logit models may lead to an incidental parameter problem (Charbonneau, 2012).

Table A.14: Conflicts and mineral prices: Fixed effects logit estimator

	(1)	(2)	(3)	(4)	(5)
Estimator			FE logit		
Dep. var.			Conflict incidence		
Sample	All	$\mathbb{V}(M_{kt}) = 0$		All	$\mathbb{V}(M_{kt}) = 0$
mine > 0	0.708				
	(1.065)				
ln price main mineral	-0.460				0.010
	(0.480)				(0.005)
ln price × mines > 0	1.375	1.173	0.746		1.222
	(0.404)	(0.311)	(0.274)		(0.262)
ln price × mines > 0 (neighbouring cells)			0.600		
			(0.237)		
ln price × mines > 0 (ever)				0.689	
				(0.260)	
Year FE	Yes	Yes	Yes	Yes	Yes
Cell FE	Yes	Yes	Yes	Yes	No
Neighbour-pairs FE	No	No	No	No	Yes
Observations	35470	34762	30604	35532	6650

Standard errors clustered by country in parentheses. mine > 0 is a dummy taking the value 1 if at least 1 mine is active in the cell in year t. mines > 0 (ever) is a dummy taking the value 1 if at least 1 mine is recorded in the cell at any point over the 1997-2010 period. mines > 0 (neighbouring cells) is a dummy taking the value 1 if at least 1 mine is recorded in neighbouring cells of degree 1 and 2 in year t. $\mathbb{V}(M_{kt}) = 0$ means that we consider only cells in which the mine dummy (or dummies in column (3)) takes always the same value over the period. Column (5) is run on a sample containing only mining cells and their immediate neighbouring cells. In columns (1) to (4), ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells. In column (5) ln price main mineral takes the same value for the mining cell and its immediate neighbours. Estimations (1) and (5) include controls for the average level of mineral world price interacted with the mine dummy.

K Mining intensity

In the baseline analysis of the paper we do not exploit information about the intensive margin, i.e. the *volume* or *scale* of production. One of the reasons for this is the concern about exogeneity. In the current section we shall investigate robustness to taking into account this intensive margin.

Table A.15 displays the results. In column (1), we estimate the effect of the interaction of the mining price times the *number* of mines in a given cell. To avoid picking up endogenous opening and closing of mines, we limit the sample to cells with a constant number of mines over the period. While the coefficient of interest has the expected sign, it is not statistically significant at conventional levels. This is unsurprising given the big drop in mines contained in our sample. To address this loss of information, we keep in column (2) all cells in the sample, and define the variable of interest as the interaction of the mining price times the *average* number of mines in a cell over the sample period. This allows us to attenuate concerns about endogenous opening and closing of mines, while keeping all cells in the sample. The coefficient of interest is now positive and significant at the 1 percent level. In columns (3) and (4), our variable of interest is the average production value of the main mineral. It turns out that the coefficient of interest is positive and significant at the 1 percent level both in column (3) (where the sample is restricted to cells with permanently active mines) and in column (4) (mining activity is defined as cells where at least a mine has been recorded as active at any point over the 1997-2010 period). Columns (5) and (6) replicate the columns (3) and (4), but replace current production with the production in 1997, serving the purpose of addressing concerns about the endogeneity of production levels. The coefficients of interest remain positive and highly significant.

Table A.15: Robustness: intensity of mining production

	(1)	(2)	(3)	(4)	(5)	(6)
Estimator			LPM			
Dep. var.			Conflict incidence			
Sample	$\mathbb{V}(\#\ \text{mines}_{kt}) = 0$	All	$\mathbb{V}(\text{M}_{kt}) = 0$	All	$\mathbb{V}(\text{M}_{kt}) = 0$	All
ln price × # mines	0.011					
	(0.008)					
ln price × # mines (average)		0.016				
		(0.006)				
ln total value main mineral			0.074	0.048		
			(0.021)	(0.014)		
ln total value main min. (at 1997 prod.)					0.075	0.047
					(0.022)	(0.019)
Country×year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cell FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	142254	144102	142534	144102	142534	144102

LPM estimations. Conley (1999) standard errors in parentheses, allowing for spatial correlation within a 500km radius and for infinite serial correlation. ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells. # mines is the number of active mines observed in the cell in year t. # mines (average) is the number of mines observed on average in the cell over the period. ln total value main mineral is the value of the main mineral computed using the contemporaneous world price and the average production volume. ln total value main mineral (at 1997 production) is the value of the main mineral computed using the contemporaneous world price and the production volume in 1997. $\mathbb{V}(\text{M}_{kt}) = 0$ means that we consider only cells in which the mine variable (number of mine in column (1), mine dummy in columns (3) and (5)) always takes the same value over the period.

L Excluding border cells

One potential worry with our econometric specification, and in particular with the use of the country × year fixed effects, is that a cell may belong to more than one country, which is the case for 15 percent of the cells. In order to address this concern, we replicate below our baseline Table 2, but excluding from the sample all border cells for which the distance between the cell's centroid and the closest international border is smaller than 30 kilometers. Table A.16 displays the results. The coefficients of interest are positive and statistically significant in all columns, and are similar in magnitude to those of the baseline Table 2.

Table A.16: Robustness: excluding cells in multiple countries

	(1)	(2)	(3)	(4)	(5)	(6)
Estimator	LPM					
Dep. var.	Conflict incidence					
Sample	All	$\mathbb{V}(\text{M}_{kt}) = 0$		All	$\mathbb{V}(\text{M}_{kt}) = 0$	
mine > 0	0.040					-0.004
	(0.060)					(0.039)
ln price main mineral	-0.042					0.034
	(0.034)					(0.021)
ln price × mines > 0	0.094	0.063	0.049		0.081	0.111
	(0.037)	(0.023)	(0.024)		(0.027)	(0.051)
ln price × mines > 0 (neighbouring cells)			0.018			
			(0.006)			
ln price × mines > 0 (ever)				0.039		
				(0.014)		
Country×year FE	Yes	Yes	Yes	Yes	No	No
Year FE	No	No	No	No	Yes	Yes
Cell FE	Yes	Yes	Yes	Yes	Yes	No
Neighbour-pairs FE	No	No	No	No	No	Yes
Observations	123088	121786	110390	123088	121786	13986

LPM estimations. These estimations exclude from the sample cells for which the distance between the cell's centroid and the closest international border is larger than 30km. Conley (1999) standard errors in parentheses, allowing for spatial correlation within a 500km radius and for infinite serial correlation. mine > 0 is a dummy taking the value 1 if at least 1 mine is active in the cell in year t. mines > 0 (ever) is a dummy taking the value 1 if at least 1 mine is recorded in the cell at any point over the 1997-2010 period. mines > 0 (neighbouring cells) is a dummy taking the value 1 if at least 1 mine is recorded in neighbouring cells of degree 1 and 2 in year t. $\mathbb{V}(\text{M}_{kt}) = 0$ means that we consider only cells in which the mine dummy (or dummies in column (3)) takes always the same value over the period. Column (6) is run on a sample containing only mining cells and their immediate neighbouring cells. In columns (1) to (5), ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells. In column (6) ln price main mineral takes the same value for the mining cell and its immediate neighbours. Estimations (1) and (6) include controls for the average level of mineral world price interacted with the mine dummy.

M Prices: Levels vs Differences

In our main analysis we interact mining activity with the *level* of mineral log-prices. An alternative approach would be to focus on price growth over time (i.e. *difference* in log-prices). A theoretical reason for focusing on levels is that the typical workhorse model of conflict (Contest Success Function) would predict the mineral price level and not changes to affect conflict incentives. Moreover, when taking such a model to the data, Ciccone (2011) shows (in the context of rainfall-induced income shocks) that the correct specification of the econometric model involves levels rather than differences: Only in the presence of non-stationary price series can the effect of shocks on conflict be uncovered using a specification in differences. To assess stationarity, we display below in Tables A.17 and A.18 the results from various variants of unit root tests. We purge the price series of a potential common trend by including year fixed effects (as we do in the main regressions). The unit root tests are either performed on each series separately (i.e. augmented Dickey-Fuller tests in Table A.17) or jointly on all series (i.e. the panel version of Im-Pesaran-Shin and variants in Table A.18). In the vast majority of cases the null hypothesis of a presence of unit root is clearly rejected. In a nutshell, when de-trended, the time series of the mineral prices turn out to be stationary. This result is consistent with the finding of Bazzi and Blattman (2014) who show that the persistence of most commodity prices tend to be short (see their discussion in Section 1.A and their online Appendix).

Moreover, as shown below in Table A.19, our results continue to hold when focusing on price differences rather than levels. Note that the specifications in price differences also include cell fixed effects in order to capture cell-specific unobservables: Hence, our coefficients of interest pick up the impact on conflict probability of a deviation of price growth from their average growth rate –the interpretation of such an effect is less straightforward than in the case of our baseline estimations specified in levels. More precisely column (1) displays for the purpose of comparison the baseline estimate of column (2) of the benchmark Table 2. In column (2) the price variable is defined as the change in mineral prices between period t-1 and the current period t. The variable of interest hence becomes the interaction of the price difference with active mine. While the coefficient of interest is still of the expected positive sign its magnitude is now considerably smaller and it loses significance. One downside of focusing on short-term price movements is the risk of picking up much random noise, leading to attenuation bias. Hence, in column (3) we focus on the price difference over a longer period, i.e. between t-2 and t. The coefficient of interest continues to be of positive sign, but now is again of similar magnitude as in the baseline regression and becomes significant again at the 1 percent level. Similarly, column (4) shows that the results also hold for price changes over an even longer period, i.e. between t-3 and t. This corresponds to the baseline specification of Bruckner and Ciccone (2010) who estimate the country-level impact of a 3-year commodity price growth on civil war.

Finally, we address further the question of the time response of conflict to variations in price shocks in Table A.20 by looking at the delay in response (lagged prices) and the role of expectations (leads prices). In column (1) the price variable is lagged by one year. The coefficient of interest is very close to the baseline point estimate of Table 2, col. (2) (0.078 vs 0.072). Nevertheless, statistical significance is lost when including both current and lagged prices in column (2), or up to two lags in column (3). The same pattern emerges in columns (4) and

(5) where we replicate the exercise with a one year lead in prices.[3] The overall interpretation of these findings is unclear given that the levels of current and lagged (or leads) prices are highly correlated (close to 0.98). When we look at the sum of the coefficients however, it is always statistically significant and quantitatively close to our baseline estimates.

In columns (6) and (7) we implement a dynamic OLS (Stock and Watson, 1993) where the current level of log-price is included together with the leads and lags of the log-price first differences. Given the inclusion of cell-fixed effects, the log-price level can be interpreted as deviations from long-run means, whereas the first differences can be interpreted as short-run variations. We see that the coefficient of current price level retains its statistical significance, while the coefficients of price differences are not significant anymore. This result indicates that price deviations from long-run tend to impact conflicts while short-run variations do not. To the extent that the expected value of future prices is captured by current price, this also indicates that unexpected shifts in prices do not affect conflicts. All in all this evidence supports the theoretical view that the decision to fight and to conquer mining areas is not a short run decision based on transitory shocks in mineral values.

Table A.17: Dickey-Fuller Unit root tests

Mineral	**Augmented Dickey Fuller** (p-value)
Aluminum	0.220
Coal	0.000
Copper	0.035
Gold	0.178
Iron	0.009
Lead	0.000
Nickel	0.004
Phosphate	0.000
Platinum	0.063
Silver	0.017
Tin	0.043
Zinc	0.005

Dickey-Fuller test is based on the log of each mineral's series, over the entire 1960-2012 period. The null hypothesis (rejected here in most cases) is that the variable follows a random walk with non zero drift. Prices series have been purged from their common time components (i.e. we use the residuals from a regression of the log price on year dummies).

[3] The significant coefficient of the lead of prices in column (4) of Table A.20 might also be a consequence of the aggregation of our data at the annual level: for events occurring toward the end of a given year, the average price in $t+1$ might be more relevant.

Table A.18: Panel unit root tests

Test	**p-value**
Im-Pesaran-Shin	0.001
Levin-Lin-Chu	0.011
Harris-Tzavalis	0.000
Combined Dickey Fuller	0.001
Breitung	0.001
Hadri	0.000

Tests is based on the log of all minerals' series together, over the entire 1960-2012 period. The null hypothesis is that all the panels contain a unit root. Price series have been purged from their common time components (i.e. we use the residuals from a regression of the log price on year dummies).

Table A.19: Robustness: log differences

	(1)	(2)	(3)	(4)
Estimator	LPM			
Dep. var.	Conflict incidence			
Sample	$\mathbb{V}(\mathrm{M}_{kt}) = 0$			
ln price × mines > 0	0.072 (0.020)			
$\Delta_{t,t-1}$ ln price × mines > 0		0.017 (0.042)		
$\Delta_{t,t-2}$ ln price × mines > 0			0.078 (0.029)	
$\Delta_{t,t-3}$ ln price × mines > 0				0.061 (0.026)
Country×year FE	Yes	Yes	Yes	Yes
Cell FE	Yes	Yes	Yes	Yes
Observations	142296	142296	142296	142296

LPM estimations. Conley (1999) standard errors in parentheses, allowing for spatial correlation within a 500km radius and for infinite serial correlation. mine > 0 is a dummy taking the value 1 if at least 1 mine is active in the cell in year t. $\mathbb{V}(\mathrm{M}_{kt}) = 0$ means that we consider only cells in which the mine dummy takes always the same value over the period. ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells.

Table A.20: Robustness: short-run versus medium-run effect

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Estimator				LPM			
Dep. var.				Conflict incidence			
Sample				$\mathbb{V}(\text{M}_{kt}) = 0$			
ln price$_{t-1}$ × mines > 0	0.078	0.052	0.115				
	(0.024)	(0.051)	(0.058)				
ln price$_t$ × mines > 0		0.028	0.040		0.057	0.080	0.100
		(0.044)	(0.045)		(0.045)	(0.023)	(0.027)
ln price$_{t-2}$ × mines > 0			-0.091				
			(0.030)				
ln price$_{t+1}$ × mines > 0				0.080	0.035		
				(0.022)	(0.042)		
$\Delta_{t,t-1}$ ln price × mines > 0						-0.052	-0.053
						(0.051)	(0.049)
$\Delta_{t,t+1}$ ln price × mines > 0							0.020
							(0.043)
Sum coef.		0.080	0.064		0.092		
		(0.023)	(0.022)		(0.024)		
Country×year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cell FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	132132	132132	121968	132132	132132	132132	121968

LPM estimations. Conley (1999) standard errors in parentheses, allowing for spatial correlation within a 500km radius and for infinite serial correlation. mine > 0 is a dummy taking the value 1 if at least 1 mine is active in the cell in year t. $\mathbb{V}(\text{M}_{kt}) = 0$ means that we consider only cells in which the mine dummy takes always the same value over the period. ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells.

N Time-varying controls

While our identification strategy manages to filter out time-invariant factors at the cell-level (through the cell fixed effects) and country-level shocks (through the country × year fixed effects), our results could potentially be biased by cell-level shocks. To address this concern, we control in this section for variables that are time-varying at the cell-level.

Table A.21 replicates the baseline Table 2, but adding cell-specific, time-varying controls which may be correlated with commodity price variations. In particular, we control for rainfall and temperature, both as levels and interacted with the presence of mines. In all columns, our coefficients of interest remain stable and highly significant.

Table A.21: Robustness: additional time-varying controls

	(1)	(2)	(3)	(4)	(5)	(6)
Estimator	LPM					
Dep. var.	Conflict incidence					
Sample	All	$\mathbb{V}(M_{kt}) = 0$		All	$\mathbb{V}(M_{kt}) = 0$	
mine > 0	0.135					0.071
	(0.072)					(0.074)
ln price main mineral	-0.032					0.028
	(0.033)					(0.019)
ln price × mines > 0	0.088	0.067	0.053		0.081	0.107
	(0.035)	(0.019)	(0.020)		(0.023)	(0.041)
ln price × mines > 0 (neighbouring cells)			0.021			
			(0.006)			
ln price × mines > 0 (ever)				0.042		
				(0.014)		
Temperature × mines > 0	0.003	0.018	0.031	-0.000	0.017	0.006
	(0.004)	(0.016)	(0.018)	(0.004)	(0.019)	(0.006)
Rainfall × mines > 0	-0.002	-0.029	-0.019	0.009	-0.037	0.019
	(0.011)	(0.021)	(0.022)	(0.013)	(0.024)	(0.014)
Temperature	0.001	-0.000	-0.000	0.001	0.006	-0.007
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.004)
Rainfall	0.001	0.001	0.001	0.001	0.000	0.015
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.009)
Country×year FE	Yes	Yes	Yes	Yes	No	No
Year FE	No	No	No	No	Yes	Yes
Cell FE	Yes	Yes	Yes	Yes	Yes	No
Neighborhood FE	No	No	No	No	No	Yes
Observations	143655	142183	127875	143655	142183	17360

LPM estimations. Conley (1999) standard errors in parentheses, allowing for spatial correlation within a 500km radius and for infinite serial correlation. mine > 0 is a dummy taking the value 1 if at least 1 mine is active in the cell in year t. mines > 0 (ever) is a dummy taking the value 1 if at least 1 mine is recorded in the cell at any point over the 1997-2010 period. mines > 0 (neighbouring cells) is a dummy taking the value 1 if at least 1 mine is recorded in neighbouring cells of degree 1 and 2 in year t. $\mathbb{V}(M_{kt}) = 0$ means that we consider only cells in which the mine dummy (or dummies in column (3)) takes always the same value over the period. Column (6) is run on a sample containing only mining cells and their immediate neighboring cells. In columns (1) to (5), ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells. In column (6) ln price main mineral takes the same value for the mining cell and its immediate neighbours. Estimations (1) and (6) include controls for the average level of mineral world price interacted with the mine dummy. Weather-related variables are time-demeaned.

O Mines data: measurement error

The RMD data only includes big, industrially operated mines, and hence do not report direct information on small-scale artisanal production sites. In presence of classical measurement errors, our empirical strategy that is based on spatial clustering of deposits and variations in prices, limits the extent of the attenuation bias (see our discussion in Section 3 of the main text). However, the scale of operation of extractive activity— big industrial mines or small artisanal sites – does not only depend on geographical features; it may also be correlated with the presence of conflict. Hence, there could be non-classical measurement errors affecting our mining data points and the resulting estimation bias is unclear.

Suppose for example that multinationals only go to places with low political risk. In this case there would be more missing mines in high-risk areas, and focusing on industrial mines could bias downward the effect we find. On the contrary, if big mining companies were to benefit from political instability (which could make the bribing of officials easier), in this case there could be more missing mines in peaceful zones and our analysis could suffer from over-stated estimates of the effect of mining extraction on conflict. Notice that, in both cases, the inclusion of cell and country×year fixed-effects alleviates most of our concern. The only estimation bias that would be problematic could arise in case these non-classical measurement errors were more likely in periods of high prices. Here we study this potential problem, following a recent approach developed by Koenig *et al.* (2015).

The basic idea consists in regressing a subsample of our RMD mining data on a quasi-exhaustive list of mines and to see whether the residual variation in RMD coverage can be significantly explained by conflict. Unsurprisingly, for most types of minerals no alternative data sources are available that capture a broader range of mines than RMD. However, luckily, there exists one dataset on diamonds, DIADATA, from Gilmore et al. (2005), which is extremely fine-grained and aims to include not only big, industrial mining sites, but also small, artisanal exploitations. Further, it does not only include sites with production, but also mining areas with confirmed diamond presence where production has not started yet. They stress that "DIADATA is a comprehensive list of diamond occurrences throughout the world. (...) A diamond occurrence is broadly defined as any site with known activity, meaning production (either commercial or artisan) or confirmed discovery. The list of sites was compiled through an intensive literature search of academic databases and journals, national geological survey reports, and industry databases and reports" (2005: 5).

To see whether the RMD diamonds data are biased, consider the following simple model:

$$\textsc{diamonds}_{ct}^{\text{DIADATA}} = \textsc{diamonds}_{ct} + v_{ct}^{\text{DIADATA}} \tag{1}$$

$$\textsc{diamonds}_{ct}^{\text{RMD}} = \textsc{diamonds}_{ct} + \tilde{v}_{ct}^{\text{RMD}} \tag{2}$$

where c denotes the grid cell at which diamonds are measured, $\textsc{diamonds}_{ct}$ are the true (unobservable) diamond mines, and v_{ct}^{DIADATA} and $\tilde{v}_{ct}^{RMD}$ are the measurement errors. v_{ct}^{DIADATA} is assumed to be i.i.d.. The error term of the RMD measure is potentially subject to violence-driven measurement error. This possibility is allowed by letting $\tilde{v}_{ct}^{\text{RMD}} = \xi \times \textsc{violence}_{ct} + v_{ct}^{\text{RMD}}$ where v_{ct}^{RMD} is an i.i.d. error term. One can eliminate $\textsc{diamonds}_{ct}$ from the above system of equations and obtain:

$$\text{DIAMONDS}_{ct}^{\text{RMD}} = \text{DIAMONDS}_{ct}^{\text{DIADATA}} + \xi \times \text{VIOLENCE}_{ct} + \nu_{ct} \tag{3}$$

where $\nu_{ct} = v_{ct}^{\text{RMD}} - v_{ct}^{\text{DIADATA}}$ is an i.i.d. disturbance. Our null hypothesis is that $\xi = 0$. If $\xi \neq 0$, the RMD measure suffers from non-classical measurement error.

We run a regression based on equation (3), measuring violence by the number of conflicts in ACLED. Table A.22 summarizes the results. Column (1) is a cross-sectional specification; column (2) includes annual year fixed effects, while column (3) includes country fixed effects. Finally, column (4) includes country x year fixed effects. Note that the DIADATA dataset does not contain time variation for the period we study, which excludes any specifications with cell fixed effects. We allow for robust standard errors to be clustered at the country level.

As expected, there is a highly significant positive correlation between the RMD and the DIADATA diamond measures. Most importantly, all estimates of ξ are tiny and not significantly different from zero, with its point estimates switching sign across specifications. We conclude that there is no evidence that the RMD diamond data are subject to non-classical measurement error in our sample.

Table A.22: Mines data: non classical measurement errors

	(1)	(2)	(3)	(4)
Dep. var.	Number of RMD mines			
Nb of mines by grid (DIADATA)	0.095	0.095	0.096	0.096
	(0.033)	(0.033)	(0.032)	(0.032)
Number of events (ACLED)	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Fixed effects	No	Year	Country	Country-year
Observations	144690	144690	144690	144690
R-squared	0.136	0.136	0.151	0.153

LPM estimations. Standard errors, clustered by country, in parentheses.

P Port-level corruption

In this section, we study how a specific type of corruption – at the port – affects the impact of mineral price variations on conflict. We follow the trade literature (e.g. Sequeira, 2016; Fisman and Wei, 2004; Javorcik and Narciso, 2007) and use the gaps in the declarations of importers and exporters as a proxy for port-level corruption. More precisely, we use the ratio of the import quantities declared by the country over the quantities declared by the rest of the World as exports to the country (in the 5 years before the start of the period). Because of import tariffs, importers have strong incentives to under-report trade quantities, and under-reporting is easier in corrupt environments. Starting from our preferred specifications (columns (2) and (4) of Table 2) we now consider the triple interaction between our main explanatory variable ($M_k \times \ln p^W_{kt}$) with either this trade gap ratio (TRADE GAP RATIO) or with a dummy taking the value 1 whenever imports declared are lower than exports at the port-level (TRADE GAP < 1). Table A.23 displays the results. We find evidence of a conflict inducing effect of our proxy of port-level corruption. Interestingly, this result continues to hold controlling for our more global measure of corruption (columns (3)-(4), (7)-(8)).

Table A.23: Conflicts and mineral prices: port-level corruption

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Estimator				LPM				
Dep. var.				Conflict incidence				
Sample	$\mathbb{V}(\mathrm{M}_{kt}) = 0$	All	$\mathbb{V}(\mathrm{M}_{kt}) = 0$	All	$\mathbb{V}(\mathrm{M}_{kt}) = 0$	All	$\mathbb{V}(\mathrm{M}_{kt}) = 0$	All
ln price × mines > 0	0.074		0.077		0.006		-0.002	
	(0.025)		(0.021)		(0.018)		(0.008)	
× Trade Gap Ratio	-0.001		-0.001					
	(0.000)		(0.001)					
× Trade Gap < 1					0.072		0.083	
					(0.031)		(0.025)	
× Anti-corruption index			-0.048				-0.045	
			(0.027)				(0.025)	
ln price × mines > 0 (ever)		0.049		0.049		-0.016		-0.017
		(0.012)		(0.012)		(0.005)		(0.008)
× Trade Gap Ratio		-0.001		-0.001				
		(0.000)		(0.000)				
× Trade Gap < 1						0.068		0.069
						(0.013)		(0.015)
× Anti-corruption index				-0.017				-0.014
				(0.015)				(0.014)
Country×year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cell FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	135268	136752	124614	126028	135268	136752	124614	126028

LPM estimations. Standard errors in parentheses, clustered by country. mines > 0 (ever) is a dummy taking the value 1 if at least 1 mine is recorded in the cell at any point over the 1997-2010 period. $\mathbb{V}(\mathrm{M}_{kt}) = 0$ means that we consider only cells in which the mine dummy takes always the same value over the period. ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells. Trade Gap Ratio is the ratio of quantities imported from the rest of the world declared by the country over the quantities exported by the rest of the world to the country (declared by the rest of the world), computed over the period 1992-1996. Trade Gap <1 is a dummy which equals 1 if the trade gap ratio is lower than 1. Anti-corruption index is the anti-corruption index from the WGI ("Worldwide Governance Indicators") dataset from Kaufmann, Kraay, and Mastruzzi (2013), taken at the beginning of the period.

Q Additional results: mineral characteristics

In section 4.5 of the main text, and in particular in Table 14 in the appendix we display results on how the relative capital versus labor intensiveness of mining production affects the impact of mineral price spikes on the conflict risk. We are not able to detect any effect of relative capital intensiveness, which may well be due to the fact that the variation in relative capital intensiveness among the minerals studied is not very large.

We display further results on the impact of relative capital intensiveness in Table A.24. This Table is constructed identically to appendix Table 14, simply focusing on three other capital intensiveness measures for the triple interactions.

In columns (1)-(2), capital intensiveness is measured using production functions. In particular, we take as starting point a Cobb-Douglas production function of $Y = K^{\alpha}L^{\beta}$ with K=capital, L=labor. For each mineral separately, we regress on the firm level the ln(production) on ln(capital) and ln(employees) to obtain estimates of α and β, and to define as relative capital intensiveness the ratio of $\alpha/(\alpha+\beta)$. All data on production, capital and employees are from RMD.[4] The coefficient of the triple interaction of the main explanatory variable ($M_k \times \ln p^W_{kt}$) with our measure of $\alpha/(\alpha+\beta)$ is not statistically significant. The reason why we prefer the variables used in the appendix Table 14 is that for estimating our production functions we need to proxy capital very crudely with project cost estimates, and face many missing observations.

Columns (3)-(4) focus on using mean lead (i.e. development) times until a newly opened mine of a given mineral is up and running. This measure varying at the mineral-level is from Hargreaves and Fromson (1983). A longer lead / development time can be thought of indicating greater capital intensiveness. The triple interaction with this variable is not statistically significant. Finally, columns (5)-(6) interact our variable of mining price shocks with the artisan and small scale mining proportion of world production of various metals, collected by ICMM (2012). The triple interaction with this variable is non-significant. Again, the reason we do not prefer these specifications is that lead times and artisan mining proportion are only crude proxies.

In a nutshell, these additional results confirm our earlier conclusion that we are unable to detect an effect of capital intensiveness on the magnitude of price shock impact on conflict.

[4] To measure production value we use end of period production amounts multiplied with pre-period prices. Capital is proxied (very crudely) by project cost estimates (no actual capital figures are available). Both the project cost and number of employees information is time invariant and corresponds to end of period numbers. We only include firms with non-zero amounts for Y, K and L, and only keep minerals with at least 15 firm observations.

Table A.24: Heterogeneous effects: minerals' capital intensity (additional results)

	(1)	(2)	(3)	(4)	(5)	(6)
Estimator			LPM			
Dep. var.			Conflict incidence			
Sample	$\mathbb{V}(\mathrm{M}_{kt}) = 0$	All	$\mathbb{V}(\mathrm{M}_{kt}) = 0$	All	$\mathbb{V}(\mathrm{M}_{kt}) = 0$	All
ln price × mines > 0	0.069		0.052		0.071	
	(0.035)		(0.058)		(0.036)	
ln price × mines > 0 (ever)		0.043		0.055		0.031
		(0.026)		(0.043)		(0.026)
× Capital intensiveness	0.067	0.028				
	(0.124)	(0.085)				
× Lead time			0.003	-0.002		
			(0.008)	(0.006)		
× Artisanal					-0.001	0.000
					(0.002)	(0.001)
Country×year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cell FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	141946	142870	142296	143768	142030	143038

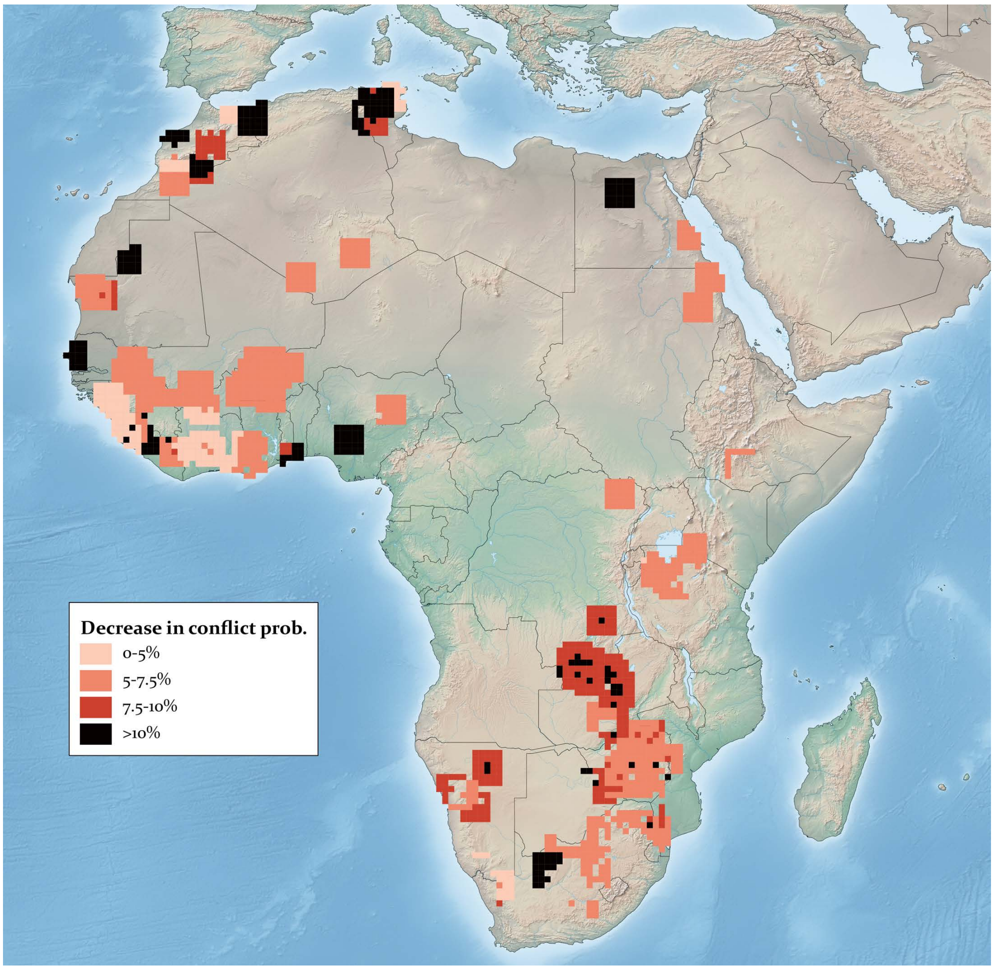
LPM estimations. Conley (1999) standard errors in parentheses, allowing for spatial correlation within a 500km radius and for infinite serial correlation. mine > 0 is a dummy taking the value 1 if at least 1 mine is active in the cell in year t. mines > 0 (ever) is a dummy taking the value 1 if at least 1 mine is recorded in the cell at any point over the 1997-2010 period. $\mathbb{V}(\mathrm{M}_{kt}) = 0$ means that we consider only cells in which the mine dummy takes always the same value over the period. ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells. See the text of the current online appendix, section Q for details on the construction of the mineral-specific variables.

R Additional quantifications

R.1 Cell-level

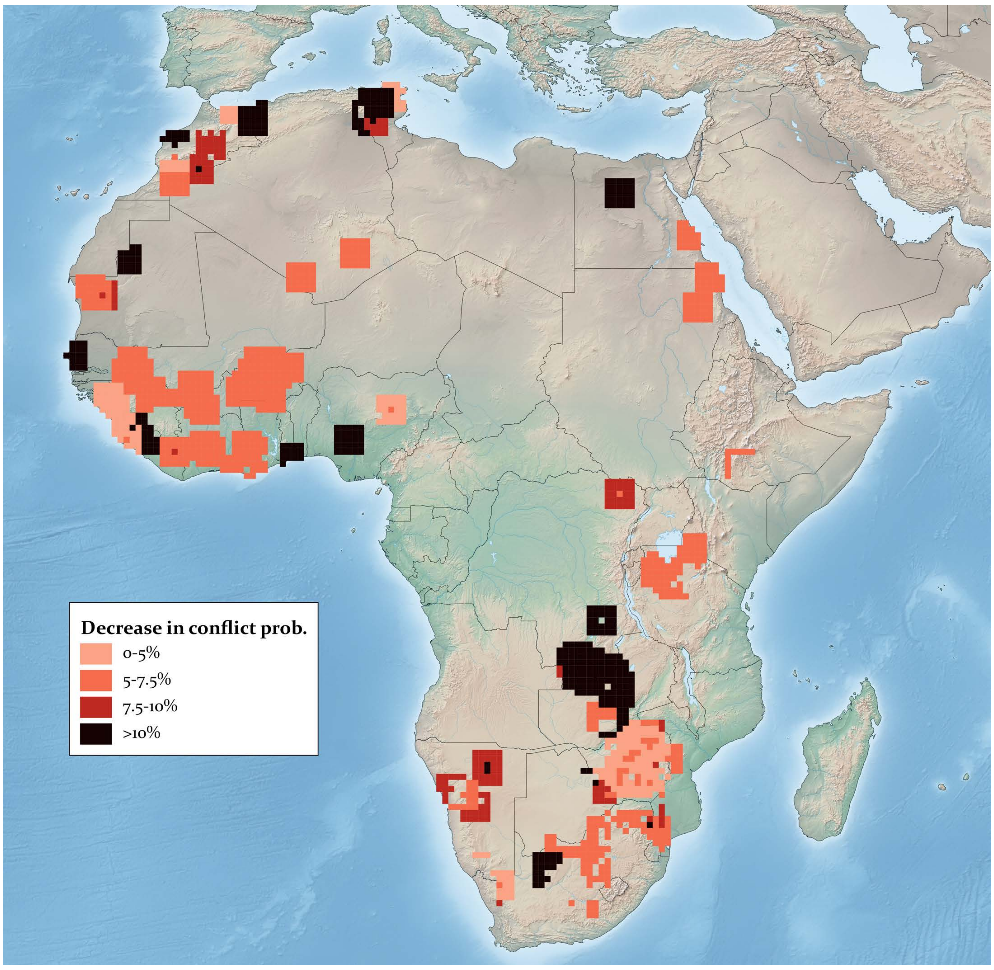
Figure A.5 shows, by cell, the predicted decrease in the conflict probability that would be observed in 2010 if the prices were the same as in 1997. This counterfactual exercise is based on the estimated coefficients of a regression similar to column (4) of Table 2, except that we also include the interaction term between mineral prices and the mining dummy for neighbouring cells of degrees 1 and 2. This is our preferred specification for this type of exercise as it allows performing in-sample predictions for all cells in which a mine is opened at some point. Note that a number of mining cells do not appear in these maps as price data is not available for all minerals. Figure A.6 performs the same exercise based on the coefficients of column (3) of Table 2, which is restricted to cells with permanently active mines.

Figure A.5: The contribution of rising mineral prices to the probability of conflict in Africa



Note: This figure represents for each mining cell the decrease in conflict probability that would have occurred in 2010 if mineral prices had stayed at their 1997 level. Predictions are based on the coefficients of a regression similar to column (4) of Table 2, except that we also include the interaction term between mineral prices and the mining dummy for neighbouring cells.

Figure A.6: The contribution of rising mineral prices to the probability of conflict in Africa (alternative specification)

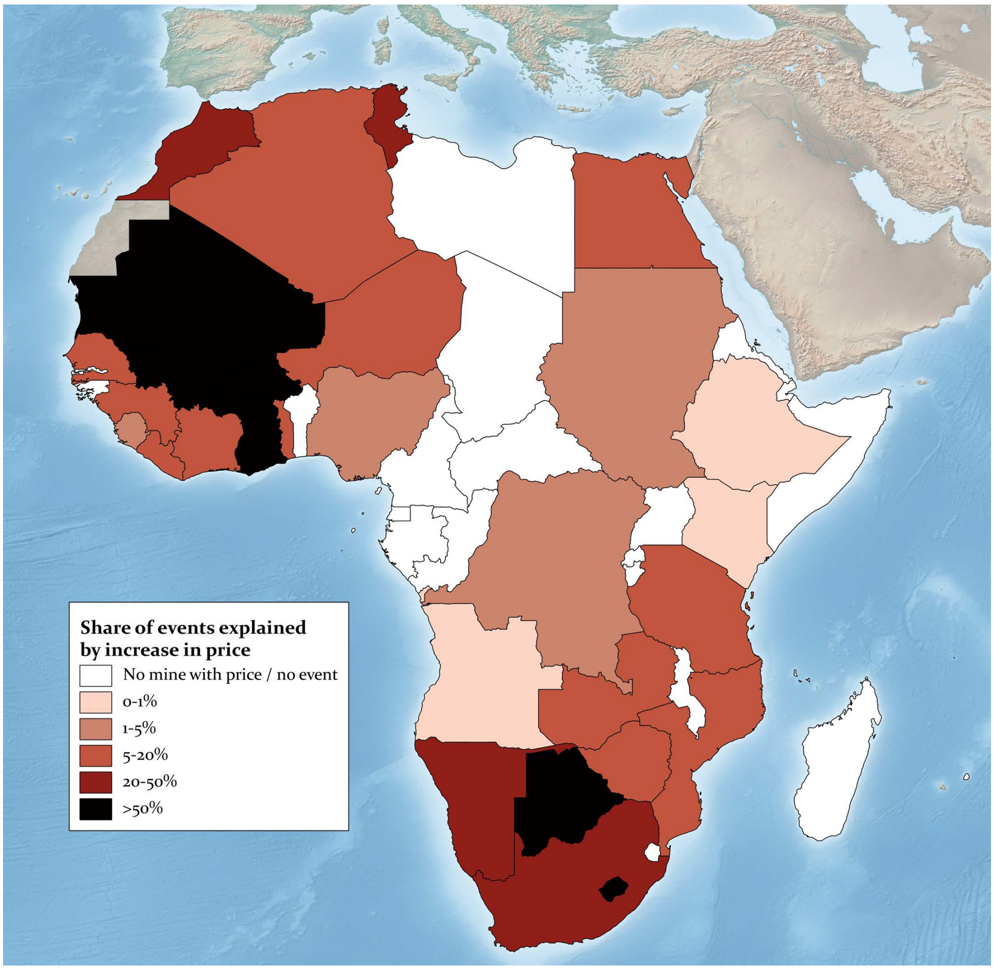


Note: This figure represents for each mining cell the decrease in conflict probability that would have occurred in 2010 if mineral prices had stayed at their 1997 level. Predictions are based on the coefficients of Table 2, column (3). As this specification is restricted to cells with a permanently active mine over the entire period ($\text{Var}(M_{kt}) = 0$), we complement the in-sample predictions for those cells with the out-of-sample predictions for cells that have a transiently active mine for which price data is available. Put differently, we apply the estimated coefficients of Table 2, column (3), to all cells contained in Table 2, column (1).

R.2 Country-level

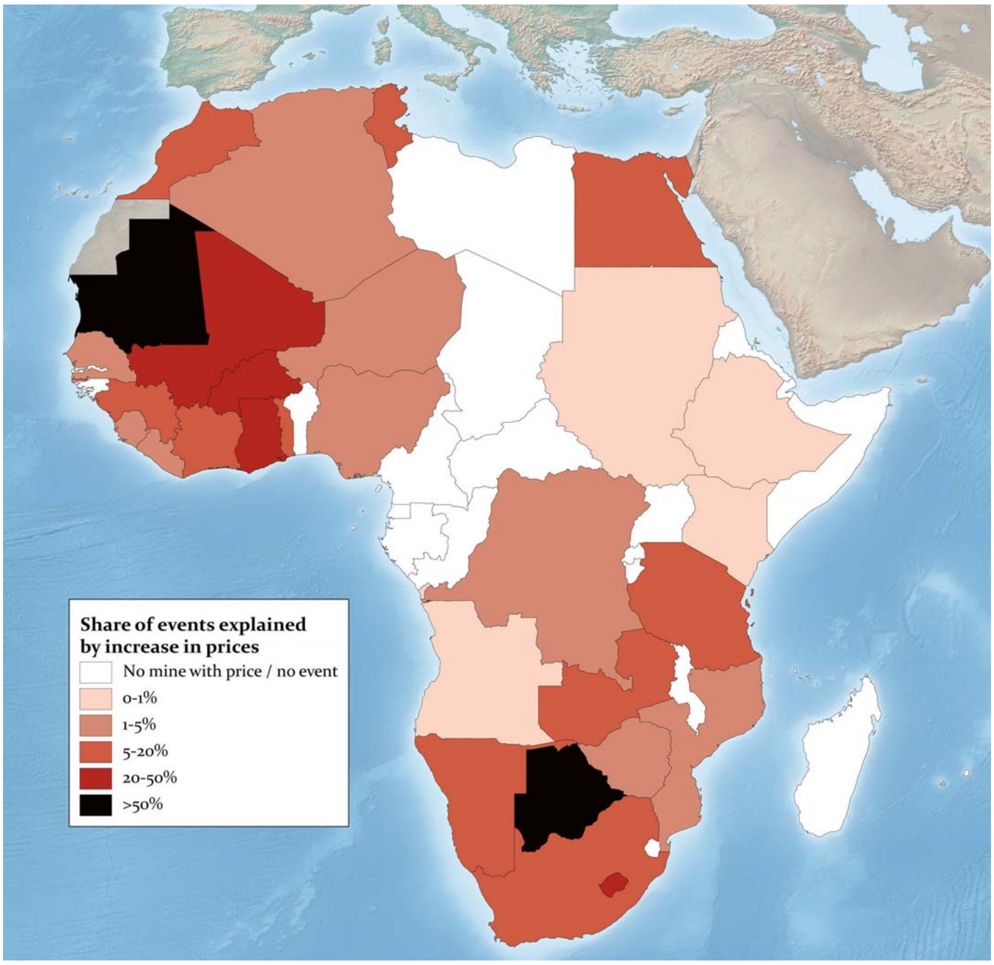
Figures A.7 and A.8 are map-equivalents of Figure 1 (main text). Figure A.9 performs the same exercise as Figure 1 (main text), except that coefficients are based on estimations similar to Panel A of Table 11, which is restricted to cells with permanently active mines.

Figure A.7: Counterfactuals: share of events due to increasing prices (PPML)



Note: This figure represents for each country the counterfactual share of events that would not have happened if prices had stayed stable at their 1997 level across the entire period. Predictions are based on an estimation similar to Table 11, Panel B, column (5) except that we also include the interaction term between mineral prices and the mining dummy for neighbouring cells.

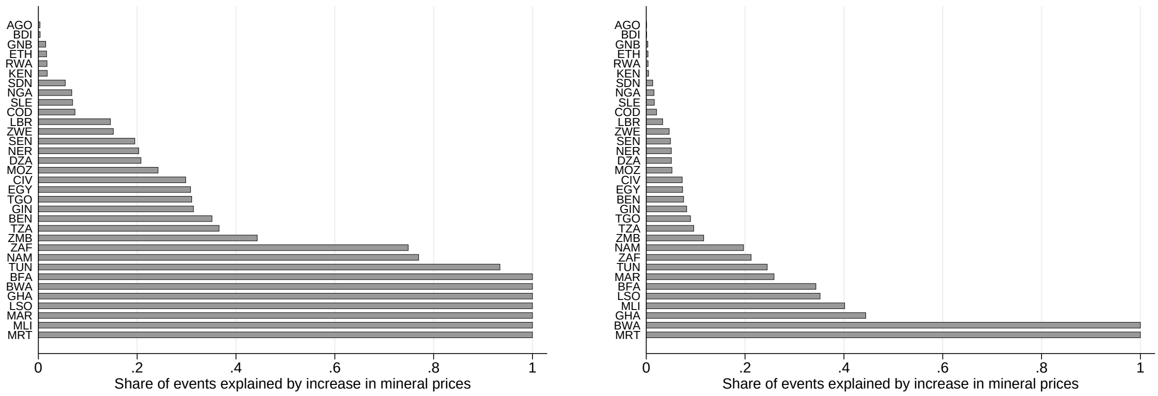
Figure A.8: Counterfactuals: share of events due to increasing prices (LPM)



Note: This figure represents for each country the counterfactual share of events that would not have happened if prices had stayed stable at their 1997 level across the entire period. Predictions are based on an estimation similar to Table 11, Panel B, column (2) except that we also include the interaction term between mineral prices and the mining dummy for neighbouring cells.

Figure A.9: The contribution of rising mineral prices to violence in Africa (alternative specification)

(a) PPML (b) LPM



Note: These figures represent for each country the counterfactual share of events that would not have happened if prices had stayed stable at their 1997 level across the entire period. Predictions are based on an estimation similar to Table 11, Panel A, columns (5) and (2) except that we also include the interaction term between mineral prices and the mining dummy for neighbouring cells. As this specification is restricted to cells with a permanently active mine over the entire period ($\text{Var}(M_{kt}) = 0$), we complement the in-sample predictions for those cells with the out-of-sample predictions for cells that have a transiently active mine for which price data is available.

S The role of population changes

In this section, we aim to mitigate the concern that our results could be entirely driven by migration-related violence due to population inflows into mining areas when mineral prices increase. To this purpose we investigate whether mineral price shocks have a systematic impact on total population size. In Table A.25 we consider two different proxies of population size at the local level, the first one being nighttime lights from NOAA (columns (1) and (2)), the second one being a fine-grained measure of population retrieved from prio-grid but originally from G-econ (columns (3)-(6)). The effect of mineral price variations is positive and significant only in column (2); in all other columns, no significant effect can be detected, suggesting that the impact of mining shocks on population changes are limited.

Finally, we perform a different exercise by looking at potential heterogeneous effects. The idea is that, in the presence of a pervasive migration channel, we should observe larger effects for mining areas close to big population centers, such as the capital city. The underlying assumption is that population inflows/outflows should be larger when mobility costs are low. Hence, in columns (7) and (8), we return to our baseline specifications and estimate the interaction term between mineral price shocks and the distance to the capital city of the cells' centroids (controlling for equivalent interaction terms with distance to the closest international border). We detect no significant heterogeneous effect, suggesting again that migration does not play a key role in explaining our findings on mining-induced violence.

Table A.25: Conflicts and mineral prices, and population

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Estimator	LPM							
Sample	$\mathbb{V}(M_{kt}) = 0$	All	$\mathbb{V}(M_{kt}) = 0$	All	$\mathbb{V}(M_{kt}) = 0$	All	$\mathbb{V}(M_{kt}) = 0$	All
Dep. var.	Nighttime lights		log population				Conflict Incidence	
					(interpolated)			
ln price × mines > 0	0.095		0.002		0.002		0.345	
	(0.063)		(0.017)		(0.011)		(0.153)	
× ln dist. to capital							-0.037	
							(0.024)	
ln price × mines > 0 (ever)		0.130		0.008		0.005		0.258
		(0.047)		(0.012)		(0.008)		(0.130)
× ln dist. to capital								-0.026
								(0.021)
Country×year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cell FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	142296	143864	30396	30732	111452	112684	138908	140476

LPM estimations. Conley (1999) standard errors in parentheses, allowing for spatial correlation within a 500km radius and for infinite serial correlation. mines > 0 (ever) is a dummy taking the value 1 if at least 1 mine is recorded in the cell at any point over the 1997-2010 period. $\mathbb{V}(M_{kt}) = 0$ means that we consider only cells in which the mine dummy takes always the same value over the period. ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells. Missing values of the population variable (the dependent variable) are interpolated in columns (5) and (6). Estimations (7) and (8) also include interaction terms between the mining price shock variables and distance to the closest international border. ln dist. to capital is demeaned.

T Types of events – full results

We replicate our baseline Table 2 for each of the three categories of violent events covered by the ACLED dataset: battles between fighting groups, violence against civilians, and riots/protests. The occurrence of battles is significantly affected by changes in the value of mines, except in column (4), confirming that the appropriation of mines is a key driver of violence (Table A.26). We find also that an increase in mineral prices leads to more violence against civilians (Table A.27) and more riots/protests (Table A.28).

Table A.26: Conflicts and mineral prices: Battles

	(1)	(2)	(3)	(4)	(5)	(6)
Estimator	LPM					
Dep. var.	Conflict incidence – battles only					
Sample	All	$\mathbb{V}(\mathrm{M}_{kt}) = 0$		All	$\mathbb{V}(\mathrm{M}_{kt}) = 0$	
mine > 0	0.011					0.007
	(0.036)					(0.020)
ln price main mineral	-0.030					0.009
	(0.013)					(0.015)
ln price × mines > 0	0.040	0.016	0.006		0.018	0.022
	(0.014)	(0.008)	(0.008)		(0.008)	(0.012)
ln price × mines > 0 (neighbouring cells)			0.010			
			(0.005)			
ln price × mines > 0 (ever)				0.002		
				(0.006)		
Country×year FE	Yes	Yes	Yes	Yes	No	No
Year FE	No	No	No	No	Yes	Yes
Cell FE	Yes	Yes	Yes	Yes	Yes	No
Neighborhood FE	No	No	No	No	No	Yes
Observations	143768	142296	127974	143864	142296	17360

LPM estimations. Conley (1999) standard errors in parentheses, allowing for spatial correlation within a 500km radius and for infinite serial correlation. mine > 0 is a dummy taking the value 1 if at least 1 mine is active in the cell in year t. mines > 0 (ever) is a dummy taking the value 1 if at least 1 mine is recorded in the cell at any point over the 1997-2010 period. mines > 0 (neighbouring cells) is a dummy taking the value 1 if at least 1 mine is recorded in neighbouring cells of degree 1 and 2 in year t. $\mathbb{V}(\mathrm{M}_{kt}) = 0$ means that we consider only cells in which the mine dummy (or dummies in column (3)) takes always the same value over the period. Column (6) is estimated on a sample containing only mining cells and their immediate neighboring cells. In columns (1) to (5), ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells. In column (6) ln price main mineral takes the same value for the mining cell and its immediate neighbours. Estimations (1) and (6) include controls for the average level of mineral world price interacted with the mine dummy.

Table A.27: Conflicts and mineral prices: Violence against civilians

	(1)	(2)	(3)	(4)	(5)	(6)
Estimator	LPM					
Dep. var.	Conflict incidence – violence against civilians only					
Sample	All	$\mathbb{V}(M_{kt}) = 0$		All	$\mathbb{V}(M_{kt}) = 0$	
mine > 0	0.030					-0.010
	(0.044)					(0.037)
ln price main mineral	0.008					0.011
	(0.023)					(0.012)
ln price × mines > 0	0.035	0.040	0.041		0.051	0.088
	(0.025)	(0.014)	(0.016)		(0.018)	(0.046)
ln price × mines > 0 (neighbouring cells)			0.011			
			(0.005)			
ln price × mines > 0 (ever)				0.034		
				(0.010)		
Country×year FE	Yes	Yes	Yes	Yes	No	No
Year FE	No	No	No	No	Yes	Yes
Cell FE	Yes	Yes	Yes	Yes	Yes	No
Neighborhood FE	No	No	No	No	No	Yes
Observations	143768	142296	127974	143864	142296	17360

LPM estimations. Conley (1999) standard errors in parentheses, allowing for spatial correlation within a 500km radius and for infinite serial correlation. mine > 0 is a dummy taking the value 1 if at least 1 mine is active in the cell in year t. mines > 0 (ever) is a dummy taking the value 1 if at least 1 mine is recorded in the cell at any point over the 1997-2010 period. mines > 0 (neighbouring cells) is a dummy taking the value 1 if at least 1 mine is recorded in neighbouring cells of degree 1 and 2 in year t. $\mathbb{V}(M_{kt}) = 0$ means that we consider only cells in which the mine dummy (or dummies in column (3)) takes always the same value over the period. Column (6) is estimated on a sample containing only mining cells and their immediate neighboring cells. In columns (1) to (5), ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells. In column (6) ln price main mineral takes the same value for the mining cell and its immediate neighbours. Estimations (1) and (6) include controls for the average level of mineral world price interacted with the mine dummy.

Table A.28: Conflicts and mineral prices: Riots

	(1)	(2)	(3)	(4)	(5)	(6)
Estimator	LPM					
Dep. var.	Conflict incidence – riots only					
Sample	All	$\mathbb{V}(\mathrm{M}_{kt}) = 0$		All	$\mathbb{V}(\mathrm{M}_{kt}) = 0$	
mine > 0	-0.018					0.071
	(0.077)					(0.057)
ln price main mineral	0.029					0.004
	(0.025)					(0.009)
ln price × mines > 0	0.004	0.044	0.046		0.047	0.087
	(0.028)	(0.018)	(0.019)		(0.018)	(0.048)
ln price × mines > 0 (neighbouring cells)			0.004			
			(0.003)			
ln price × mines > 0 (ever)				0.038		
				(0.011)		
Country×year FE	Yes	Yes	Yes	Yes	No	No
Year FE	No	No	No	No	Yes	Yes
Cell FE	Yes	Yes	Yes	Yes	Yes	No
Neighborhood FE	No	No	No	No	No	Yes
Observations	143768	142296	127974	143864	142296	17360

LPM estimations. Conley (1999) standard errors in parentheses, allowing for spatial correlation within a 500km radius and for infinite serial correlation. mine > 0 is a dummy taking the value 1 if at least 1 mine is active in the cell in year t. mines > 0 (ever) is a dummy taking the value 1 if at least 1 mine is recorded in the cell at any point over the 1997-2010 period. mines > 0 (neighbouring cells) is a dummy taking the value 1 if at least 1 mine is recorded in neighbouring cells of degree 1 and 2 in year t. $\mathbb{V}(\mathrm{M}_{kt}) = 0$ means that we consider only cells in which the mine dummy (or dummies in column (3)) takes always the same value over the period. Column (6) is estimated on a sample containing only mining cells and their immediate neighboring cells. In columns (1) to (5), ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells. In column (6) ln price main mineral takes the same value for the mining cell and its immediate neighbours. Estimations (1) and (6) include controls for the average level of mineral world price interacted with the mine dummy.

U Mines in ethnic homelands – robustness

We include supplementary material and further robustness checks on the regressions of section 5.1 of the main text. In particular, we start by displaying descriptive statistics (Table A.29). Then, we replicate in Table A.30 the results of Table 4, but using a weighted price index of all minerals present instead of the price of the main mineral. Further, to capture the diffusion of violence from mining areas to non-mining areas, we replicate in Table A.31 the results of Table 4 when restricting the dependent variable to conflicts occurring in cells located outside mining areas. Overall, the results of the robustness tables presented here are consistent with the ones displayed in section 5.1 of the main text.

Table A.29: Descriptive statistics: ethnic homeland

	Obs.	Mean	S.D.	Median
Pr(Conflict> 0)				
all	2548	0.21	0.41	0.00
outside ethnic homeland	2548	0.13	0.34	0.00
excluding mining areas	2506	0.19	0.40	0.00
excluding mining areas and ethnic hom.	2506	0.12	0.32	0.00
if at least 1 mine in homeland	126	0.27	0.45	0.00
if no mine in homeland	2422	0.21	0.41	0.00
# conflicts				
all	2548	4.32	31.86	0.00
# mines (beginning-of-period)				
in homeland, in country	2548	0.05	0.25	0.00
in homeland, all countries	2548	0.36	0.88	0.00
outside homeland, in country	2548	0.43	1.16	0.00

Source: Statistics on the sample of 109 rebel groups contained in ACLED that could be matched with 35 ethnic groups. Each observation is a rebel group-country-year triplet.

Table A.30: Feasibility - Mines in ethnic homelands (price index)

	(1)	(2)	(3)	(4)	(5)	(6)
Estimator	LPM					
Dep. var.	Conflict incidence					
Conflict zone	Unrestricted		Outside ethnic homelands		Unrestr.	Outside ethn. homel.
ln price index minerals (homeland in country)	-0.479	-0.178	-0.549	-0.234	-1.307	-1.464
	(0.203)	(0.298)	(0.098)	(0.278)	(0.510)	(0.335)
× # mines	0.307	0.096	0.379	0.152	0.719	0.856
	(0.194)	(0.194)	(0.088)	(0.162)	(0.324)	(0.199)
ln price index minerals (entire homeland)					0.138	0.051
					(0.116)	(0.074)
× # mines					-0.091	-0.066
					(0.031)	(0.022)
ln price index minerals (in country outside homeland)					0.104	0.043
					(0.095)	(0.078)
× # mines					0.021	0.032
					(0.020)	(0.015)
Actor-country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No	Yes	Yes
Country×year FE	No	Yes	No	Yes	No	No
Observations	2352	2226	2352	2226	2352	2352

LPM estimations. Standard errors, clustered by actor, in parentheses. Estimations are run at the rebel group-country-year level. Sample without mine opening/closing over the period. Cols. (3), (4) and (6) keep in the sample only cells which are located outside the ethnic homeland associated with the rebel group. ln price index minerals (homeland in country) is the sum of prices of the all main minerals produced in the cells belonging to the ethnic homeland of the rebel group and in the considered country, weighted by the share in total production at 1997 prices. ln price index minerals (entire homeland) and ln price main mineral (in country outside homeland) are the equivalent for the minerals produced in the ethnic homeland of the rebel group inside or outside the considered country and for the minerals produced inside the considered country but outside the ethnic homeland of the rebel group. For each price variable the associated # mines variable denotes the number of mines in each respective area. All specifications include linear terms and interaction terms but only the coefficients of the interactions are displayed.

Table A.31: Feasibility - Mines in ethnic homelands, excluding mining areas

	(1)	(2)	(3)	(4)	(5)	(6)
Estimator			LPM			
Dep. var.			Conflict incidence			
Conflict zone	Unrestricted		Outside ethnic homelands		Unrestr.	Outside ethn. homel.
ln price main mineral	-0.730	-0.412	-0.431	-0.183	-1.388	-0.876
(homeland in country)	(0.056)	(0.191)	(0.188)	(0.195)	(0.316)	(0.385)
× # mines	0.562	0.289	0.374	0.146	0.944	0.663
	(0.012)	(0.118)	(0.091)	(0.112)	(0.152)	(0.189)
ln price main mineral					0.098	-0.001
(entire homeland)					(0.106)	(0.063)
× # mines					-0.085	-0.056
					(0.033)	(0.019)
ln price main mineral					0.116	0.092
(in country outside homeland)					(0.083)	(0.063)
× # mines					0.029	0.023
					(0.018)	(0.019)
Actor-country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No	Yes	Yes
Country×year FE	No	Yes	No	Yes	No	No
Observations	2352	2226	2352	2226	2352	2352

LPM estimations. Standard errors, clustered by actor, in parentheses. Estimations are run at the rebel group-country-year level. When aggregating the data all cells containing a mine at some point, or surrounded by cells containing a mine at some point over the period are excluded. Sample without mine opening/closing over the period. Cols. (3), (4) and (6) keep in the sample only cells which are located outside the ethnic homeland associated with the rebel group. ln price main mineral (homeland in country) is the price of the main mineral produced in the ethnic homeland of the rebel group and in the considered country. ln price main mineral (entire homeland) is the price of the main mineral produced in the ethnic homeland of the rebel group, inside or outside the considered country. ln price main mineral (in country outside homeland) is the price of the main mineral produced inside the considered country but outside the ethnic homeland of the rebel group. Main minerals are defined as the mineral produced in the largest number of cells at the beginning of the period. For each price variable the associated # mines variable denotes the number of mines producing the mineral in each respective area. All specifications include linear terms and interaction terms but only the coefficients of the interactions are displayed.

V Changes in territory – robustness

We display summary statistics and additional robustness results for the section 5.2. In particular, Table A.32 presents the descriptive statistics for this section, followed by Table A.33 that uses spatially clustered standard errors and Table A.34 that allows for two-way clustering of standard errors by group and cells. Finally, in Table A.35 the dependent variable is outbreak of battle events only (instead of all events). The significance levels of all robustness tables presented here are very similar to the ones reported in Table 5.

Table A.32: Descriptive statistics: battle won

	Obs.	Mean	S.D.	Median
Pr(Conflict> 0)	204402	0.01	0.11	0.00
# conflicts	204402	0.06	1.48	0.00
$\text{Battle}^{0}_{g,t-1}$	204402	0.41	0.49	0.00
$\text{Battle}^{m}_{g,t-1}$	204402	0.01	0.12	0.00
# $\text{battles}_{g,t-1}$	204402	2.61	6.94	0.00
# $\text{battles}^{0}_{g,t-1}$	204402	2.58	6.81	0.00
# $\text{battles}^{m}_{g,t-1}$	204402	0.03	0.24	0.00
# $\text{battles}^{0}_{g,t-1}$ (no change of terr.)	204402	30.31	99.77	8
# $\text{battles}^{m}_{g,t-1}$ (no change of terr.)	204402	0.17	0.71	0.00
ln average distance to battles_{t-1}	204402	790.48	404.31	748.52

Statistics on the sample of 126 rebel groups contained in ACLED that were active in year $t-1$. Each observation is a rebel group-cell-year triplet. # $\text{battles}_{g,t-1}$, # $\text{battles}^{o}_{g,t-1}$ and # $\text{battles}^{m}_{g,t-1}$ are the number of battles won in t-1, respectively in total, in non mining areas and in mining areas. "No change of terr." means the number of battles with no change in territory. # battles variables are expressed as $\log(x+1)$. ln average distance to battles_{t-1} is the average distance between the cell and all previous year's battles.

Table A.33: Feasibility and the diffusion of war: Conley standard errors

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Conflict onset				
Estimator				LPM				
# battles$_{g,t-1}$	0.002						0.033	
	(0.001)						(0.010)	
Battle$^{0}_{g,t-1}$		0.000						
		(0.001)						
Battle$^{m}_{g,t-1}$		0.040						
		(0.010)						
# battles$^{0}_{g,t-1}$			0.001	-0.001	0.000	0.000		0.029
			(0.001)	(0.001)	(0.001)	(0.001)		(0.010)
# battles$^{m}_{g,t-1}$			0.053	0.041	0.062	0.054		0.600
			(0.015)	(0.015)	(0.016)	(0.015)		(0.214)
# battles$^{0}_{g,t-1}$ (no change of terr.)				0.001				
				(0.001)				
# battles$^{m}_{g,t-1}$ (no change of terr.)				0.008				
				(0.003)				
# battles$^{0}_{g,t-2}$					-0.000	0.000		
					(0.001)	(0.001)		
# battles$^{m}_{g,t-2}$					0.023	0.021		
					(0.008)	(0.008)		
# battles$^{0}_{g,t-3}$						-0.004		
						(0.001)		
# battles$^{m}_{g,t-3}$						0.030		
						(0.023)		
ln average distance to battles$_{t-1}$							-0.001	-0.001
							(0.002)	(0.002)
# battles$_{g,t-1}\times$ ln av. dist.							-0.005	
							(0.001)	
# battles$^{0}_{g,t-1}$ $\times$ ln av. dist								-0.004
								(0.001)
# battles$^{m}_{g,t-1}$ $\times$ ln av. dist								-0.084
								(0.032)
Difference in coefs.								
# battles$^{m}_{g,t-1}$–# battles$^{0}_{g,t-1}$		0.039	0.056	0.042	0.061	0.053		
		(0.011)	(0.015)	(0.015)	(0.016)	(0.015)		
– no change of terr.				0.007				
				(0.004)				
Country×year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Actor-Cell FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	201352	201352	201352	201352	201352	189444	201352	201352

LPM estimations. Conley (1999) standard errors in parentheses, allowing for spatial correlation within a 500km radius and for infinite serial correlation. This estimations are run at the cell-rebel group-year level. Only the sample of rebel groups active in $t-1$ is considered. Singletons are dropped. # battles$_{g,t-1}$, # battles$^{o}_{g,t-1}$ and # battles$^{m}_{g,t-1}$ are the number of battles won in t-1, respectively in total, in non mining areas and in mining areas. "No change of terr." means the number of battles with no change in territory. # battles variables are expressed as $\log(x+1)$. ln average distance to battles$_{t-1}$ is the average distance between the cell and all previous year's battles.

Table A.34: Feasibility and the diffusion of war: multi-way clustering

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Conflict onset							
Estimator	LPM							
# battles$_{g,t-1}$	0.002						0.033	
	(0.002)						(0.015)	
Battle$^0_{g,t-1}$		0.000						
		(0.002)						
Battle$^m_{g,t-1}$		0.040						
		(0.012)						
# battles$^0_{g,t-1}$			0.001	-0.001	0.000	0.000		0.029
			(0.002)	(0.002)	(0.002)	(0.002)		(0.014)
# battles$^m_{g,t-1}$			0.053	0.041	0.062	0.054		0.600
			(0.016)	(0.017)	(0.013)	(0.013)		(0.184)
# battles$^0_{g,t-1}$ (no change of terr.)				0.001				
				(0.001)				
# battles$^m_{g,t-1}$ (no change of terr.)				0.008				
				(0.003)				
# battles$^0_{g,t-2}$					-0.000	0.000		
					(0.001)	(0.001)		
# battles$^m_{g,t-2}$					0.023	0.021		
					(0.009)	(0.008)		
# battles$^0_{g,t-3}$						-0.004		
						(0.001)		
# battles$^m_{g,t-3}$						0.030		
						(0.016)		
ln average distance to battles$_{t-1}$							-0.001	-0.001
							(0.003)	(0.003)
# battles$_{g,t-1}\times$ ln av. dist.							-0.005	
							(0.002)	
# battles$^0_{g,t-1}$ $\times$ ln av. dist								-0.004
								(0.002)
# battles$^m_{g,t-1}$ $\times$ ln av. dist								-0.084
								(0.027)
Difference in coefs.								
# battles$^m_{g,t-1}$–# battles$^0_{g,t-1}$		0.039	0.056	0.042	0.061	0.053		
		(0.012)	(0.016)	(0.016)	(0.013)	(0.013)		
– no change of terr.				0.007				
				(0.003)				
Country×year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Actor-Cell FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	168887	168887	168887	168887	168887	158040	168887	168887

LPM estimations. Standard errors, clustered two-ways by actor and cells, in parentheses. This estimations are run at the cell-rebel group-year level. Only the sample of rebel groups active in $t-1$ is considered. Singletons are dropped. # battles$_{g,t-1}$, # battles$^o_{g,t-1}$ and # battles$^m_{g,t-1}$ are the number of battles won in t-1, respectively in total, in non mining areas and in mining areas. "No change of terr." means the number of battles with no change in territory. # battles variables are expressed as $\log(x+1)$. ln average distance to battles$_{t-1}$ is the average distance between the cell and all previous year's battles.

Table A.35: Feasibility and the diffusion of war: battles only

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Conflict onset (battles only)							
Estimator	LPM							
# battles$_{g,t-1}$	0.002						0.034	
	(0.001)						(0.012)	
Battle$^{0}_{g,t-1}$		0.000						
		(0.001)						
Battle$^{m}_{g,t-1}$		0.040						
		(0.010)						
# battles$^{0}_{g,t-1}$			0.001	-0.001	0.000	0.001		0.030
			(0.001)	(0.001)	(0.001)	(0.001)		(0.011)
# battles$^{m}_{g,t-1}$			0.053	0.044	0.060	0.052		0.555
			(0.015)	(0.014)	(0.012)	(0.011)		(0.135)
# battles$^{0}_{g,t-1}$ (no change of terr.)				0.002				
				(0.001)				
# battles$^{m}_{g,t-1}$ (no change of terr.)				0.006				
				(0.003)				
# battles$^{0}_{g,t-2}$					-0.001	0.000		
					(0.001)	(0.001)		
# battles$^{m}_{g,t-2}$					0.019	0.017		
					(0.007)	(0.006)		
# battles$^{0}_{g,t-3}$						-0.003		
						(0.001)		
# battles$^{m}_{g,t-3}$						0.014		
						(0.011)		
ln average distance to battles$_{t-1}$							0.000	0.000
							(0.002)	(0.002)
# battles$_{g,t-1}\times$ ln av. dist.							-0.005	
							(0.002)	
# battles$^{0}_{g,t-1}$ $\times$ ln av. dist								-0.004
								(0.002)
# battles$^{m}_{g,t-1}$ $\times$ ln av. dist								-0.077
								(0.019)
Difference in coefs.								
# battles$^{m}_{g,t-1}$–# battles$^{0}_{g,t-1}$		0.039	0.052	0.045	0.059	0.051		
		(0.011)	(0.014)	(0.014)	(0.012)	(0.011)		
– no change of terr.				0.004				
				(0.004)				
Country$\times$year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Actor-Cell FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	168887	168887	168887	168887	168887	158040	168887	168887

LPM estimations. Standard errors, clustered by group, in parentheses. This estimations are run at the cell-rebel group-year level. Only the sample of rebel groups active in $t-1$ is considered. Singletons are dropped. # battles$_{g,t-1}$, # battles$^{o}_{g,t-1}$ and # battles$^{m}_{g,t-1}$ are the number of battles won in t-1, respectively in total, in non mining areas and in mining areas. "No change of terr." means the number of battles with no change in territory. # battles variables are expressed as $\log(x+1)$. ln average distance to battles$_{t-1}$ is the average distance between the cell and all previous year's battles.

W Company ownership – some descriptive statistics

Table A.36 displays descriptive statistics on the company characteristics, of which we make use in section 6.1 of the main text.

Table A.36: Company characteristics

	Obs.	Mean	S.D.	Median
Share				
Domestic - Publicly owned	2310	0.12	0.32	0
Domestic - Privately owned	2310	0.27	0.42	0
Foreign owned	2310	0.60	0.46	1
Former colonizer	2310	0.14	0.32	0
Other	2310	0.47	0.48	0.33
Major company	2310	0.43	0.47	0
Full ownership				
Domestic - Publicly owned	2310	0.12	0.32	0
Domestic - Privately owned	2310	0.22	0.41	0
Foreign owned	2310	0.55	0.50	1
Former colonizer	2310	0.11	0.31	0
Other	2310	0.42	0.49	0

Statistics on the sample of mining cells. Shares are shares of mines with a given ownership type in the cell at the beginning of the period. Full ownership is a dummy which equals 1 when all mines in a given cell are of a given type at the beginning of the period.

X The role of transparency – robustness

We present additional results for the analysis of section 6.2 of the main text. First, we replicate in Table A.37 the regressions of Table 7 but for domestic firms. The effects found for foreign firms do not carry over to domestic firms, suggesting hence that the detrimental effect of mining price spikes as well as the virtues of transparency are confined to foreign firms only. Second, Table A.38 studies the impact of the Kimberley initiative on war diamonds, finding either no effect or a marginally significant conflict-reducing effect (caution is however required for the interpretation of the results, given the limited source of identification and the drawbacks of the diamond price data discussed in the main text).

Table A.37: Heterogeneous effects: The Role of Transparency (other types of companies)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Estimator	LPM									
Sample	$\mathbb{V}(\mathrm{M}_{kt}) = 0$									
Dep. var.	Conflict incidence									
Events	All	Battles	All	Battles	All	Battles	All	Battles	All	Battles
ln price × mines > 0	0.025	-0.009	0.044	-0.006	0.033	-0.018	0.046	-0.006	0.047	-0.006
	(0.035)	(0.005)	(0.036)	(0.008)	(0.039)	(0.008)	(0.038)	(0.008)	(0.038)	(0.008)
× Large Firms	0.026	-0.005	-0.020	0.012	-0.024	0.002	-0.014	0.014	-0.015	0.013
	(0.030)	(0.006)	(0.053)	(0.011)	(0.051)	(0.015)	(0.041)	(0.008)	(0.041)	(0.008)
× Control of Corruption	-0.023	0.021								
	(0.027)	(0.013)								
× Firm CSR (ICMM)			0.025	0.006						
			(0.069)	(0.016)						
× Tracea. Init. (EITI, request)					0.014	0.014				
					(0.005)	(0.007)				
× Tracea. Init. (EITI, compliance)							-0.009	0.001		
							(0.008)	(0.002)		
× Tracea. Init. (GLR)									-0.003	-0.000
									(0.002)	(0.000)
Country×year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cell FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	130998	130998	141610	141610	141596	141596	141596	141596	141596	141596

LPM estimations. Conley (1999) standard errors in parentheses, allowing for spatial correlation within a 500km radius and for infinite serial correlation. Sample restricted to non mining cells and cells for which domestic (private and public owned) represent the largest share. mine > 0 is a dummy taking the value 1 if at least 1 mine is active in the cell in year t. $\mathbb{V}(\mathrm{M}_{kt}) = 0$ means that we consider only cells in which the mine dummy takes always the same value over the period. ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells. See main text for a description of the various transparency variables.

Table A.38: Conflicts and mineral prices: the Kimberley process

	(1)	(2)	(3)	(4)
Estimator	LPM			
Dep. var.	Conflict incidence			
Conflicts	All events		Battles only	
Sample	$\mathbb{V}(\text{M}_{kt}) = 0$	All	$\mathbb{V}(\text{M}_{kt}) = 0$	All
ln price × mines > 0	0.036		0.010	
	(0.025)		(0.009)	
× Kimberley	0.007		-0.005	
	(0.010)		(0.003)	
ln price × mines > 0 (ever)		0.026		0.003
		(0.016)		(0.007)
× Kimberley		-0.009		-0.008
		(0.010)		(0.005)
Country×year FE	Yes	Yes	Yes	Yes
Cell FE	Yes	Yes	Yes	Yes
Observations	142646	144424	142646	144424

LPM estimations. Conley (1999) standard errors in parentheses, allowing for spatial correlation within a 500km radius and for infinite serial correlation. mine > 0 is a dummy taking the value 1 if at least 1 mine is active in the cell in year t. mines > 0 (ever) is a dummy taking the value 1 if at least 1 mine is recorded in the cell at any point over the 1997-2010 period. $\mathbb{V}(\text{M}_{kt}) = 0$ means that we consider only cells in which the mine dummy takes always the same value over the period. ln price main mineral is the world price of the mineral with the highest production over the period (evaluated at 1997 prices) for mining cells, and zero for non-mining cells. Kimberley is a dummy taking the value 1 after 2002 for mining cells whose main mineral is diamond. The estimations also include interaction terms between the price×mines variables and a diamond dummy, as well as between the price×mines variables and a post-2002 dummy.

Y Additional references

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