Geographical Exposure to Conflicts and Firm Performance: Evidence from The MENA Region

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Abstract

This paper assesses the impact of insecurity generated by conflicts on firm performance in the Middle East and North Africa (MENA) region. It contributes to the literature in three ways. First, we try to identify the local effect of conflicts using a geospatial approach where we evaluate the exposure of each firm and its shipment routes and infrastructures to conflictual events overtime in a specific location. Second, from a methodological perspective, we adopt a simple methodology – new to the literature- to identify the within-firm effect. To do so, we use two series of information on performance (measured by sales and labor productivity) on the current year *t* and year *t-2, both* being reported in the same World Bank Enterprise Survey (WBES) conducted for a country in year *t*. Third, large datasets from the WBES for six non-oil countries (Egypt, Jordan, Lebanon, Palestine, Tunisia and Morocco) were merged with geospatial measures to conflicts. Key findings show that battles and explosions negatively and robustly affect sales and productivity, all the more so for small and mid-sized firms. Nevertheless, we do not find robust effects of exposure to protests, riots and violence against civilians across different measures of the performance of firms and conclude for further research on these issues.

Keywords: MENA region, conflicts, firm-level data.
JEL Classifications: F10, D74.

1. Introduction

The Middle East and North Africa (MENA) region is one of the regions that suffer the most from several conflicts ranging from armed state and non-state conflicts to riots and protests. In particular, the Arab Spring events which spread to the whole Arab world by early 2010 resulted in a series of protests which opened the ground for important political instability in the region, leading to serious security problems. Moreover, terrorism events in the region during this same period increased further insecurity. Clearly, insecurity environments due to conflicts may affect the performance of the firms in the MENA region.

Different types of conflicts exert in general a negative effect on firms' performance through several channels. First, conflicts increase uncertainty which negatively affects investment decisions and consequently expansion plans, sales and employment. Second, conflicts destroy the country's physical infrastructure, which negatively affects supply chains, inputs transportation from origin to plants and products from plants to markets. Third, all of these risky events are expected to affect the movement of people (workers, consumers) and decision making to hire. Fourth, security measures set at the level of the firm may have increased the costs of production leading to a reduction in profitability of the firms. Fifth, with infrastructure destruction, operating costs increase due to supply disruptions of intermediate inputs, electricity and other utilities (Klapper et al., 2013). Finally, from a development perspective, conflicts also create a development gap between countries/regions within a country/region that have experienced any conflict and those that have not, which worsens inequality within and between countries.

The empirical literature focused on the role of risk and uncertainty related to political instability and how they affect many performance measures at aggregate or firm levels such as stock returns or exports (Belo et al., 2013; Handley and Limao, 2015; Koijen et al., 2016; Hassan et al, 2019 provide examples). Other studies looked at the impact of civil wars or terrorism on aggregate outcomes such as GDP per capita or countries' trade performance (such as Abadie, and Gardeazabal, 2003; Glick and Taylor, 2010; Verdier and Mirza, 2014; 2018). Some concentrate on firm level performance including some studies focusing on countries from the MENA region (Camacho and Rodriguez 2013; Amodio, and M Di Maio, 2018, Khalil, Mirza and Zaki, 2019 and Karam and Zaki, 2016). While most of the studies focused on the macroeconomic implications of conflicts and the trade-related impact at the microeconomic level, less attention has been brought to employment and sales not to mention that the MENA region was seldom studied from this perspective.

Against this background, this paper tries to assess the impact of insecurity generated by conflicts on firms' performance in the MENA region. It contributes to the literature in three ways. First, we try to identify the local effect of conflicts using a geospatial approach where we evaluate the exposure of each firm and their shipment routes and infrastructures to conflictual events overtime in a specific location. Second, from a methodological perspective, we adopt a simple – yet new to

the literature - methodology to identify the within-firm effect. To do so, we use two series of information on performance (measured by sales and labor productivity) on the current year *t* and the year *t-2, both* being reported in *the same* World Bank Enterprise Survey (WBES) conducted *for a country at year t*. Third, large datasets from the World Bank Enterprise Survey for six non-oil countries (Egypt, Jordan, Lebanon, Palestine, Tunisia and Morocco) were merged with geospatial measures to conflicts. In addition, the analysis was further developed in three ways. First, a detailed examination of how conflicts differently affect small, medium and large firms. While small and medium ones are generally more fragile and hence cannot bear a higher cost of conflict, larger firms that are richer and have more assets are more likely to be looted. Second, conflicts were separated into three types: protests and riots, explosions and battles and violence against civilians. Finally, for each type of conflict, the exposure of a firm to a certain event (conflict onset) was assessed along with the fatalities associated to this same event (conflict intensity).

Key findings show that, at the aggregate levels, exposure to events (whether measured by events onset or fatalities) do not affect firms' performance, with the exception of medium firms' sales. This is why the heterogeneity among different types of events and size of firms must be taken into consideration. Further, we find that while battles and explosions negatively affect sales and productivity, violence against civilians and protest and riots have different impacts across the measures of performance being considered. Clearly, further research needs to be conducted in order to understand the mechanisms are behind this result. One hypothesis, for instance, is that exposure to violence against civilians' (i.e. terrorism) might be endogenous to firm activity as terrorist attacks target large agglomerations for a better visibility. Another explanation supported by the data is that adjustments costs might have been transmitted to employees through a reduction of their number at the firm level coupled with an increase in the productivity of those who stay in their job. Nonetheless, when firm size is taken into consideration, one observes that the effect of explosions and battles is mainly observed for small and mid-sized firms, not for larger ones. This is chiefly due to the fact that larger firms are more able to absorb the shock than smaller ones for several reasons. Indeed, they can diversify their resources; have an *a priori* healthier financial situation; can more easily borrow from the banks; and hence, are more resilient. When it comes to infrastructure exposure to protests and riots, the latter seem to be negatively affecting firm sales when they are located near seaports. It is worthy to note that importers are more negatively affected by such an exposure. In the same vein, the interaction term with importers for airports being prone to protests and riots events, happen to be negative and statistically significant.

The paper is organized as follows: section 2 reviews the literature section 3 shows the data sources, section 4 presents some stylized facts using the built geo-spatial and firm level datasets, section 5 is dedicated to the methodology, section 6 presents the empirical findings and section 7 concludes.

2. Literature Review

The literature on the effects of conflicts is rich and can be divided in two main strands: the first one focuses on the macroeconomic effects of conflicts and the second one on the microeconomic ones.

At the macroeconomic level, Collier and Hoeffler (1998) and Collier (1999) argued that, unlike interstate wars, civil wars are considered more damaging since the cost is totally borne by a single country. Moreover, Bano and Sala (2004) and Sachs (2006) argued that civil conflicts affect the ability of a country to reach its steady state leading it to a low growth level. For the MENA region, the literature has shown that war is a development issue since conflict is both a cause and a consequence of lacking development. As a consequence, MENA countries found themselves locked in both a conflict trap (Collier et al., 2003 and Gates et al., 2010) with low and volatile economic growth rates. In addition to growth, trade is also affected. Indeed, Karam and Zaki (2016), using an augmented gravity model, distinguished between different types of conflicts and showed that non-state conflicts have a detrimental effect on bilateral trade flows. Wars increase the trade cost by an average tariff equivalent of 5% of the value of trade.

At the firm level, a large part of the literature examined the effects of conflicts on trade performance (Belo et al., 2013; Handley and Limao, 2015; Koijen et al., 2016; Hassan et al, 2019). For instance, in Africa, Ksoll et al. (2016) examined the effects of post-electoral violence of 2008 on exporting firms in Kenya. They showed that, while violence reduced exports because of workers' absence, the impact of violence on trade is mediated by different institutional arrangements associated with exports. Institutional arrangements refer to direct contractual relationships in export markets and membership of business associations. For the MENA region, using monthly trade data combined with data on Arab Spring and terror events from the Armed Conflict Location & Event Data Project (ACLED), Khalil et al. (2020) showed that Egyptian exports are negatively affected by different events with a stronger effect on small firms followed by medium ones for both the quantities and the values of exports.

As per other performance indicators, the literature focused on the effect of conflicts on returns and productivity in some European, African and Latin American countries whereas Middle-Eastern ones were almost absent from the literature.

For civil conflicts, in their seminal paper, Guidolin and La Ferrara (2007) investigated the nexus between civil war and the value of firms of the diamond mining sector in Angola. They conducted an event study to analyze the effects of the death of the rebel movement leader in 2002 and found that his death was perceived as a bad news leading to a decline of the firms' returns by 4 percentage points. In the same vein, following the 2007 election, Kenya experienced an increase in ethnic discrimination. Hjort (2014) showed that interethnic rivalries reduce allocative efficiency in the private sector.

Collier and Duponchel (2010), using survey data, investigate various channels through which conflicts can affect firm performance in Sierra Leone. They identified two main channels which are technology deterioration and loss of workers' skills. They also showed that, five years after the end of the conflict, firms are willing to invest in staff training to overcome such a shortage of skilled labor. For Cote d'Ivoire, Klapper et al. (2013) showed that the conflict led to an average of 16–23 percent drop in firm total factor productivity. Moreover, because of higher operating costs, Ivorian firms responded by hiring fewer foreign workers.

As per armed conflicts, Abadie and Gardeazabal (2003) examined the effect of the cease-fire declared by the Basque terrorist organization ETA in 1998-1999 on returns of firms operating in the Basque Country. They found that the end of cease-fire led to a negative impact on their returns. Moreover, in Columbia, Camacho and Rodriguez (2010) adopted an instrumental variables approach to assess the impact of armed conflicts on the exit of manufacturing firms. They found that firms are more likely to exit in high conflict regions (even after instrumenting the attack rates). Similarly, Petracco and Schweiger (2012), using the World Bank Enterprise Surveys and a difference-in-difference technique, examined the impact on Georgian firms before and after the armed conflict between Georgia and Russia. They found that this armed conflict had a significant and negative impact on exports, sales and employment, especially for young firms that had to exit from the market prematurely.

It is worthy to note that none of these papers used geo-spatial data to identify the exact location of the conflict and how the latter affects infrastructure. Moreover, and as it was mentioned before, the literature did not cover the MENA region. Accordingly, this paper focuses on the effects of conflicts on MENA firms and contributes to this literature in three ways. First, this study adopts an innovative approach to identify the effect of conflicts by using geo-spatial data and combining it with the WBES. Thus, each firm's location was associated to a measure of its exposure to the locations of conflictual events overtime. Second, the effects of different types of events ranging from protests and riots, battles and explosions and violence against civilians, were examined. The literature has generally focused on civil conflicts without distinguishing between different types of events. Third, this innovative methodology was applied to the MENA region, being one of the regions that witnessed a lot of conflicts compared to other emerging regions. Yet, this region is still under-studied in the literature that focused mainly on Sub-Saharan Africa.

3. Data Sources

Three datasets were relied on to undertake this empirical work: Geographic Information System (GIS) and ArcMap 10.6 software; Armed Conflict Location & Event Data Project (ACLED) database and the World Bank Enterprise Surveys (WBES). These datasets are merged though several phases.

The first phase of the work consists of computing distances to conflicts for each firm and distances to conflicts for each important route and port infrastructure in the country to which the firm belongs. The Geographic Information System (GIS) via ArcMap 10.6 software[4] was used to construct three series of data: 1) a geographical distances' database between each studied firm and the surrounding conflicts, 2) a geographical distances' database that separates each firm from neighboring infrastructure (highways, major roads, airports and seaports), and 3) a distances' database between each infrastructure and the observed conflicts. Information on the city location of the firms is extracted from the World Bank Enterprise Survey collected for 6 countries in the MENA region.

The Armed Conflict Location & Event Data Project (ACLED) database is used for the exact geospatial locations of the conflictual events (http://www.acleddata.com/). Finally, geospatial data for road networks, airports and seaports were gathered from OpenStreetMap[5]. In a second step, we use all of these distances to construct alternatives measures of exposure of each firm to the events during a considered period as it will be shown later. Using a similar method of distances-as-weights, the exposure of each of the chosen infrastructures in the country to the events was also computed. Figure 1 shows the countries tackled in this study. It is worthy to note that the choice of the set of countries was constrained by surveys' availability in the World Bank Enterprise Surveys. Thereof, Egypt, Jordan, Lebanon, Palestine, Morocco and Tunisia were tackled in this study.

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[4] ArcMap is the main component of Esri's ArcGIS suite of geospatial processing programs, and is used primarily to view, edit, create, and analyze geospatial data. ArcMap allows the user to explore data within a data set, symbolize features accordingly, and create maps.

[5] OpenStreetMap is an initiative to create and provide free geographic data, such as street maps, to anyone. The OpenStreetMap Foundation is an international not-for-profit organization supporting, but not controlling, the OpenStreetMap Project. It is dedicated to encouraging the growth, development and distribution of free geospatial data and to providing geospatial data for anyone to use and share.

Figure 1: Country Coverage

Source: Constructed by the authors.

The third source of data comes from the World Business Interprise Survey (WBES) constructed and made available by the Worldbank. This dataset informs about the firms city locations. It offers an expansive array of economic data on 131,000 private firms in 139 countries. The available surveys for six MENA countries were extracted: Egypt, Jordan, Lebanon, Morocco, Tunisia, West Bank and Gaza[6]. Therefore, the studied sample contains 5725 manufacturing and services firms located in the region. The standard survey topics include, among other variables, firm characteristics, together with many indicators of performance variables ranging from input costs to sales, while also including export status of the firm, export sales and imports of each firm.

As it was mentioned before, we are mainly interested in studying two variables of performance (sales and a measure of apparent productivity, sales per full time workers) from the WBES. For a given survey and at a given date *t,* these can easily be obtained via the information delivered by each firm on the value of its sales and the number of its full time permanent employees. Interestingly, this information is being reported for the fiscal year just before the survey has been undertaken along with an additional information related to the value of sales and permanent employment two fiscal years before the survey. For instance, in a typical survey published by the World Bank in 2016 one can find a responding firm, say from Morocco, to report the value of its sales and full time permanent employment in the last fiscal year (say in 2015) along with another precious information about the value of its sales and its employment that it has declared to the fiscal administration two fiscal years before (i.e. that is in 2013). This enables us then to compute for this firm, a change in its performance between 2015 and 2013. It is this change in performance, computed either through change in sales or via change in sales per employee, that will be

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[6] Although there are several waves of data for the World Bank Enterprise Surveys, we run the analysis for 2013 that it is the only year for which the data are harmonized for MENA countries.

confronted to the change in exposure to conflicts that the firm has experienced in exactly the same years (between 2013 and 2015).

Before going into the econometric details and results, the types of conflicts and events that characterize the MENA region will be presented first, followed by the method of construction of the exposure measures and then some simple analysis of correlation between performance of firms and their exposure to events is being shown.

4. Exposure to Conflicts and Firms' Performance in the MENA region
4.1. Overview of Conflicts in the MENA region

Our sample includes six non-oil exporters from the World Bank Enterprise Surveys (Egypt, Jordan, Lebanon, Palestine, Morocco and Tunisia). These countries were chosen for two reasons. First, compared to oil exporters in the MENA region, these countries are more diversified, export more manufactured products that rely on imported inputs and hence are more likely to be affected by conflicts. Second, this sample serves the comparison between the effects of different types of conflicts on different countries. While most of the countries experienced protests and riots (namely Morocco, Tunisia, Lebanon and Jordan), some of them witnessed more serious battles and explosions (Egypt, Palestine and to a lesser extent Lebanon) or violence against civilians (Palestine followed by Egypt) over the period of the analysis (2010-2019) as it is highlighted in Figure 2.

Figure 2: Distribution of Conflicts by Country
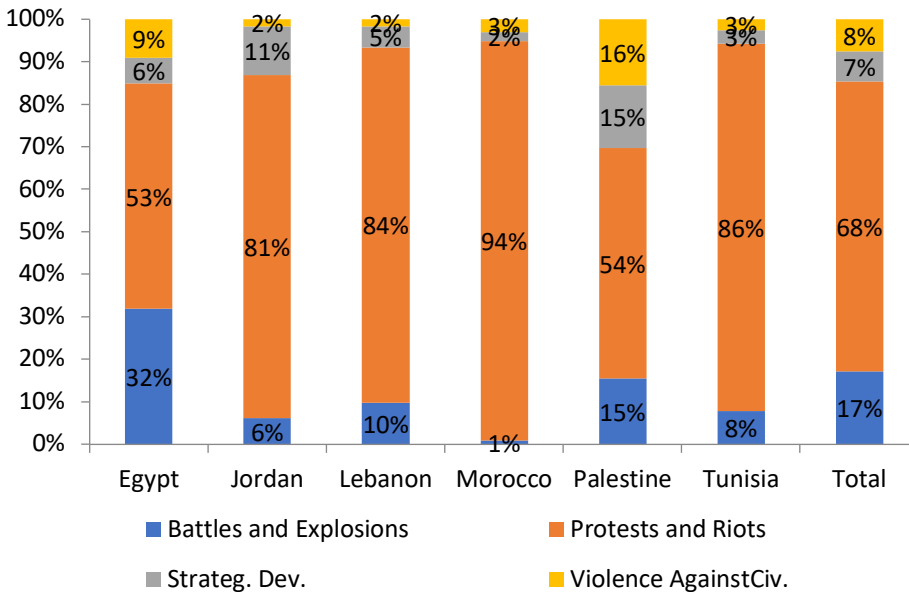
Source: Constructed by the authors using the Armed Conflict Location & Event Data Project (ACLED) database

A closer look to the evolution of each type of conflict shows different trends in each country. In Egypt, during the period 2011-2013, the number of protests and riots increased significantly with the revolution of 2011 and the Muslim Brotherhood period 2012-2013. Starting 2014, with

increased security measures and protests banning, the number of protests and riots declined and was surpassed by the number of battles and explosions. This is mainly due to violence that escalated in the Sinai Peninsula as the group of Ansar Bayt al-Maqdis and the Islamic State (IS) began fighting the government. Since 2017, Harakir Sawa'id Misr and Jama'at Ansar al-Islam were also among the terrorist groups that challenged the government. While most of the firms operating in the manufacturing sector are located in Greater Cairo (Cairo, Giza and Qualyubiya) and to a lesser extent in the Delta, South Sinai is chiefly dependent on tourism. Hence, protests and riots are more likely to affect firms in the main cities (see Figure A1 in Appendix 1) since battles and explosions are concentrated in the northern part of the Peninsula endowed with a trivial share of firms (see Figure 3). Consequently, this can lead to an identification problem since most of the conflicts will take place in large agglomeration (where the most efficient firms are located). The explained approach in the following sections is believed to help control this endogeneity between conflicts and firms' performance.

Figure 3: Evolution of Conflicts – Egypt
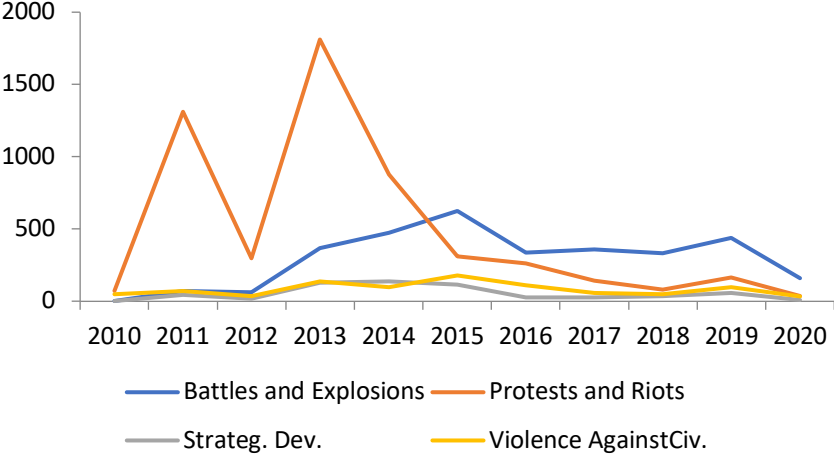
Source: Constructed by the authors using the ACLED dataset.

With a negligible number of battles and explosions (as shown in Figure 4), the Hashemite Kingdom is mainly affected by protests and riots that increased between 2016 and 2019 for economic and political reasons. For instance, at the political level, several protests were against the gas deal between Jordan and Israel. At the economic level, protests against the government were mainly because of economic reforms and austerity measures, especially in 2018. Similarly to the Egyptian case, most of the protests and riots took place in large economic cities which negatively affects firms' performance (see Figure A2 in Appendix 1).

Figure 4: Evolution of Conflicts – Jordan
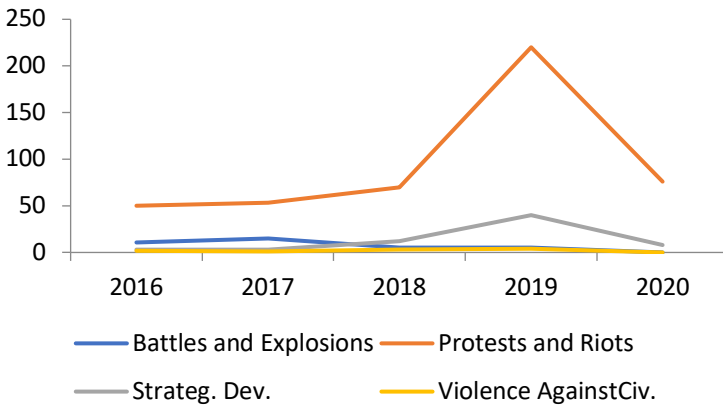
Concerning the case of Lebanon, an unprecedented economic crisis (with a high public debt, currency depreciation and capital outflows) has pushed tens of thousands of people into poverty and triggered, in October 2019, the largest anti-government protests that the country has ever experienced. However, sectarian divides add another layer of complexity to the crisis since they continued to plague the stability of the political system. This is why the number of protests and riots were rather stable between 2016 and 2018 but then increased exponentially in 2019 as shown in Figure 5. The same observation of conflicts that take place in important coastal areas applies to Lebanon (see Figure A3 in Appendix 1).

Figure 5: Evolution of Conflicts – Lebanon
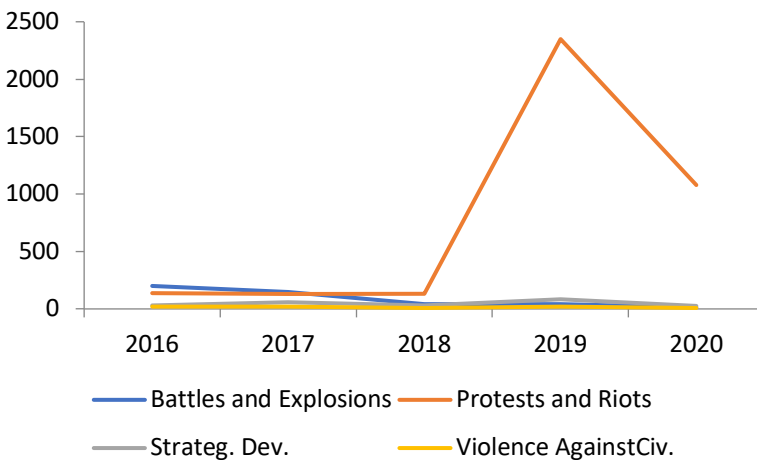
In Palestine (see Figure 6), the situation is different since violence against civilians on the one hand and battles and explosions on the other are not as trivial as the other countries because of the Israeli occupation. Riots and protests erupted mainly in 2018-2019 with the so-called *the Great March of Return.* These protests were related to several issues: the right of Palestinian refugees to

return to the land they were displaced from by Israel, terminating the blockade of Gaza Stripe and moving the Embassy of the United States in Israel to Jerusalem.

Figure 6: Evolution of Conflicts – Palestine
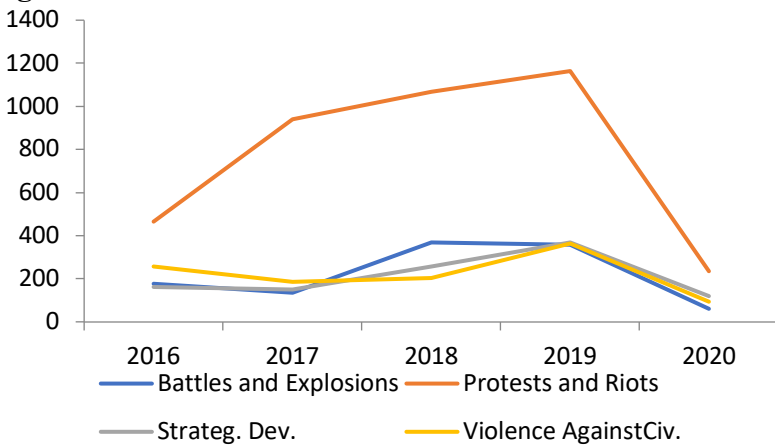
Source: Constructed by the authors using the ACLED dataset.

Regarding the case of Morocco, protests and riots started to increase significantly in October 2016 in the Amazigh-speaking region called Rif with the death of the fishmonger Mouhcine Fikri, who was crushed inside a rubbish truck trying to recover fish confiscated by police. Later on, other protests took place for two mains reasons. First, Berber population feels neglected by the central government in Rabat and protests against longstanding grievances, poor living conditions and marginalization. Second, some protests were demonstrating against the imprisonment of the leader of the so-called al-Hirak al-Shabi (Popular Movement) and other activists. Similar to the other cases, most of the conflicts take place in large cities (see Figure A.5 in Appendix 1).

Figure 7: Evolution of Conflicts – Morocco
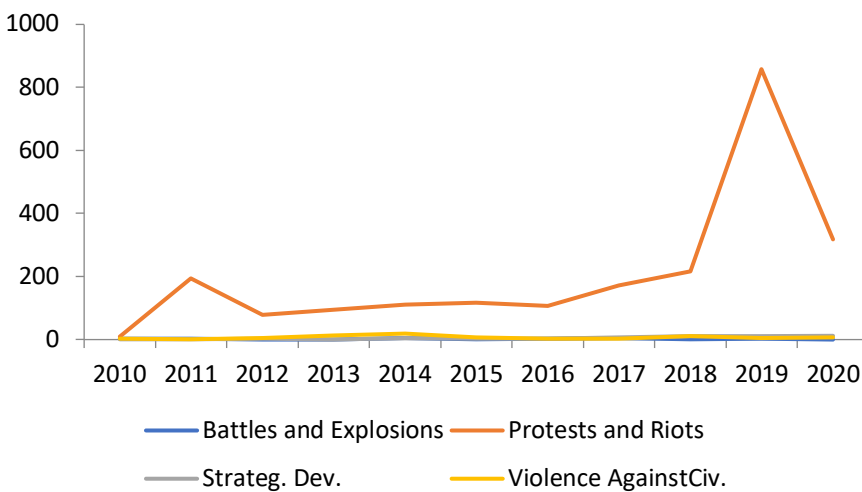
Source: Constructed by the authors using the ACLED dataset.

In Tunisia, after the revolution of 2011, several protests took place in marginalized towns where many young Tunisians protested against lack of jobs and deteriorating economic conditions, notably in 2018. Yet, it is worthy to note that Tunisia remained on of the countries in the MENA region that witnessed a peaceful democratic change with free and transparent elections and a relative compromise between Islamist and secular rivals. Figure A.6. in Appendix shows also that most of these events take place in large agglomerations.

Figure 8: Evolution of Conflicts – Tunisia
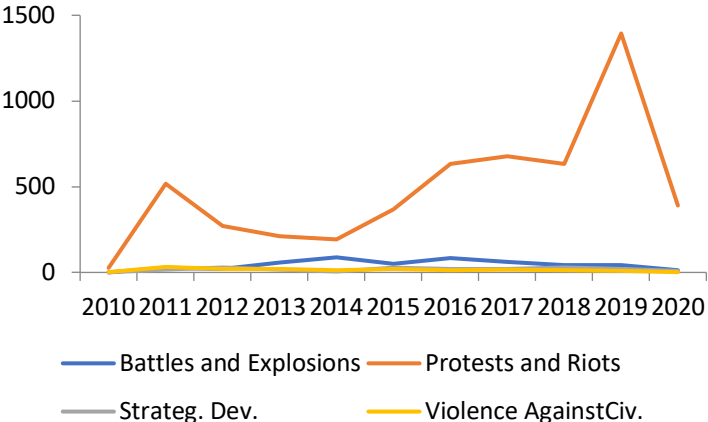
Source: Constructed by the authors using the ACLED dataset.

In a nutshell, conflicts in these six countries of interest had three main characteristics. First, they are mainly dominated by protests and riots, with a few exceptions of battles and explosions in Egypt with the war against terrorism and Palestine with the Israeli occupation. Second, these protests and riots took place generally because of economic conditions, with the exception of Palestine where protests had a political motive. Finally, these protests and riots take place in large economic cities, and thus are likely to exert a negative effect on firms' performance. It is important to note that in this empirical analysis, the main focus will be on protests and riots (PR), battles and explosions (BE) and violence against civilians (VC) since the observations related to strategic development are extremely small and have fewer implications on the analysis compared to the other three forms of events.

4.2. Firm Performance and Conflicts

In order to determine the channels through which firms are affected by different categories of events, two measures are calculated: exposure of a firm to a certain event and the closeness to exposure of major infrastructure installations measures[7].

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[7] Yet, the case of Palestine is more complicated than other countries since Palestine relies on other countries' infrastructure, mainly Israel and Jordan. This increases its exposure to conflicts in these countries and hence affects its firms' performance. Indeed, Israeli ports continued to be the major gateways used by Palestinian shippers as they have no access to Egyptian or Jordanian ports. Moreover, enterprises located in West Bank have essentially two options to access the world market: either through Israeli ports or airport; or across the Jordan River and out through Jordan ports or airport. Whereas it is possible to trade goods across Israel and through Egypt, the cost of trade is high compared to other routes (UNCTAD, 2014).

The exposure to an event measures the proximity of each region (where a firm is located from the WBES) to each observed event (from the ACLED dataset) during a given fiscal year of observation. The proximity measure is the inverse of the distance between the centroid location of a region in a certain country and the exact coordinates of an event (see Box 1 for the detailed calculation method of this index). The second variable, namely the closeness to exposure of major infrastructure installations shows whether the firms under study are being close to major infrastructure which could be, in turn, prone to conflicts. Three types of infrastructures are examined: roads, airports and ports (see Box 2 for the detailed calculation method of this index). For each index, two versions are calculated: the first one based on the events onset and the other based on the fatalities (as a proxy of the conflict intensity).

It is worthy to note that these measures are calculated on the regional level given in the WBES for each country so that it would be possible to merge the two datasets and examine the effect of events on firms' performance.

Intuitively, the exposure of firms to any event and the closeness to exposure of infrastructure are likely to be highly collinear since the event that takes place in a region can destroy/affect the infrastructure located in this region. Table 1 presents the correlation matrix between the index of exposure to an event (for battles and explosions (BE), protest and riots (PR) and violence against civilians (VC)) and the closeness to the exposure of infrastructure (roads, ports and airports) for each type of event. In most of the cases the correlation coefficient is positive and strong (around 0.9). In addition, the exposure of a certain type of infrastructure is strongly correlated to the exposure of another type (for instance the correlation coefficient between the exposure of ports and airports to battles and explosions is 0.95). This is why, from an econometric point of view, these two variables cannot be included in the same regression or, if they are included altogether, their coefficients have to be constrained as it will be shown later.

Box 1: Calculating Exposure of regions [where the firm belong] to events measures

1.1) the proximity of each region (where a firm is located) to each observed event during a given fiscal year of observation is first computed. The proximity measure is simply the inverse of the geodesic distance (great circle distance) between the centroid location of a region r in country i and the exact coordinates (longitude and latitude) of an event, say n, given by the ACLED data. It is computed as $\frac{1}{D_{r,i}(n)}$ from the Geographic Information System (GIS) handled by ArcMap 10.6 software.

1.2/ Then the sum over all of these proximity values obtained over all acts of conflicts over a year t, is calculated to obtain a yearly-based indicator of a region's exposure to which a firm belongs.

$$Exposure_{r,i,t}(n) = \sum_n \left(\frac{1}{D_{r,i,t}(n)} \right)$$

To understand what this measure expresses, pick 3 events that have taken place during a year. Imagine first that these events are located just near the center of the region (say at most at 1 km distance). Then the exposure of the region would take the value of 3 over a year. It is as if the exposure variable was counting the number of events that the region experiences in its heart (at a 1km distance from center) in a year. Now consider, 3 events again but where the first is at a km from the center of the region, the second is at 10 km and the third at 100 km. Here, the Exposure measure would then take the value of 1.11 (1+0.10+0.01). This measure provides us then with the number of events experienced over the year that is equivalent to that would have been obtained, had one had experienced them at 1 km distance. It is as if the number of events here was normalized to the scale of 1 km distance from the center.

1.3) An alternative measure of exposure is also provided where each event n is given a weight in relation to the number of fatalities. Hence, a yearly fatality-based indicator is obtained:

$$Exposure_{r,i,t}(f,n) = \sum_n \left(\frac{Max(1, nb.\,fatal_{r,i,t}(n))}{D_{r,i,t}(n)} \right)$$

Here, events with 0 fatalities are considered to contribute as those of events with 1 fatality which is why the maximum function had been inserted into the numerator. Again, if say, event 1 makes no fatalities, the 10-km distance event makes 5 and the 100km distance one makes 200 fatalities, the exposure would take the value of 3.6. Hence, this measure reveals the potential impact of events that decreases with distance but increases with the number of fatalities.

1.4) The two alternative measures were defined either by summing up all of the events of whichever type together during the year, or by computing these measures for each of the three types under study (Battles and Explosions; Protests and Riots and finally, Violence against civilians).

1.5) In the paper, however, both indicators are demonstrated to be leading in tendency to more or less the same results.

Box 2: Closeness to exposure of major infrastructure installations measures

Here, the idea is to measure whether the studied firms are being close to major infrastructure which could be, in turn, prone to conflicts (i.e. unsafe infrastructures)

2.1) Compute, for each event, its geodesic distance to a major infrastructure in the country. For ports and international airports, this is simple: each of these has a precise location. For roads, it is trickier: Roads are considered topological networks dived into edges and nodes. Hence in the case of a roads with 3 sections, the software computes the distance between each center of region and each center of the edges (In Egypt for instance, while around 10 international airports and about 20 seaports are included in the study, there are more than 700 edges of main roads and highways which are included.)

2.2) From there compute exactly the same exposure indicators than those presented before but now to indicate the exposure of each of these infrastructure installations to conflicts at a given year of observation. This has been an important work as it involved working with high dimension matrixes. Namely, in Egypt for instance, each of the 700 section roads had to be paired with each of the conflict's events during the period under study. Then, a yearly exposure measure was computed for each infrastructure installation (port, road or section of road).

2.3) Armed with a third set of geodesic distances between the center of the firms'regions and each infrastructure, the closeness to infrastructures-prone to conflicts measures is then computed. To make things clearer, assume m a particular installation, say a road section or a seaport,
Then, a closeness of a region r from a country i, [where a firm stands] to an installation m prone to a certain level of conflict is computed as:

$$Closeness_{r,i,t}(n,m) = \left(\frac{1}{D_{r,i,t}(m)}\right)\sum_{n}\left(\frac{1}{D_{m,i,t}(n)}\right)$$

Where $D_{m,i,t}(n)$ expresses the distance between m and each event n on one hand. On the other hand, $D_{r,i,t}(m)$ expresses the distance between region r and the installation m.

2.4) An average Closeness of region r to each of the three families of infrastructures (roads, seaports and airports) is finally computed by calculating a simple average across all installations within each family. This variable is presented as

$$Closeness\_infra_{r,i,t} = \left(\frac{1}{M}\right)\sum_{m} Closeness_{r,i,t}(n,m)$$

and used as a regressor specific to each family of infrastructures in the econometric model.

2.5) The same procedures are run to obtain an alternative measure of average closeness to unsafe infrastructures through weighting with fatalities, to obtain:

$$Closeness\_infra_{r,i,t}(f,m) = \left(\frac{1}{M}\right).\sum_{m}\left(\frac{1}{D_{r,i,t}(m)}\right).\sum_{n}\left(\frac{Max[1,nb.fatal_{m,i,t}(n)]}{D_{m,i,t}(n)}\right)$$

Again, the results based on either of the indicators shown above are very close to each other. So, not all of them are shown in the heart of the text.

Table 1: Correlation between Exposure to Events and Exposure of Infrastructure

		Events			Exp. of Infra to PR			Exp. of Infra to BE			Exp. of Infra to VC		
		BE	PR	VC	Roads	Ports	Airports	Roads	Ports	Airports	Roads	Ports	Airports
Events	BE	1.00											
	PR	0.18	1.00										
	VC	0.53	-0.41	1.00									
Exposure of Infra to PR	Roads	-0.11	0.91	-0.57	1.00								
	Ports	0.13	0.96	-0.35	0.88	1.00							
	Airports	0.16	0.92	-0.28	0.86	0.94	1.00						
Exposure of Infra to BE	Roads	0.67	0.47	0.22	0.29	0.50	0.57	1.00					
	Ports	0.21	0.90	-0.22	0.82	0.95	0.94	0.69	1.00				
	Airports	0.23	0.91	-0.25	0.80	0.94	0.97	0.60	0.95	1.00			
Exposure of Infra to VC	Roads	-0.03	-0.43	0.42	-0.22	-0.32	-0.24	0.23	-0.10	-0.29	1.00		
	Ports	-0.05	-0.96	0.54	-0.91	-0.89	-0.88	-0.30	-0.79	-0.84	0.55	1.00	
	Airports	0.16	0.90	-0.19	0.81	0.93	0.98	0.57	0.94	0.97	-0.22	-0.83	1.00

Source: Constructed by the authors using the ACLED dataset.
Note: BE stands for Battles and Explosions, PR for Protests and Riots and VC violence against civilians.

A first attempt to examine the nexus between the 2-years change in sales and the 2-years change in the exposure to different types of events (explosions and battles, protests and riots and violence against civilians) is to draw a scatter plot between both[8]. While a negative correlation is observed for all these events (especially for violence against civilians, for protests and riots but to a lesser extent explosions and battles), one cannot derive a solid link between the two variables.

Figure 9: Correlation between Sales and Exposure to Explosions and Battles
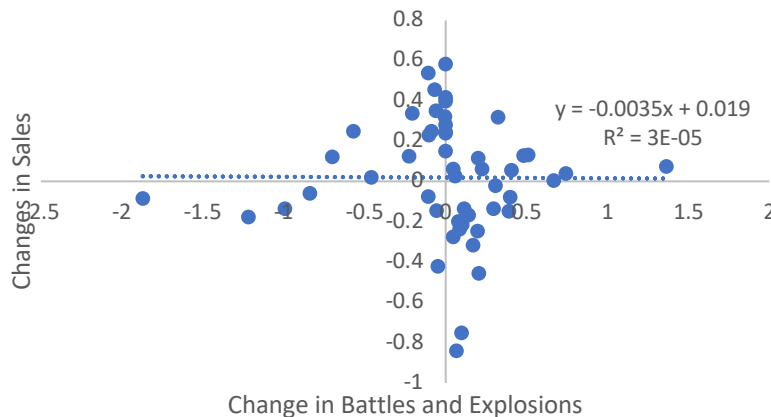
Source: Constructed by the authors.

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[8] Recall that we have data for fiscal years *t* and *t-2* for each firm in each survey.

Figure 10: Correlation between Sales and Exposure to Protests and Riots
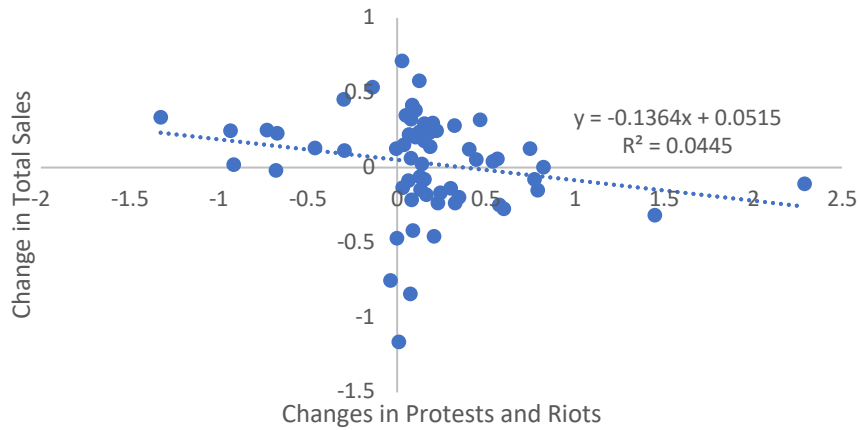
Source: Constructed by the authors.

Figure 11: Correlation between Sales and Exposure to Violence against Civilians
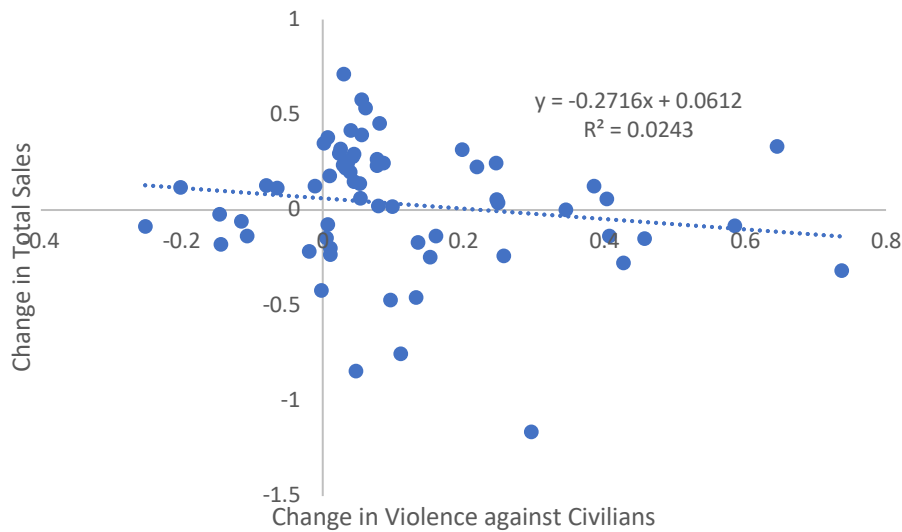
Source: Constructed by the authors.

In this context, the next section will provide a better attempt to identify the link between exposure to conflicts and firm performance. Thus, the econometric specification will be first presented and then some empirical remarks essential to the analysis will be highlighted.

5. Methodology

5.1. Identifying the impact of heterogeneous exposure of firms to conflicts on their performance

To examine the effect of exposure to conflicts on firm performance, the following simple specification is implemented, before being modified to introduce other variables of interest[9]:

$$\ln Y_{f,r,i,k,t} = \alpha_0 + \gamma \ln Y_{f,r,i,k,t-2} + \beta \Delta \ln Exposure_{r,i,t} + Z_{f,r,i,k,t} + FE_i + FE_k + u_{f,r,k,i,t}$$

where Y is a vector of variables measuring the performance of each firm, namely log of sales and log of sales per worker (i.e. labor productivity). These two variables are focused on since firms report the values of sales and full-time permanent employment for fiscal year t and fiscal year of t-2 as already mentioned. The 2 year lagged values of sales (or labor productivity) are controlled in order to control firm f unobservables, in region v, sector k, country i and year t. An alternative option to having $Y_{f,r,i,k,t-2}$ in the right hand side would have been to compute $\Delta (\ln Y_{r,i,t})$ and use it a dependant variable, but we preferred to opt for more flexibility by letting the data estimate whether or not the coefficient on $Y_{f,r,i,k,t-2}$ is close to one. The results obtained in what follows clearly show that the related coefficient is somewhat close to one.

On its side, the variable $\Delta (\ln Exposure_{r,i,t})$ is computed as the change in the exposure of the region to conflicts between the two dates (t and t-2) (i.e. $\ln Exposure_{r,i,t} - \ln Exposure_{r,i,t-2}$). As already mentioned in the box describing the variables of conflicts that are used (see Box 1), two alternative measures can be inserted here to express exposure to conflicts, one related to the number of events and another being weighted by the number of fatalities of those events. The exposure to conflicts variables is supposed to be a proxy for production costs (employees work less time for example, because they spend their rest of time sheltered at home or protesting against the government). But it can also be a proxy for transaction costs and even for uncertainty (which might lead in turn to decrease in demand for investment and other resources, by the firm). One could imagine indeed how being close to conflicts might change the behavior of firm owners in terms of investments and purchase of material supplies and intermediary inputs, more than those who are further away from conflicts, even within a given country.

Besides, a set of control variables $Z_{f,r,i,k,t}$ is introduced at the firm level observed at date t (from information offered by the survey), which is supposed to affect the change in performance of the firms being observed between the two dates t and t-2. For instance, some firms being bigger, or producing different types of products, might be having better performance between year t and year t-2, for reasons which are unrelated to exposure to conflicts. As control variables, the class-size of the firm to which it belongs was chosen (small firms covering those with an employment size up to 19, medium size ones -20 to 99 employees- and big firms, above 100 employees). The share of

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[9] Table A.1. and A.2 present the main descriptive statistics of these variables.

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government ownership and whether the firm has an international certification or not, were also inserted. Finally, the perceived preciseness of respondents, reported in the survey, is also included. This variable measures how the investigators perceive the precision and real validity of the answers provided by the representatives of the surveyed firms[10].

Also, country and industry fixed effects are introduced. These should actually reflect the change in performance of firms due to country and industry specific shocks that could have been experienced between dates *t* and *t-2* by a country or a typical industry in the region.

The analysis is extended in three ways. First, an examination of how conflicts affect small, medium and large firms differently. While small and medium ones are generally more fragile and hence can bear a higher cost of conflict, larger firms that are richer and have more assets are more likely to be looted. Second, a distinction between three types of conflicts is made: protests and riots, explosions and battles and violence against civilians. Finally, for each type of conflict, the exposure of a firm to a certain event (conflict onset) is distinguished from the fatalities associated to this event (conflict intensity).

5.2.   Identifying the impact of heterogeneous exposure of firms to unsafe infrastructure on their performance

In a second step, the econometric specification above is deepened and increased by introducing a new variable related to the closeness to unsafe infrastructure (see Box 2). The econometric specification takes now the following shape.

$$\ln Y_{f,r,i,k,t} = \alpha_0 + \gamma \ln Y_{f,r,i,k,t-2} + \beta \Delta \ln Exposure_{r,i,t} + \partial \Delta \ln Closeness\_infra_{r,i,t} + Z_{f,r,i,k,t} + FE_i + FE_k + u_{f,r,k,i,t}$$

Here, those variables are progressively introduced with respect to the type of infrastructure: closeness to unsafe roads (and highways) first, then paired progressively with closeness to ports and airports variables as two additional variables. As for the other variables of interest, the closeness to infrastructures variables are also computed as the change in 2-years log values between *t* and *t-2*.

The variables of closeness to unsafe infrastructure aim at capturing the transaction costs borne by the firms during conflicts. Indeed, the fact that an important infrastructure is located next to a series of conflicts during the year, makes it more costly for firms to ship their goods and arrange for travels of their employees through this infrastructure, making business more costly, especially for those firms in regions, which are more connected to that infrastructure.

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[10] The investigator can choose among the following: don't know, not truthful, somewhat truthful and truthful.

Besides, earlier sections of the paper have shown that some of these variables are being correlated with the exposure measure (see Table 1): recall that this is, again, due to the fact that concentration of activities and big infrastructure installations are usually geographically clustered across the country. Thus, being next to a conflict onset for a firm might be associated with the main infrastructures to be next to such conflict too. One of the objectives is then to let the econometrics try to disentangle the effect of being next to conflicts from that of being next to an infrastructure itself prone to conflicts.

Several empirical remarks are worth to be mentioned before discussing the results for the first and the second series of specifications.

First, in order to enable a proper identification of conflicts related variables on performance, it is indispensable to consider a specification to focus on within country-regions changes. Indeed, as it was mentioned before, most of the conflicts, in particular riots and protests, are concentrated in agglomerations endowed with the most reliable infrastructure and where the most efficient firms are located. Econometrically, this has two important implications. On the one hand, we cannot identify the desired effects on the performance of firms by simply looking at the cross-section variation between firms and or regions where they are located (since the activity is highly concentrated in places where a good infrastructure is present and conflicts take place). A cross-section treatment will suffer from a strong endogeneity: it is quite possible that firms that are highly exposed to conflicts or that are close to a good infrastructure (itself exposed to conflicts) would also be those which are in general the most efficient. This is why the within variation for each firm is used (the change between two different dates of exposure to conflicts and the change in the firm's performance between these two dates). Hence the idea of using the data in fiscal year t compared to $t-2$. The second implication is related to the fact that infrastructure, ports and airports are located in places where economic activities are concentrated and that are often near the coasts. Consequently, a strong correlation can be found between their changes to conflict exposures over time, therefore this should be taken into consideration in the empirical work conducted.

Second, since aggregated conflict data (at the country-region level) are being merged with disaggregated firm-level data, the errors are clustered by country-region because each survey is specific to each country without a proper panel dimension. Regressions are also executed using a different method of clustering (by country-region-year) and the obtained results remain qualitatively the same.

Third, given that a survey is used, estimates based on a sample that does not correctly represent the population according to the region, the sector or the size of the surveyed firms, can produce biased estimators (although there is no consensus on this in the literature). In other words, the probability of randomly drawing each surveyed firm will no longer be the same, which can produce biased results. The proposed solution is to weight each observation linked to a firm by the inverse

of the probability of selection of the surveyed firm to guarantee a good representativeness of each observation in the studied sample[11].

6. Empirical Results
6.1. Exposure to all types of conflicts

First, an analysis tackling how exposure to all types of conflicts (Battles, Protests and Riots and finally, Violence against civilians), irrespective of their type, is affecting the firms' performance is conducted. A first series of regressions are undertaken by considering the change in exposure based on events ($\Delta \ln Exposure_{r,i,t}(n)_{r,i,t}$) while the second series are undertaken by inserting, as an alternative, the change in exposure based on fatalities $\Delta \ln Exposure_{r,i,t}(f,n)_{r,i,t}$.

Table 2 reports the first set of results regarding equation 1 for the log of sales regression. The results, related to the 4 columns (1 to 4) where the number of events-based exposure variable is being employed, are presented first. Columns 5 to 8 deliver the results for the number of fatality-based exposure variable tackled in a second step[12].

Before discussing the obtained results, it is important to pinpoint some remarks regarding the variables of interest.

First, past sales (in t-2) appear with a coefficient γ of around 0.88 to 0.97 across all 4 columns. It is obvious that this is also true for columns 5 to 8. These coefficients are relatively close to 1: in fact, some alternative regressions with as an alternative dependent variable the change in log of sales between t and t-2 (i.e. $\Delta \ln Y_{f,r,i,k,t} = \ln Y_{f,r,i,k,t} - \ln Y_{f,r,i,k,t-2}$) were run. This is similar to if the coefficient on past sales in the shown specification was constrained to 1. The main results do not change, however.

Secondly, in columns 1 and 5 where all firms are being considered, *ceteris paribus*, the size of firms appears to be positively associated with the performance in sales of the firms, even after accounting for their past performance in t-2. This suggests that big firms, independently from their exposure to events, seem to be performing, on average and over time, better than smaller ones, in these Arab countries. It might be due to their easier accessibility to foreign markets, or to financing their investments (El-Said et al, 2016). This is however, beyond the scope of this paper and left for further research.

Thirdly, belonging to a national government does not advantage firms, neither having an international certification, except for big firms. This also shows how small and medium firms are still less likely to be part of global value chains, which increases their fragility.

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[11] Three possible weights linked to each observed firm are given in the WBES according to three possible criteria (in terms of the level of eligibility of the surveyed firms *ex-post* compared to those planned *ex-ante*): wstrict (strict eligibility), wmedian (median level) and wweak (low eligibility level). If only one of the three weights had to be retained, the World Bank recommends the wmedian one.

[12] Appendix 3 presents the results for employment that are generally less robust than sales and labor productivity.

Concerning the variables of interest, in column 1, one observes that by pooling all firms together (and all types of events together), the estimator on the event-based exposure variable is statistically insignificant. From column (2) to (4) the same specification is run across three class sizes of the firms (small, medium and large firms). While no statistically significant effect of exposure is observed here, there appears to be a negative and statistically significant impact on mid-sized firms. In columns 5 to 8, the fatality-based exposure variable is used instead. Nevertheless, these columns still show very similar results in magnitude, sign and statistical significance.

Table 3 concentrates on the alternative performance variable for firms, being labor productivity (i.e. sale per -permanent long-term- employee). Again, labor productivity for a firm in t is very much associated to that in t-2 with a coefficient of around 0.8 across columns. Noting however that, unlike for sales, size class in columns 1 and 5 do not appear to play a role on changes in labor productivity overtime. The other control variables might not reflect the same effects on labor productivity than the ones obtained on sales in Table 2 neither.

Of more interest however, are the results that obtained on the exposure of firms to conflicts. In the first column of Table 3, one can identify a positive (not negative) and statistically significant effect on productivity which seems to come solely from the small firms (see column 2 compared to 3 and 4). Note however, that by using the alternative exposure variable (fatality-based) in columns 5 to 8, the positive effect does not seem to hold anymore.

All in all, if one judges by these measures based on all types of events, one could conclude that being close to events of whichever nature does not seem to be associated with a robust impact on the performance of the firms, whether performance is expressed in terms of sales or in terms of sales per employee. This is why disentangling the effects of each category of events is important to be taken into consideration.

6.2. Accounting for the heterogeneity of conflicts

Table 4 shows the results for the same types of specifications but now, exposure variables are computed by type of events. Recalling that we are working with three types of events: Battles and Explosions events (BE events, hereafter), Protests and Riot events (PR) and Violence against civilians' events (VC events).

First, exposure variables linked to each type of events at a time are introduced and then pooled all three together. Columns 1 to 4 do that for the number of events-based exposure variable. Interestingly, being more exposed to Battles and Explosions in t compared to t-2 appears with a robust negative impact on the changes in sales of the firms. The elasticity is measured to be around 0.13. We believe that this negative effect is attributed to the fact that we take into consider local (not national) shocks. Such local shocks related to specific conflicts can alter the stability of the production process, supply chains (related to both goods and services), access to resources and thus firms' productivity. This is why, with local shocks, the closer a firm is located to the shock, the more it is likely to be negatively affected compared to farther ones. When looking at how the

coefficient changes across the three different sizes of firms (columns 5 to 7), the effect is mainly observed for small and mid-sized firms, not for big ones.

Nevertheless, exposure to Protests and Riots (PR events) and exposure to Violence against civilians do not seem to be negatively affecting the sales of the firms. However, one result for exposure to violence appears to be positive on sales of firms when concentrating on mid-size firms. This might be due, among other reasons, to some endogeneity between changes in sales and changes in exposure to violence against civilians. This issue is further developed in this study when describing other results in the following tables. Interestingly, very similar results are obtained by applying the fatality-based exposure measure as an alternative in Table 5.

Table 6 uses labor productivity as an alternative dependent variable and shows the results for exactly the same specifications than those shown in table 4. Again and very similarly, labor productivity of firms overtime is hit almost in the same way than sales, when these firms are more exposed to Battles and Explosions, and by about 1.2 % when exposure increase by 10%. But this figure is very much due to small firms. For mid-sized firms the negative effect on productivity seems to be even higher (coefficient of around 0.22) while, statistically, big firms do not seem to be significantly more affected by being next to Battles. This is chiefly due to the fact that larger firms are more able to absorb the shock than smaller ones for several reasons. They can diversify their resources, they have an *a priori* healthier financial situation, can more easily borrow from the banks, and hence, they are more resilient. Besides, the results linked to PR or VC-events are very similar to those obtained in Table 4. Again, these events do not seem to impact labor productivity overtime in a robust manner. Moreover, similar results are obtained when fatalities are used as an alternative measure to events onset (see Table 7).

6.3. Accounting for the exposure of road infrastructure and its impact on firm performance
In the following series of Tables 8 to 13, the variables of closeness to unsafe infrastructures are progressively introduced, represented by the generic variable $\Delta \ln Closeness\_infra_{r,i,t}$ in equation 2 above.

In Tables 8 and 9, the closeness to unsafe roads and highways are first introduced into the firm sales and labor productivity equations to run. Table 8 starts with the firm sales equation. Here 12 columns are being presented through three series of four columns. Each series is related to one specific type of conflict: Columns 1 to 4 are related to Battles and Explosions events, 5 to 8 to Protests and Riots and 9 to 12 to Violence against civilian ones. Columns 1, 5 and 9 are benchmark specifications where the introduced exposure variables relate respectively to BE events, PR events and V ones. These columns reproduce exactly columns 1, 2 and 3 in Table 4.

In column 2, the exposure of firms to BE events variable are first replaced by that of their closeness to roads which are themselves prone to BE events. The estimator obtained is negative (and statistically significant) with an elasticity of 0.05. In column 3, both measures are then introduced together. This does not affect the statistical significance's robustness of the estimator related to exposure to BE events. It even increases its magnitude. Nevertheless, the impact of the closeness

measure becomes statistically insignificant, pointing to a very probable link between the two measures. As it was already mentioned in the previous stylized facts section, these two measures might be very well correlated by construction. It is indeed possible that firms which are highly exposed to events like battles might be close to roads which are also highly exposed to battles too. Hence, the two measures might be capturing some common information: once they are introduced together, the closeness to roads variable ends-up not being statistically significant anymore. In column 4, a constraint is introduced on the estimators which are on both variables by forcing the coefficient to be the same for both. Here, the impact obtained is still negative and statistically significant with a common value at around -0.04. However, a simple test rejects the hypothesis H0 that the two coefficients are equal (see F test shown at the bottom of column 3) which suggests that it is better not to constrain both coefficients on the variables of exposure and that of closeness.

Column 5 shows the series of results regarding protests and riots' events. Column 6 replaces the exposure variable by the closeness to unsafe PR events one. Column 7 pools them together. In neither specification do the coefficients seem statistically significant. With an equality test mentioning that the equality of the two coefficients is not to be rejected (see bottom of column 7), both coefficients are constrained to have the same value to be estimated in column 8. But even there, no statistically significant effect arises. Put differently, neither changes in direct exposure of firms nor closeness to roads which might experience a change in their own exposure to protests and riots do appear to have affected firm sales.

From column 9 onwards, a series of regressions related to the last type of events, those of violence against civilians, are run. Here, the results are at odds with what one would expect: especially, putting both measures together, either by not constraining their coefficients to be the same (column 11) or constraining them to be equal (column 12) provides a positive association with firm sales. This result needs some further discussion. First, again, the two measures on violence acts seem to be linked by construction and thus provide partially similar information on their link to firms' sales. Now, the question is why then they would be positively and not negatively correlated to firm sales. One reason has to do with the high endogeneity between these measures and changes in firm sales. In fact, violence against civilians mainly encompasses terror activities against civilians. Terror organizations, as it is well documented by the literature (see for instance Mirza and Verdier, 2008 or Enders and Sandler, 2012) target locations where they can gain the highest visibility. Thus, they seem to perpetrate their acts especially in regions with the highest activity. Hence, one could then imagine that an increase in the activity of firms in some locations might lead terror organizations to target especially those locations and the reverse could be as true when the activity slows down in some locations.

Table 9 reproduces the same specifications taking labor productivity as a dependent variable. Strikingly, the results happen to be very close to those of Table 8 in magnitude and statistical significance. Note however, that the coefficients on closeness of protests or violence against civilians to road infrastructure happen to be positive (not negative) on productivity. Now, table

A.6 in the appendix provides a part of the explanation. It seems that firm employment is hurt by those events, not sales. Thus, when one considers sales per employee, one obtains a positive effect on apparent productivity. Another way to put it is that adjustments costs from protests and violence against civilians have been transmitted to employees through a reduction in their number at the firm level coupled with an increase in the productivity of those who stay in their job.

6.4. Accounting for the role of ports and airports exposure to conflicts
At this point, and because of their probable endogeneity, results related to violence against civilians' events are not presented anymore. The focus is now only on Battles and Explosions (BEs) and Protest and Riots types of events (PRs).

Table 10 expands on Table 8 but by concentrating only, first, on the proximity to BE events and the impact on firm sales. Here the objective is to introduce progressively the exposure of ports and airports to BE events and how closeness to these infrastructures for firms might affect their performance.

Now, again, because activities are clustered in few areas of a country, closeness of firms to ports and/or airports prone to terror might also be correlated with the exposure of firms themselves to the locations of conflicts. Therefore, two measures are first introduced alternatively; the firm-closeness to ports which are prone to terror variable and the firm-closeness to airports which are in turn prone to terror in columns 1 and 2 of table 10. Both produce negative and statistically significant coefficients on firm sales. Now putting both measures together clearly produces multicollinearity as the coefficient of both is multiplied by 9 (see column 3), one taking a negative value while the other having a positive value. In column 4, the closeness to airports is then removed in order to focus on closeness to unsafe ports only, while reintroducing now the two variables studied in Table 8 (exposure of firms to BEs and closeness to roads prone to BE events). This shows again the robust coefficient value on the variable exposure to BE events that appears now with a value of -0.28, perhaps overestimated in magnitude due to the inclusion of exposure of ports variable, which appears in this case with a positive and statistically significant effect on firm sales.

In columns 5 and 6 an augmented version is tested in order to look at the heterogeneity of impact across firms which are linked to an international activity (importers of inputs or exporters of their goods). Indeed, one would expect an even greater negative impact of ports (or airports) prone to conflicts, on the activity of firms when those are related in a way or another with the international environment. The results however are not consistent with this view. In columns 5 and 6, the interaction term with imports and exports respectively together, does not show up with a negative coefficient. Column 6 shows even a positive coefficient on exporters which means that ports being hit by Battles and other Explosions might seem to be associated with more positive sales of exporters than those of importers (or those with no direct link with the international environment), which is one result that this current study is unable to explain in a rigorous manner.

Columns 7 to 9 expand on the specifications related to columns 4 to 6, by pooling together the variables of closeness to airports-prone to BEs with that of ports-prone to BEs, and the related

interaction terms. Yet, in order to avoid multicollinearity problems, both coefficients are constrained on the closeness to ports and closeness to airports to be equal. The results do not change much, however. One new result is that interaction terms for airport related variables with importers and exporters do not appear to be statistically significant.

Table 11 reproduces the same specifications regarding firms' sales but now with a focus on Protest and riots events. Here, again, the alternative inclusion of ports and airports related measures in columns 1 and 2 produce somewhat high negative impact on firm sales with statistical significance. Putting both together seems to end-up increasing the magnitude of one coefficient while driving statistical insignificance for the other, which again might point to some multicollinearity justifying the use of only one of them (in columns 4 to 6) or alternatively introducing them together but through fixing their coefficients to be equal (columns 7 to 9).

In columns 4 to 6 indeed, protests and riots seem to be negatively impacting firm sales when they are located near the ports (absolute value elasticity of 0.10 or so). These figures are robust to the inclusion of direct exposure to PR events variable in column 4, the latter still showing up with non-statistical significance. But why would then protest and riots have a negative effect on firms when they are located near ports while they do not seem to negatively impact them when they happen to be located next to firms? This question is hard to answer and calls clearly for further research. In columns 5 and 6, interaction terms with being an importer and an exporter are introduced respectively. The related coefficients do not appear to be statistically significant although they happen to be negative for importers. Generally speaking, the countries of interest are highly dependent on imported inputs, particularly in the manufacturing sector, this is why, importers are negatively affected by the exposure of infrastructure to protests and riots.

In columns 7 to 9, both variables of ports and airports prone to PR events are being introduced. Here, again, when constraining the coefficients to be equal, both provide robust evidence of a negative impact on firm sales when they are more prone to protests and riots. Interestingly, the interaction term with importers for airports being prone to PR events, happen to be negative and statistically significant. This is consistent with the idea that when airports are more prone to protests and rots, business costs happen to be higher for importer of foreign materials and inputs.

Table 12 reproduces the specifications of Table 10 for Battles and Explosions but by using labor productivity as a dependent variable. Here most of the results appear to be consistent with table 10, except that for columns 7 to 9, the pooling of ports and airports' related closeness variables together with constraining them to be equal produce negative impact of these infrastructures prone to battles on firm sales, with a coefficient of around -0.06. Besides, coefficient on direct exposure of firms is still negative and statistically significant (at around –0.12). The coefficients of the interaction terms continue to be in line with those obtained in the firm sales regressions (table 10). Finally, Table 13 reproduces the specifications of Table 11 for Protests and riot events, while using labor productivity as a dependent variable. Here the results are very much in line with those of Table 11 where sales dependent variable are used. Nothing really changes actually compared to Table 11.

Table 2: Impact of Direct exposure to all events on Sales

	1	2	3	4	5	6	7	8
	LnD.Sales	LnD.Sales	LnD.Sales	LnD.Sales	LnD.Sales	LnD.Sales	LnD.Sales	LnD.Sales
	All	Small	Medium	Large	All	Small	Medium	Large
Log of the establishment's total annual sales	0.904***	0.889***	0.973***	0.881***	0.904***	0.889***	0.974***	0.881***
	[0.014]	[0.018]	[0.022]	[0.029]	[0.014]	[0.018]	[0.021]	[0.029]
Ch.in Regional Exposure to ALL events	0.005	0.009	-0.316**	0.028				
	[0.033]	[0.032]	[0.140]	[0.038]				
Ch. in Regional Exposure to ALL fat. events					-0.003	0.003	-0.237*	0.028
					[0.037]	[0.037]	[0.123]	[0.034]
Size	0.115***				0.114***			
	[0.036]				[0.036]			
Internationally recognized certification	0.048	0.06	-0.107	0.452**	0.049	0.061	-0.146	0.455**
	[0.081]	[0.083]	[0.143]	[0.180]	[0.081]	[0.083]	[0.128]	[0.180]
Percent of firm belonging to national government	0.002	0.002	-0.001	0.004	0.002	0.002	-0.001	0.004
	[0.002]	[0.003]	[0.004]	[0.002]	[0.002]	[0.003]	[0.004]	[0.002]
Perceived Preciseness of respondents	0.053	0.109*	-0.239**	-0.062	0.053	0.109*	-0.227**	-0.061
	[0.048]	[0.059]	[0.090]	[0.056]	[0.048]	[0.059]	[0.095]	[0.057]
Observations	5697	2542	1689	1466	5697	2542	1689	1466
R-squared	0.885	0.869	0.91	0.87	0.885	0.869	0.91	0.87
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: (i) Exposure Data are based on author's calculations from different sources: Euclidian distances from GISarcmap 10.6 software, Open Street Maps and ACLED conflicts database. (ii) Standard errors between brackets. Errors are clustered by country-region. (iii) * p<0.1, ** p<0.05, *** p<0.01.

Table 3: Impact of Direct exposure to all events on Productivity

	1 LnD.Pty All	2 LnD.Pty Small	3 LnD.Pty Medium	4 LnD.Pty Large	5 LnD.Pty All	6 LnD.Pty Small	7 LnD.Pty Medium	8 LnD.Pty Large
Log of Sales per full-time permanent employees	0.807***	0.794***	0.851***	0.843***	0.807***	0.795***	0.853***	0.843***
	[0.029]	[0.034]	[0.040]	[0.025]	[0.029]	[0.034]	[0.040]	[0.025]
Ch.in Regional Exposure to ALL events	0.040*	0.047**	-0.272	-0.001				
	[0.024]	[0.023]	[0.220]	[0.044]				
Ch. in Regional Exposure to ALL fat.events					0.025	0.033	-0.194	0.005
					[0.027]	[0.025]	[0.166]	[0.040]
Size	0.004				0.003			
	[0.028]				[0.028]			
Internationally recognized certification	-0.065	-0.130*	-0.036	0.268*	-0.064	-0.129*	-0.07	0.268*
	[0.064]	[0.071]	[0.123]	[0.148]	[0.064]	[0.071]	[0.109]	[0.148]
Percent of firm belonging to national government	0.006**	0.006**	0.001	0.004	0.006**	0.006**	0.001	0.004
	[0.003]	[0.003]	[0.002]	[0.002]	[0.003]	[0.003]	[0.002]	[0.002]
Perceived Preciseness of respondents	0.078	0.112	-0.107*	-0.004	0.078	0.113	-0.098	-0.004
	[0.060]	[0.076]	[0.060]	[0.058]	[0.059]	[0.075]	[0.064]	[0.058]
Observations	5603	2521	1656	1426	5603	2521	1656	1426
R-squared	0.818	0.809	0.872	0.834	0.818	0.809	0.872	0.834
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: (i) Exposure Data are based on author's calculations from different sources: Euclidian distances from GISarcmap 10.6 software, Open Street Maps and ACLED conflicts database. (ii) Standard errors between brackets. Errors are clustered by country-region. (iii) * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

Table 4: Impact of Direct exposure to events of different types on Sales – Exposure to Events

	1	2	3	4	5	6	7
	LnD.Sales BE	LnD.Sales PR	LnD.Sales V	LnD.Sales All	LnD.Sales Small	LnD.Sales Medium	LnD.Sales Large
Log of the establishment's total annual sales, FY	0.904***	0.903***	0.904***	0.903***	0.886***	0.974***	0.881***
	[0.016]	[0.014]	[0.014]	[0.016]	[0.020]	[0.021]	[0.035]
Change in Regional Exposure to BE n-events	-0.136***			-0.132***	-0.144**	-0.157***	0.01
	[0.043]			[0.046]	[0.058]	[0.044]	[0.070]
Change in Regional Exposure to PR n-events		0.021		0.041	0.028	0.023	0.055
		[0.028]		[0.130]	[0.137]	[0.175]	[0.306]
Change in Regional Exposure to V n-events			0.016	0.101	0.1	0.178**	0.209
			[0.028]	[0.065]	[0.076]	[0.075]	[0.163]
Size	0.123***	0.117***	0.112***	0.125***			
	[0.041]	[0.036]	[0.035]	[0.042]			
Internationally recognized certification	0.054	0.048	0.049	0.056	0.071	-0.112	0.448**
	[0.079]	[0.081]	[0.081]	[0.079]	[0.080]	[0.149]	[0.181]
Percent of firm belonging to national government	0.001	0.002	0.002	0.002	0.001	-0.001	0.004**
	[0.002]	[0.002]	[0.002]	[0.002]	[0.003]	[0.005]	[0.002]
Perceived Preciseness of respondents	0.056	0.053	0.052	0.058	0.125**	-0.234**	-0.041
	[0.050]	[0.048]	[0.048]	[0.050]	[0.062]	[0.093]	[0.055]
Constant	1.203***	1.248***	1.226***	1.094***	1.230***	1.143**	2.095***
	[0.242]	[0.230]	[0.237]	[0.266]	[0.385]	[0.467]	[0.561]
Observations	5343	5696	5603	5342	2330	1642	1370
R-squared	0.885	0.885	0.884	0.885	0.868	0.908	0.873
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: (i) Exposure Data are based on author's calculations from different sources: Euclidian distances from GISarcmap 10.6 software, Open Street Maps and ACLED conflicts database. (ii) Standard errors between brackets. Errors are clustered by country-region. (iii) * p<0.1, ** p<0.05, *** p<0.01.

Table 5: Impact of Direct exposure to events of different types on Sales – Fatalities of Events

	1 LnD.Sales BE	2 LnD.Sales PR	3 LnD.Sales V	4 LnD.Sales All	5 LnD.Sales Small	6 LnD.Sales Medium	7 LnD.Sales Large
Log of the establishment's total annual sales	0.903***	0.903***	0.904***	0.902***	0.885***	0.972***	0.881***
	[0.016]	[0.014]	[0.014]	[0.015]	[0.020]	[0.019]	[0.034]
Change in Regional Exposure to BE f-events	-0.140***			-0.151***	-0.162***	-0.157***	-0.032
	[0.025]			[0.034]	[0.042]	[0.039]	[0.047]
Change in Regional Exposure to PR f-events		0.034		0.103	0.083	0.136	0.175
		[0.028]		[0.113]	[0.112]	[0.153]	[0.163]
Change in Regional Exposure to V f-events			0.008	0.094*	0.109	0.143**	-0.001
			[0.025]	[0.047]	[0.066]	[0.055]	[0.093]
Size	0.118***	0.117***	0.114***	0.123***			
	[0.040]	[0.036]	[0.036]	[0.041]			
Internationally recognized certification	0.047	0.048	0.049	0.055	0.072	-0.12	0.437**
	[0.079]	[0.082]	[0.081]	[0.077]	[0.078]	[0.150]	[0.173]
Percent of firm belonging to national government	0.002	0.002	0.002	0.002	0.002	-0.002	0.004
	[0.002]	[0.002]	[0.002]	[0.002]	[0.003]	[0.005]	[0.002]
Perceived Preciseness of respondents	0.06	0.052	0.052	0.058	0.125**	-0.236**	-0.047
	[0.050]	[0.049]	[0.048]	[0.050]	[0.060]	[0.100]	[0.058]
Constant	1.218***	1.257***	1.238***	1.163***	1.286***	1.277***	2.438***
	[0.242]	[0.230]	[0.231]	[0.249]	[0.368]	[0.449]	[0.535]
Observations	5343	5696	5603	5342	2330	1642	1370
R-squared	0.885	0.885	0.884	0.885	0.869	0.908	0.873
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: (i) Exposure Data are based on author's calculations from different sources: Euclidian distances from GISarcmap 10.6 software, Open Street Maps and ACLED conflicts database. (ii) Standard errors between brackets. Errors are clustered by country-region. (iii) * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

Table 6: Impact of Direct exposure to events of different types on Labor Productivity – Exposure to Events

	1 LnD.Pty BE	2 LnD.Pty PR	3 LnD.Pty VC	4 LnD.Pty All	5 LnD.Pty Small	6 LnD.Pty Medium	7 LnD.Pty Large
Log of Sales per full-time permanent employees (lag)	0.800***	0.806***	0.806***	0.801***	0.785***	0.852***	0.846***
	[0.032]	[0.029]	[0.030]	[0.032]	[0.038]	[0.040]	[0.032]
Change in Regional Exposure to BE n-events	-0.116***			-0.126***	-0.111**	-0.264***	0.015
	[0.023]			[0.031]	[0.042]	[0.068]	[0.064]
Change in Regional Exposure to PR n-events		0.055**		0.135	0.131	0.305	-0.128
		[0.025]		[0.165]	[0.177]	[0.191]	[0.238]
Change in Regional Exposure to V n-events			-0.016	0.019	0.037	0.031	0.052
			[0.029]	[0.060]	[0.074]	[0.090]	[0.182]
Size	0.015	0.006	0.003	0.015			
	[0.032]	[0.028]	[0.028]	[0.032]			
Internationally recognized certification	-0.06	-0.066	-0.065	-0.063	-0.128*	-0.054	0.280*
	[0.064]	[0.064]	[0.064]	[0.064]	[0.073]	[0.127]	[0.150]
Percent of firm belonging to national government	0.005**	0.006**	0.006**	0.006**	0.006**	-0.001	0.004*
	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.002]
Perceived Preciseness of respondents	0.088	0.078	0.079	0.088	0.13	-0.104	-0.026
	[0.062]	[0.059]	[0.060]	[0.062]	[0.081]	[0.067]	[0.061]
Constant	2.146***	2.129***	2.151***	2.120***	2.156***	2.143***	2.016***
	[0.415]	[0.385]	[0.396]	[0.435]	[0.532]	[0.645]	[0.366]
Observations	5260	5602	5511	5259	2314	1611	1334
R-squared	0.816	0.818	0.814	0.816	0.806	0.871	0.838
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: (i) Exposure Data are based on author's calculations from different sources: Euclidian distances from GISarcmap 10.6 software, Open Street Maps and ACLED conflicts database. (ii) Standard errors between brackets. Errors are clustered by country-region. (iii) * p<0.1, ** p<0.05, *** p<0.01.

Table 7: Impact of Direct exposure to events of different types on Labor Productivity – Fatalities

	1	2	3	4	5	6	7
	LnD.Pty BE	LnD.Pty PR	LnD.Pty VC	LnD.Pty All	LnD.Pty Small	LnD.Pty Medium	LnD.Pty Large
Log of Sales per full-time permanent employees (lag)	0.800***	0.806***	0.806***	0.801***	0.785***	0.852***	0.846***
	[0.032]	[0.029]	[0.030]	[0.032]	[0.038]	[0.039]	[0.032]
Change in Regional Exposure to BE f-events	-0.123***			-0.124***	-0.120***	-0.212***	-0.012
	[0.023]			[0.025]	[0.031]	[0.064]	[0.050]
Change in Regional Exposure to PR f-events		0.069**		0.14	0.115	0.313*	0.02
		[0.032]		[0.135]	[0.137]	[0.167]	[0.132]
Change in Regional Exposure to V f-events			-0.025	0.023	-0.002	0.181**	-0.094
			[0.026]	[0.047]	[0.065]	[0.079]	[0.100]
Size	0.01	0.005	0.003	0.009			
	[0.031]	[0.028]	[0.028]	[0.032]			
Internationally recognized certification	-0.067	-0.066	-0.067	-0.067	-0.127*	-0.063	0.249*
	[0.061]	[0.064]	[0.063]	[0.061]	[0.073]	[0.130]	[0.136]
Percent of firm belonging to national government	0.006**	0.006**	0.006**	0.006**	0.006**	-0.001	0.004*
	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.002]
Perceived Preciseness of respondents	0.092	0.077	0.08	0.087	0.126	-0.11	-0.025
	[0.063]	[0.059]	[0.060]	[0.063]	[0.081]	[0.076]	[0.062]
Constant	2.154***	2.143***	2.162***	2.164***	2.245***	2.061***	2.231***
	[0.415]	[0.386]	[0.391]	[0.425]	[0.532]	[0.603]	[0.411]
Observations	5260	5602	5511	5259	2314	1611	1334
R-squared	0.817	0.818	0.814	0.817	0.807	0.872	0.838
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: (i) Exposure Data are based on author's calculations from different sources: Euclidian distances from GISarcmap 10.6 software, Open Street Maps and ACLED conflicts database. (ii) Standard errors between brackets. Errors are clustered by country-region. (iii) * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

Table 8: Impact on Sales, of direct exposure of firms and exposure via Unsafe Major Roads and Highways

	Battles and Explosions				Protests and Riots				Violence against Civilians			
	1	2	3	4	5	6	7	8	9	10	11	12
	Dir. Exp.	Road Exp.	Both.	Same coeff.	Dir. Exp.	Road Exp.	Both.	Same coeff.	Dir. Exp.	Road Exp.	Both.	Same coeff.
Log of the establishment's total annual sales(lag)	0.904***	0.916***	0.915***	0.916***	0.903***	0.917***	0.916***	0.917***	0.904***	0.914***	0.913***	0.913***
	[0.016]	[0.013]	[0.012]	[0.012]	[0.014]	[0.013]	[0.013]	[0.012]	[0.014]	[0.012]	[0.012]	[0.012]
Change in Regional Exposure to n-events	-0.136***		-0.245***	-0.041**	0.021		-0.053	0.046	0.016		0.197*	0.143**
	[0.043]		[0.088]	[0.019]	[0.028]		[0.180]	[0.090]	[0.028]		[0.107]	[0.058]
Change in Closeness to Exp. of all rds to the event		-0.055*	0.064	-0.041**		0.076	0.089	0.046		0.133*	0.127*	0.143**
		[0.029]	[0.044]	[0.019]		[0.106]	[0.091]	[0.090]		[0.070]	[0.074]	[0.058]
Size	0.123***	0.074**	0.078**	0.075**	0.117***	0.073***	0.073**	0.073***	0.112***	0.068**	0.074**	0.071**
	[0.041]	[0.029]	[0.031]	[0.030]	[0.036]	[0.027]	[0.027]	[0.027]	[0.035]	[0.029]	[0.032]	[0.030]
Internationally recognized certification	0.054	0.046	0.057	0.049	0.048	0.044	0.046	0.043	0.049	0.054	0.058	0.058
	[0.079]	[0.074]	[0.074]	[0.073]	[0.081]	[0.076]	[0.075]	[0.076]	[0.081]	[0.079]	[0.079]	[0.079]
Percent of firm belonging to national government	0.001	0	0	0	0.002	0	0	0	0.002	0.001	0.002	0.002
	[0.002]	[0.001]	[0.002]	[0.001]	[0.002]	[0.001]	[0.001]	[0.001]	[0.002]	[0.001]	[0.001]	[0.001]
Perceived Preciseness of respondents	0.056	0.023	0.022	0.024	0.053	0.011	0.01	0.012	0.052	0.009	0.013	0.012
	[0.050]	[0.058]	[0.060]	[0.058]	[0.048]	[0.060]	[0.061]	[0.059]	[0.048]	[0.059]	[0.059]	[0.059]
Observations	5343	4044	3950	3950	5696	4044	4043	4043	5603	4044	3950	3950
R-squared	0.885	0.888	0.887		0.885	0.888	0.888		0.884	0.888	0.886	
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Proba>F-equality of coef. test			0.02**				0.46				0.59	

Notes: (i) Exposure Data are based on author's calculations from different sources: Euclidian distances from GISarcmap 10.6 software, Open Street Maps and ACLED conflicts database. (ii) Standard errors between brackets. Errors are clustered by country-region. (iii) * p<0.1, ** p<0.05, *** p<0.01. (iv) Columns 4, 8 and 12 impose on constraint on the coefficients of the regional exposure and closeness to roads to be equal.

Table 9: Impact on Labor Productivity, of direct exposure of firms and exposure via Unsafe Major Roads and Highways

	Battles and Explosions				Protests and Riots				Violence against Civilians			
	1	2	3	4	5	6	7	8	9	10	11	12
	Dir. Exp.	Road Exp.	Both.	Same coeff.	Dir. Exp.	Road Exp.	Both.	Same coeff.	Dir. Exp.	Road Exp.	Both.	Same coeff.
Lag(Productivity)	0.800***	0.813***	0.812***	0.812***	0.806***	0.814***	0.814***	0.815***	0.806***	0.811***	0.810***	0.810***
	[0.032]	[0.017]	[0.017]	[0.017]	[0.029]	[0.018]	[0.018]	[0.018]	[0.030]	[0.019]	[0.019]	[0.019]
Change in Regional Exposure to n-events	-0.116***		-0.182**	-0.039***	0.055**		0.029	0.149	-0.016		0.190*	0.191***
	[0.023]		[0.078]	[0.010]	[0.025]		[0.151]	[0.095]	[0.029]		[0.095]	[0.062]
Change in Closeness to Exp. of rds to event		-0.053***	0.035	-0.039***		0.209*	0.202*	0.149		0.198**	0.192**	0.191***
		[0.017]	[0.044]	[0.010]		[0.119]	[0.102]	[0.095]		[0.075]	[0.080]	[0.062]
Size	0.015	0.001	0.003	0.002	0.006	-0.003	-0.004	-0.003	0.003	-0.011	-0.006	-0.006
	[0.032]	[0.029]	[0.031]	[0.030]	[0.028]	[0.025]	[0.025]	[0.025]	[0.028]	[0.031]	[0.034]	[0.033]
Internationally recognized certification	-0.06	-0.062	-0.055	-0.061	-0.066	-0.062	-0.063	-0.067	-0.065	-0.052	-0.049	-0.049
	[0.064]	[0.060]	[0.062]	[0.061]	[0.064]	[0.063]	[0.062]	[0.062]	[0.064]	[0.068]	[0.070]	[0.070]
Percent of firm belonging to national gov.	0.005**	0.006***	0.005***	0.005***	0.006**	0.006***	0.006**	0.006**	0.006**	0.007***	0.007**	0.007***
	[0.003]	[0.001]	[0.001]	[0.001]	[0.003]	[0.001]	[0.001]	[0.001]	[0.003]	[0.001]	[0.002]	[0.002]
Perceived Preciseness of respondents	0.088	0.06	0.059	0.06	0.078	0.044	0.044	0.046	0.079	0.043	0.047	0.047
	[0.062]	[0.078]	[0.080]	[0.078]	[0.059]	[0.082]	[0.082]	[0.081]	[0.060]	[0.081]	[0.080]	[0.080]
Observations	5260	3997	3905	3905	5602	3997	3996	3996	5511	3997	3905	3905
R-squared	0.816	0.835	0.831		0.818	0.835	0.835		0.814	0.836	0.832	
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Proba>F-equality of coef. test			0.08**				0.28				0.98	

Notes: (i) Exposure Data are based on author's calculations from different sources: Euclidian distances from GISarcmap 10.6 software, Open Street Maps and ACLED conflicts database. (ii) Standard errors between brackets. Errors are clustered by country-region. (iii) * $p<0.1$, ** $p<0.05$, *** $p<0.01$. (iv) Columns 4, 8 and 12 impose on constraint on the coefficients of the regional exposure and closeness to roads to be equal.

Table 10: Impact of Battles and Explosions on Firm Sales with Firms exposure and Infra exposure

	1 LnD.Sales	2 LnD.Sales	3 LnD.Sales	4 LnD.Sales	5 LnD.Sales	6 LnD.Sales	7 LnD.Sales	8 LnD.Sales	9 LnD.Sales
Log of the establishment's total annual sales, FY-2	0.917*** [0.013]	0.916*** [0.012]	0.912*** [0.012]	0.914*** [0.012]	0.914*** [0.012]	0.912*** [0.013]	0.915*** [0.012]	0.914*** [0.012]	0.911*** [0.013]
Change in Closeness to Exposure of all ports to BE n	-0.057** [0.025]		0.548*** [0.059]	0.190* [0.097]	0.208* [0.115]	0.162* [0.086]	0.013 [0.029]	0.026 [0.037]	0.009 [0.029]
Change in Closeness to Exposure of all airports to BE		-0.081** [0.035]	-0.545*** [0.052]				0.013 [0.029]	0.026 [0.037]	0.009 [0.029]
Change in Regional Exposure to BE n-events				-0.288*** [0.103]	-0.273** [0.103]	-0.265*** [0.098]	-0.253** [0.099]	-0.232** [0.102]	-0.226** [0.094]
Change in Closeness to Exp. of all rds to BE n-events				-0.049 [0.089]	-0.045 [0.084]	-0.021 [0.066]	0.047 [0.047]	0.049 [0.046]	0.063 [0.039]
Interact: Closeness to Exposure of prts to BE x M					-0.061 [0.080]	-0.078 [0.086]		0.027 [0.084]	-0.08 [0.084]
Interact: Closeness to Exposure of prts to BE x X						0.202*** [0.073]			0.392** [0.164]
Interact: Closeness to Exposure of airprts to BE x M								-0.092 [0.129]	0.004 [0.122]
Interact: Closeness to Exposure of airprts to BE x X									-0.227 [0.160]
Size	0.071** [0.028]	0.072** [0.029]	0.091*** [0.033]	0.090** [0.034]	0.090** [0.034]	0.088*** [0.031]	0.079** [0.031]	0.081** [0.035]	0.079** [0.032]
Internationally recognized certification	0.045 [0.074]	0.047 [0.074]	0.048 [0.072]	0.058 [0.073]	0.059 [0.075]	0.028 [0.074]	0.057 [0.074]	0.055 [0.076]	0.019 [0.079]
Percent of firm belonging to national government	0 [0.001]	0 [0.001]	0.004*** [0.001]	0.001 [0.002]	0.001 [0.002]	0.003 [0.002]	0 [0.002]	0 [0.002]	0.004** [0.002]
Perceived Preciseness of respondents	0.02 [0.057]	0.025 [0.059]	0.022 [0.060]	0.021 [0.059]	0.022 [0.061]	0.02 [0.060]	0.022 [0.060]	0.021 [0.060]	0.023 [0.060]
Observations	4048	4044	4044	3950	3950	3950	3950	3950	3950
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: (i) Exposure Data are based on author's calculations from different sources: Euclidian distances from GISarcmap 10.6 software, Open Street Maps and ACLED conflicts database. (ii) Standard errors between brackets. Errors are clustered by country-region. (iii) * $p<0.1$, ** $p<0.05$, *** $p<0.01$. (iv) BE stands for battles and explosions, M for importer and X for exporter.

Table 11: Impact of Protests and Riots on Firm Sales with Firms exposure and Infra exposure

	1	2	3	4	5	6	7	8	9
	LnD.Sales	LnD.Sales	LnD.Sales	LnD.Sales	LnD.Sales	LnD.Sales	LnD.Sales	LnD.Sales	LnD.Sales
Log of the establishment's total annual sales, FY-2	0.916***	0.916***	0.916***	0.915***	0.909***	0.909***	0.914***	0.912***	0.912***
	[0.013]	[0.013]	[0.013]	[0.012]	[0.014]	[0.014]	[0.012]	[0.013]	[0.013]
Change in Closeness to Exposure of all prts to PR n-events	-0.143***		0.273	-0.164***	-0.119***	-0.124***	-0.090***	-0.055***	-0.058***
	[0.047]		[0.186]	[0.037]	[0.030]	[0.034]	[0.020]	[0.018]	[0.019]
Change in Closeness to Exposure of all arprts to PR		-0.155***	-0.399**				-0.090***	-0.055***	-0.058***
		[0.050]	[0.193]				[0.020]	[0.018]	[0.019]
Change in Regional Exposure to PR n-events				0.068	0.022	0.023	0.106	0.073	0.075
				[0.198]	[0.189]	[0.185]	[0.199]	[0.185]	[0.181]
Change in Closeness to Exposure of all rds to PR n-events				0.119	0.105	0.102	0.124	0.107	0.104
				[0.090]	[0.077]	[0.080]	[0.088]	[0.078]	[0.080]
Interact: Closeness to Exposure of prts to PR x M					-0.062	-0.063		-0.049	-0.051
					[0.042]	[0.043]		[0.043]	[0.044]
Interact: Closeness to Exposure of prts to PR x X						0.044			0.048
						[0.071]			[0.070]
Interact: Closeness to Exposure of airprts to PR x M								-0.045***	-0.045***
								[0.015]	[0.016]
Interact: Closeness to Exposure of airprts to PR x X									-0.001
									[0.011]
Size	0.070**	0.075**	0.083**	0.066**	0.065**	0.068**	0.068**	0.069**	0.071**
	[0.029]	[0.032]	[0.035]	[0.030]	[0.028]	[0.030]	[0.031]	[0.030]	[0.032]
Internationally recognized certification	0.048	0.05	0.052	0.048	0.055	0.053	0.048	0.055	0.053
	[0.074]	[0.073]	[0.073]	[0.074]	[0.074]	[0.074]	[0.073]	[0.077]	[0.077]
Percent of firm belonging to national government	0	0	0	0	0.001	0.001	0	0.001	0.001
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.002]	[0.001]	[0.001]	[0.002]
Perceived Preciseness of respondents	0.02	0.022	0.023	0.018	0.018	0.018	0.02	0.019	0.019
	[0.058]	[0.059]	[0.062]	[0.059]	[0.061]	[0.061]	[0.060]	[0.062]	[0.061]
Observations	4048	4044	4044	4043	4043	4043	4043	4043	4043
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: (i) Exposure Data are based on author's calculations from different sources: Euclidian distances from GISarcmap 10.6 software, Open Street Maps and ACLED conflicts database. (ii) Standard errors between brackets. Errors are clustered by country-region. (iii) * $p<0.1$, ** $p<0.05$, *** $p<0.01$. (iv) PR stands for battles and explosions, M for importer and X for exporter.

Table 12: Impact of Battles and Explosions on Sales per worker (L.Productivity) with Firms exposure and Infra exposure

	1	2	3	4	5	6	7	8	9
	LnD.Pty	LnD.Pty	LnD.Pty	LnD.Pty	LnD.Pty	LnD.Pty	LnD.Pty	LnD.Pty	LnD.Pty
Log of Sales per full-time permanent employees (lab.p	0.813***	0.812***	0.813***	0.812***	0.812***	0.811***	0.812***	0.809***	0.808***
	[0.017]	[0.017]	[0.017]	[0.017]	[0.018]	[0.018]	[0.017]	[0.019]	[0.019]
Change in Closeness to Exposure of all prts to BE n-events	-0.072***		0.250***	-0.004	0.012	-0.02	-0.061**	-0.047*	-0.060**
	[0.016]		[0.062]	[0.053]	[0.064]	[0.053]	[0.027]	[0.025]	[0.023]
Change in Closeness to Exposure of all arprts to BE		-0.079***	-0.290***				-0.061**	-0.047*	-0.060**
		[0.019]	[0.057]				[0.027]	[0.025]	[0.023]
Change in Regional Exposure to BE n-events				-0.181**	-0.167**	-0.160**	-0.145**	-0.135*	-0.129*
				[0.076]	[0.076]	[0.075]	[0.067]	[0.075]	[0.072]
Change in Closeness to Exposure of all rds to BE n-events				0.037	0.04	0.057	0.110*	0.110**	0.120**
				[0.060]	[0.057]	[0.050]	[0.056]	[0.053]	[0.053]
Interact: Closeness to Exposure of prts to BE x M					-0.054	-0.064		-0.02	-0.084
					[0.065]	[0.067]		[0.086]	[0.083]
Interact: Closeness to Exposure of prts to BE x X						0.135**			0.240**
						[0.061]			[0.104]
Interact: Closeness to Exposure of airprts to BE x M								-0.039	0.017
								[0.094]	[0.090]
Interact: Closeness to Exposure of airprts to BE x X									-0.129
									[0.088]
Size	-0.003	-0.002	0.006	0.003	0.003	0.001	-0.003	-0.005	-0.007
	[0.029]	[0.030]	[0.031]	[0.033]	[0.032]	[0.030]	[0.032]	[0.037]	[0.035]
Internationally recognized certification	-0.062	-0.062	-0.063	-0.055	-0.055	-0.075	-0.056	-0.058	-0.081
	[0.061]	[0.060]	[0.059]	[0.062]	[0.063]	[0.063]	[0.062]	[0.063]	[0.066]
Percent of firm belonging to national government	0.005***	0.006***	0.007***	0.005***	0.006***	0.007***	0.005***	0.006***	0.008***
	[0.001]	[0.001]	[0.002]	[0.001]	[0.002]	[0.002]	[0.001]	[0.001]	[0.002]
Perceived Preciseness of respondents	0.06	0.061	0.059	0.059	0.059	0.058	0.059	0.058	0.058
	[0.078]	[0.079]	[0.079]	[0.080]	[0.080]	[0.080]	[0.080]	[0.082]	[0.081]
Observations	4000	3997	3997	3905	3905	3905	3905	3905	3905
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: (i) Exposure Data are based on author's calculations from different sources: Euclidian distances from GISarcmap 10.6 software, Open Street Maps and ACLED conflicts database. (ii) Standard errors between brackets. Errors are clustered by country-region. (iii) * p<0.1, ** p<0.05, *** p<0.01. (iv) BE stands for battles and explosions, M for importer and X for exporter.

Table 13: Impact of Protests and Riots on Sales per worker (L. Productivity) with Firms exposure and Infra exposure

	1	2	3	4	5	6	7	8	9
	LnD.Pty	LnD.Pty	LnD.Pty	LnD.Pty	LnD.Pty	LnD.Pty	LnD.Pty	LnD.Pty	LnD.Pty
Log of Sales per full-time permanent employees (lab.p	0.812***	0.812***	0.812***	0.812***	0.809***	0.809***	0.812***	0.811***	0.811***
	[0.017]	[0.017]	[0.017]	[0.018]	[0.018]	[0.018]	[0.018]	[0.020]	[0.020]
Change in Closeness to Exp. of all prts to PR n-events	-0.159***		-0.054	-0.203***	-0.177***	-0.180***	-0.104***	-0.084***	-0.086***
	[0.027]		[0.162]	[0.034]	[0.047]	[0.049]	[0.019]	[0.026]	[0.027]
Change in Closeness to Exposure of all arprts to PR		-0.148***	-0.1				-0.104***	-0.084***	-0.086***
		[0.029]	[0.166]				[0.019]	[0.026]	[0.027]
Change in Regional Exposure to PR n-events				0.179	0.151	0.152	0.215	0.193	0.196
				[0.200]	[0.188]	[0.186]	[0.204]	[0.193]	[0.191]
Change in Closeness to Exp. of all rds to PR n-events				0.238**	0.227***	0.226**	0.242**	0.230***	0.229***
				[0.097]	[0.084]	[0.085]	[0.096]	[0.085]	[0.086]
Interact: Closeness to Exposure of prts to PR x M					-0.036	-0.037		-0.017	-0.018
					[0.041]	[0.040]		[0.044]	[0.043]
Interact: Closeness to Exposure of prts to PR x X						0.035			0.03
						[0.058]			[0.056]
Interact: Closeness to Exposure of airprts to PR x M								-0.037**	-0.038**
								[0.017]	[0.017]
Interact: Closeness to Exposure of airprts to PR x X									0.007
									[0.011]
Size	-0.004	0.001	0	-0.014	-0.017	-0.015	-0.012	-0.013	-0.01
	[0.031]	[0.032]	[0.034]	[0.031]	[0.032]	[0.034]	[0.032]	[0.035]	[0.037]
Internationally recognized certification	-0.061	-0.059	-0.06	-0.063	-0.062	-0.063	-0.063	-0.06	-0.061
	[0.061]	[0.061]	[0.061]	[0.060]	[0.060]	[0.060]	[0.060]	[0.061]	[0.061]
Percent of firm belonging to national government	0.005***	0.005***	0.005***	0.006***	0.006***	0.007***	0.006***	0.006***	0.007***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.002]	[0.001]	[0.001]	[0.002]
Perceived Preciseness of respondents	0.058	0.059	0.059	0.053	0.052	0.052	0.055	0.053	0.053
	[0.078]	[0.080]	[0.079]	[0.078]	[0.080]	[0.080]	[0.079]	[0.081]	[0.081]
Observations	4000	3997	3997	3996	3996	3996	3996	3996	3996
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: (i) Exposure Data are based on author's calculations from different sources: Euclidian distances from GISarcmap 10.6 software, Open Street Maps and ACLED conflicts database. (ii) Standard errors between brackets. Errors are clustered by country-region. (iii) * $p<0.1$, ** $p<0.05$, *** $p<0.01$. (iv) PR stands for battles and explosions, M for importer and X for exporter.

7. Conclusion

This paper aims at examining the effect of political events closeness to firms in the MENA region (or the effect of firms 'exposure to political events in the MENA region). The novelty of the paper lies in its identification strategy using geospatial data information: it associates to each firm's location a measure of its exposure to conflictual events overtime. It also aims at linking these events to the locations of the transport infrastructures used by the firms to ship their goods. Thus, using a large dataset from the World Bank Enterprise Surveys, the paper measures how the exposure of the firm to conflicts on one hand, and on the other hand, the exposure of its most likely use of type of transport infrastructure both affect performance variables of the firm during the period of events. Firms' performance was measured by sales and labor productivity. Different types of events (protests and riots; battles and explosion; and violence against civilians) were tackled.

The study's main findings show that at the aggregate levels, exposure to events (whether measured by events onset or fatalities) do not affect firms' performance, with the exception of medium firms' sales. This is why the heterogeneity among different types of events must be taken into consideration. Thus, while battles and explosion negatively affect sales and productivity, violence against civilians and protest and riots do not have a significant impact. Clearly, further research needs to be conducted in order to understand the mechanisms are behind this result. One hypothesis, for instance, is that exposure to violence against civilians' (i.e. terrorism) might be endogenous to firm activity as terrorist attacks target large agglomerations for a better visibility. Another explanation supported by the data is that adjustments costs might have been transmitted to employees through a reduction of their number at the firm level coupled with an increase in the productivity of those who stay in their job.

When firm size is taken into consideration, the effect is mainly observed for small and mid-sized firms, not for large ones. Interestingly, violence against civilians' closeness is positively associated with sales since most of the terrorist attacks target large agglomerations for a better visibility. When it comes to infrastructure exposure to protests and riots, the latter seem to have a negative effect on firm sales when they are located near the ports. It is noteworthy that importers are more negatively affected by such an exposure. In the same vein, the interaction term with importers for airports being prone to protests and riots events, happen to be negative and statistically significant.

From a policy perspective, our research highlights several issues that are important for the MENA region, being one of the regions that experiences various types of conflicts. First, it is clear that firms' performance is chiefly affected through the channel of infrastructure. Obviously, this can lead to undelivered imported and domestic inputs, difficulties in delivering products to both domestic and exports markets and hence disruptions in production. Second, given that the medium firms primarily bear the cost of conflicts, the latter obstruct their expansion and reinforce the missing middle hypothesis. In other words, conflicts negatively affect medium firms' performance

leading to a bimodal distribution of small and large firms on the two extremes. This is why political stability is vital to overcome this issue. Third, as mentioned before, importers of intermediate input bear an additional cost because of their exposure to conflictual events. Thus, political stability is important for the exports' competitiveness of the MENA region since these exports heavily rely on imported inputs. Finally, it is important also to note that, even if conflicts do not last long, they can have long-term impacts on firms since reconstruction of infrastructure is lengthy and very costly.

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Figure A.1.: Map of Conflicts and Infrastructure – Egypt
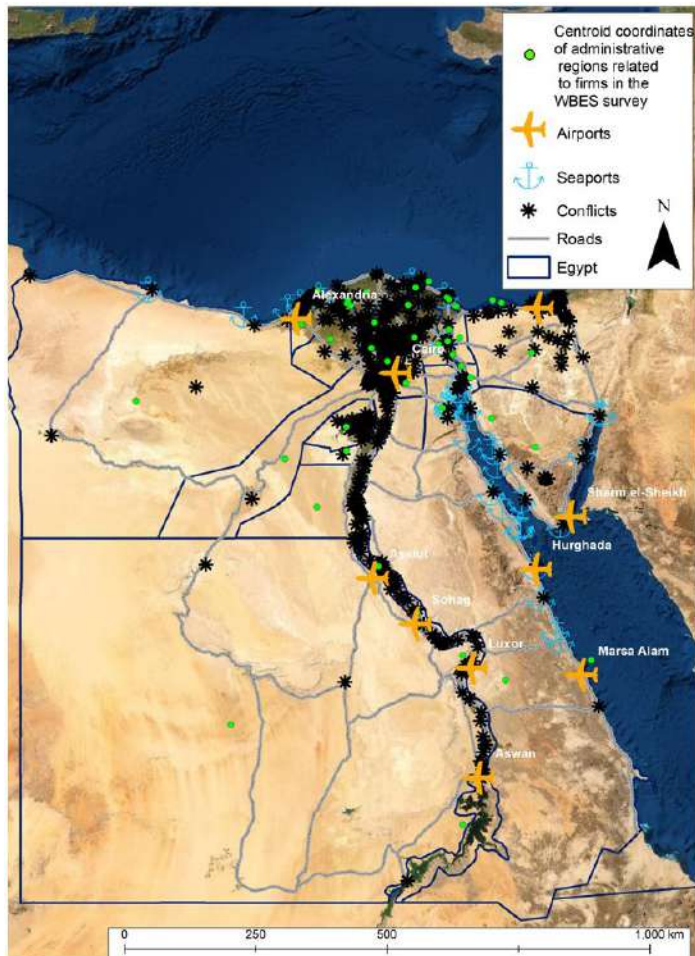
Source: Constructed by the authors using OpenStreetMap and ACLED datasets.

Figure A.2.: Map of Conflicts and Infrastructure – Jordan
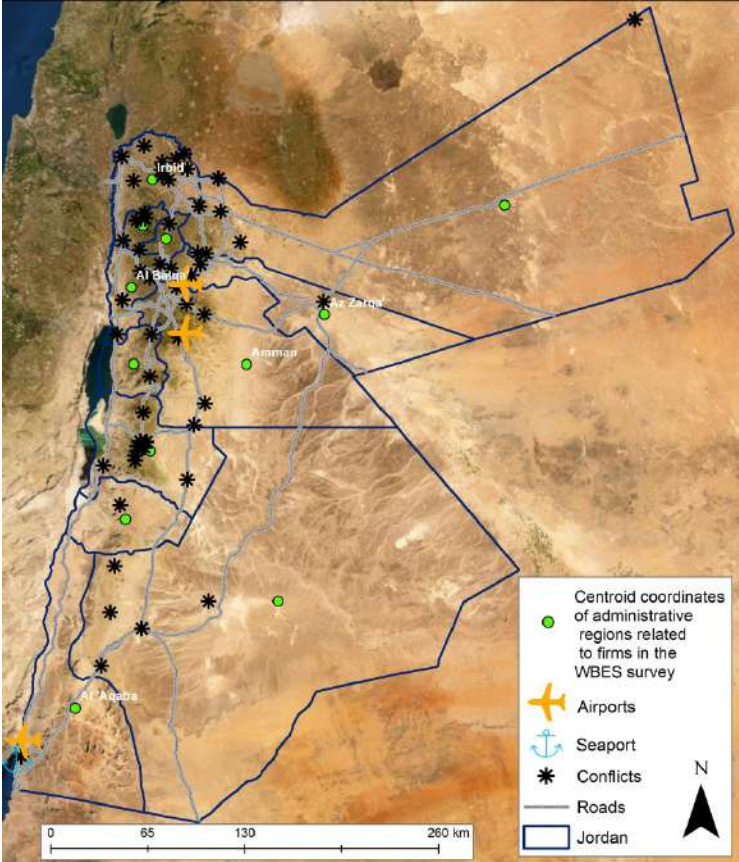
Source: Constructed by the authors using OpenStreetMap and ACLED datasets.

Figure A.3.: Map of Conflicts and Infrastructure – Lebanon
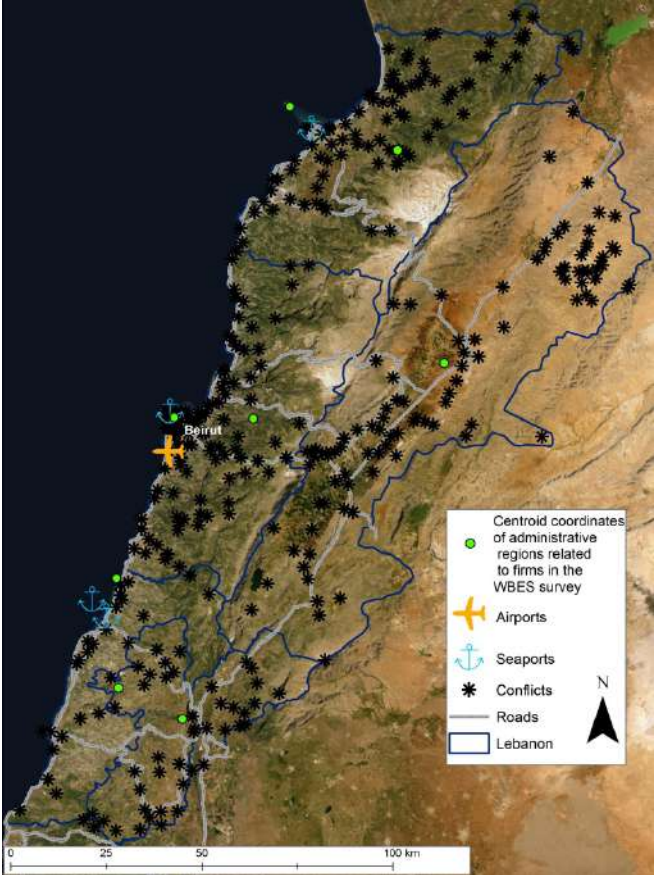
Source: Constructed by the authors using OpenStreetMap and ACLED datasets.

Figure A.4.: Map of Conflicts and Infrastructure – Palestine
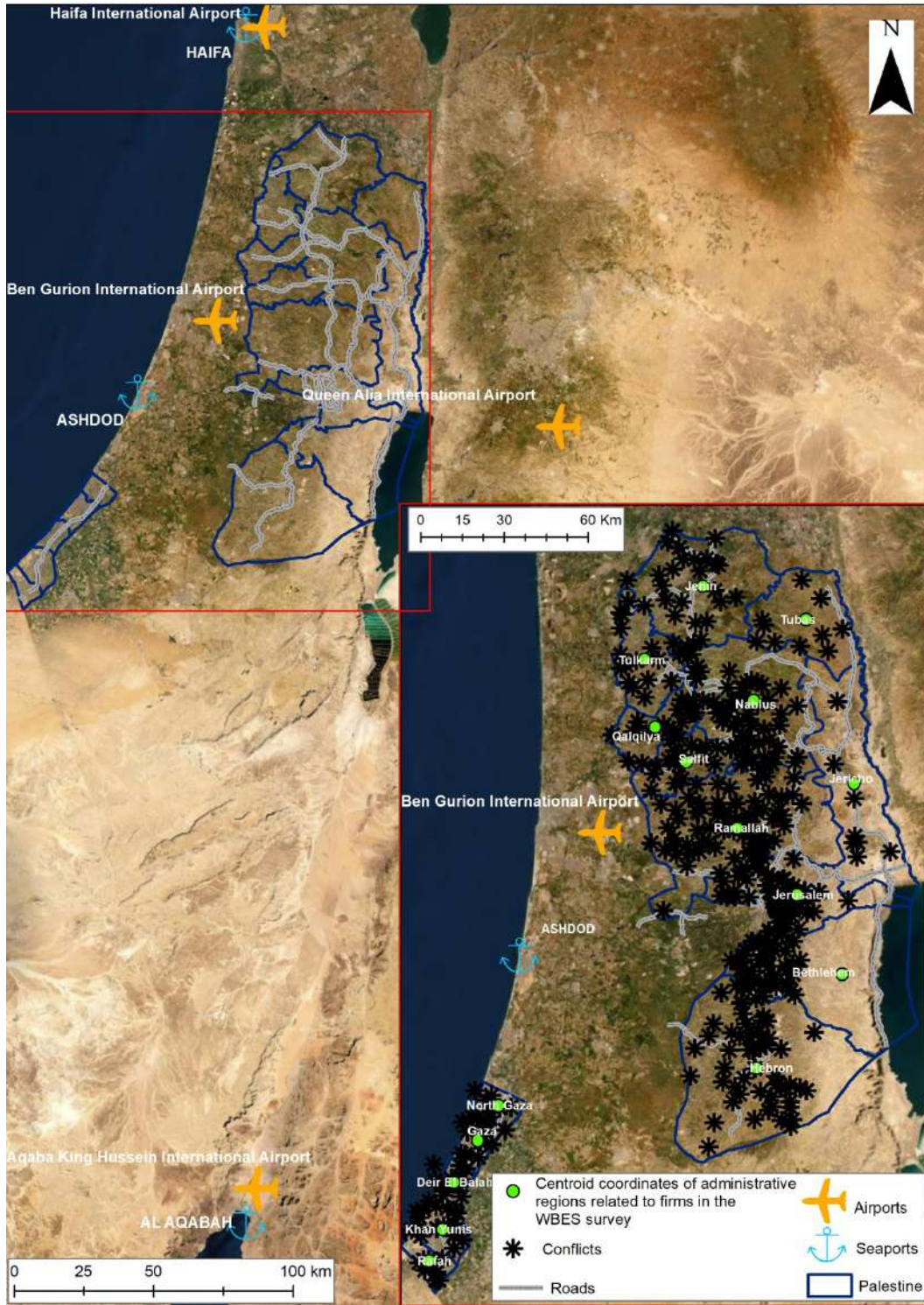
Source: Constructed by the authors using OpenStreetMap and ACLED datasets.

Figure A.5.: Map of Conflicts and Infrastructure – Morocco
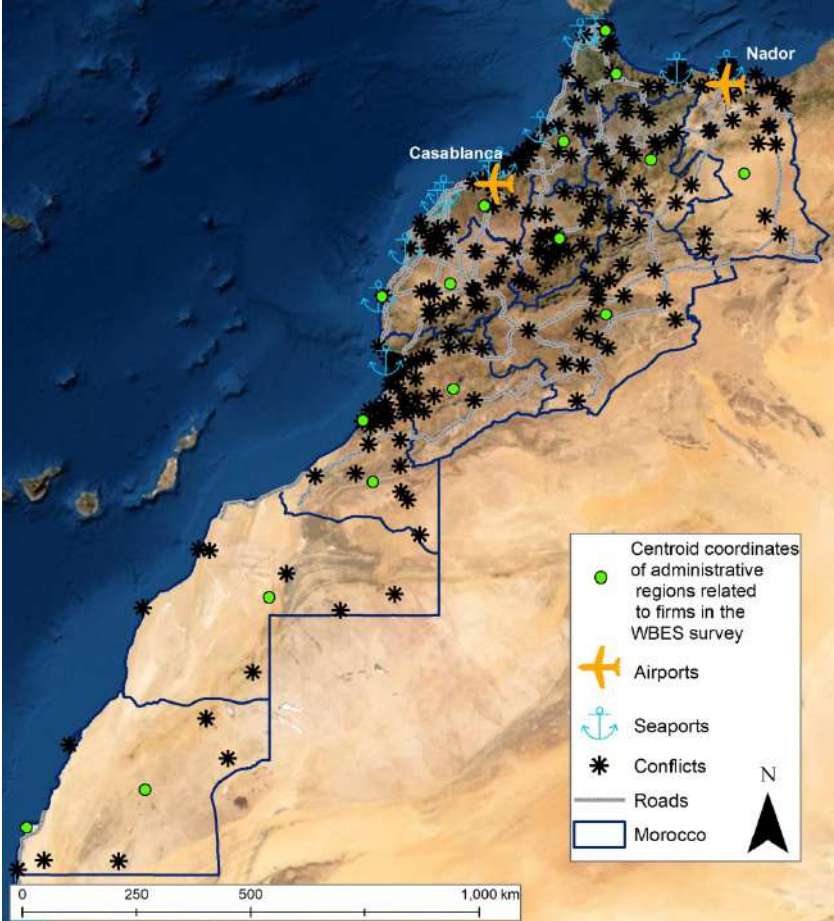
Source: Constructed by the authors using OpenStreetMap and ACLED datasets.

Figure A.6.: Map of Conflicts and Infrastructure – Tunisia
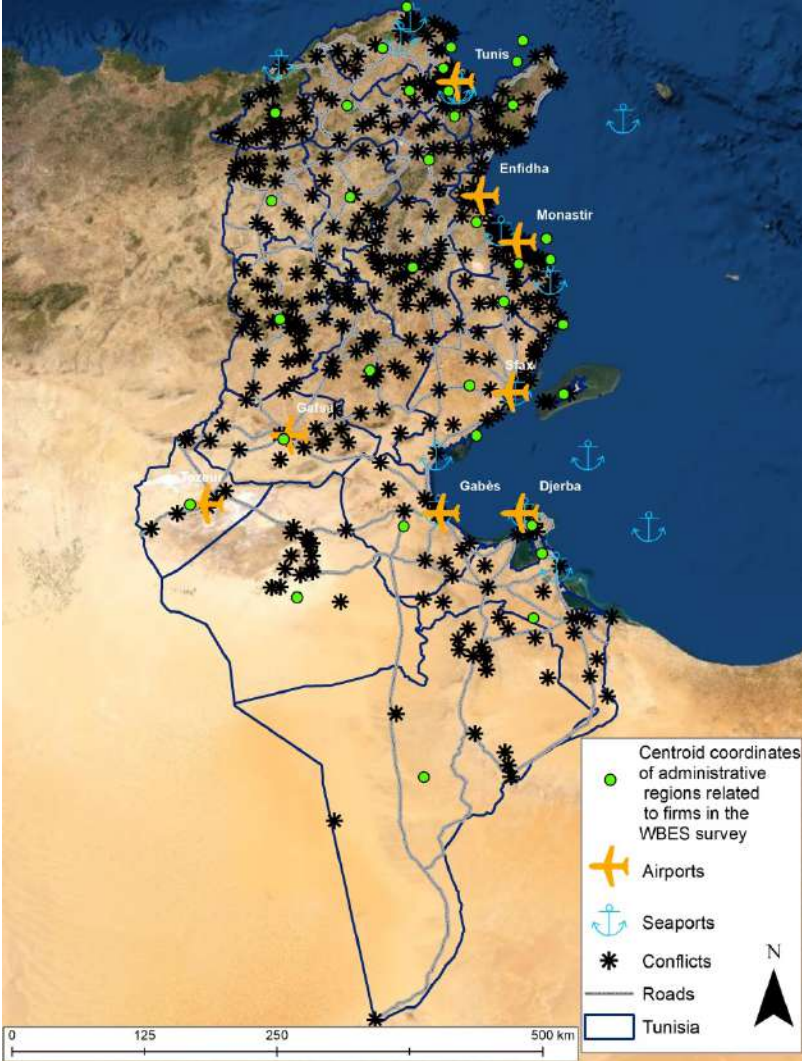
Source: Constructed by the authors using OpenStreetMap and ACLED datasets.

Appendix 2: Descriptive Statistics

Table A.1: Firms distribution by year and country

	2013	2014	2016	2017	2018	2019	Total
EGY	506	2,391	1,162	652	0	0	4,711
JOR	0	0	0	0	0	601	601
LBN	0	0	0	0	0	418	418
MAR	244	163	0	0	1	1,094	1,502
TUN	54	393	0	0	0	0	447
WBG	0	0	0	0	0	348	348
Total	804	2,947	1,162	652	1	2,461	8,027

Source: Constructed by the authors using the World Bank Enterprise Surveys

Table A.2: Descriptive Statistics and Data Sources

Variable	Obs	Mean	Std. Dev.	Min	Max	Source
percent of firm belonging to national government	7822	0.62	6.11	0.00	99.00	WBES
Were Any Of These Material Inputs And Supplies Imported Directly?	3691	1.48	0.50	1.00	2.00	WBES
Direct Exporter status: 1 if exporter ; 0 if else	8027	0.22	0.41	0.00	1.00	WBES
Indirect Exporter status: 1 if indirect exporter ; 0 if else	8027	0.12	0.32	0.00	1.00	WBES
Exporter status: 1 if exporter (direct+indirect); 0 if else)	8027	0.27	0.45	0.00	1.00	WBES
Affiliate or not to a foreign company	8027	0.12	0.32	0.00	1.00	WBES
Does the firm have an internationally recognized certification? Yes 1 Yes, In pr	8027	0.71	0.45	0.00	1.00	WBES
log of the establishment's total annual sales, last FY (t-1)	6941	15.31	2.59	3.91	25.28	WBES
log of the establishment's total annual sales, FY-2 (t-3)	6097	15.33	2.63	1.95	25.19	WBES
log of full-time permanent and temporary employees, last FY (t-1)	7604	3.48	1.45	0.00	9.95	WBES
log of full-time permanent employees, last FY (t-1)	7939	3.39	1.47	0.00	9.95	WBES
log of full-time permanent employees, FY-2 (t-3)	7184	3.42	1.46	0.00	10.60	WBES
Value of Sales per full-time permanent employees (lab.pty), last FY (t-1)	7146	7000000	42000000	-8	1300000000	WBES
log of Sales per full-time permanent employees (lab.pty), last FY (t-1)	6905	11.92	2.17	1.02	20.95	WBES
Value of Sales per full-time permanent employees (lab.pty), last FY (t-3)	6060	8600000	57000000	-8	2700000000	WBES
log of Sales per full-time permanent employees(lab.pty), last FY (t-3)	5990	11.89	2.29	-0.98	21.71	WBES
Total nb of Battles/Explosions during this fiscal Yr	7684	128.29	103.83	1.00	271.00	ACLED
Total nb of Battles/Explosions fatalities during this fiscal Yr	7684	321.57	262.45	0.00	1094.09	ACLED
Total nb of Battles/Explosions during fiscal Yr (t-1)	7521	107.14	91.85	1.00	271.00	ACLED
Total nb of Battles/Explosions during fiscal Yr (t-2)	7521	96.05	101.29	2.00	271.00	ACLED
Total nb of Battles/Explosions during fiscal Yr (t-3)	7630	82.98	95.36	1.00	253.00	ACLED
Regional Exposure to Battles/Explosions events, this fiscal Yr	7684	0.94	1.17	0.00	7.43	ACLED and GIS
Regional Exposure to Battles/Explosions fatalities, this fiscal Yr	7684	2.08	1.74	0.00	8.16	ACLED and GIS
Total nb of Battles/Explosions fatalities fiscal Yr (t-1)	7521	312.23	399.82	0.00	1112.71	ACLED
Total nb of Battles/Explosions fatalities fiscal Yr (t-2)	7521	202.96	287.19	2.00	771.00	ACLED
Total nb of Battles/Explosions fatalities fiscal Yr (t-3)	7630	137.31	171.73	0.00	522.00	ACLED
Regional Exposure to Battles/Explosions events, in fiscal Yr (t-1)	7521	0.94	1.85	0.00	12.64	ACLED and GIS
Regional Exposure to Battles/Explosions events, in fiscal Yr (t-2)	7521	0.76	1.02	0.00	5.50	ACLED and GIS
Regional Exposure to Battles/Explosions events, in fiscal Yr (t-3)	7630	0.72	0.99	0.00	4.50	ACLED and GIS

Regional Exposure to Battles/Explosions fatalities, in fiscal Yr (t-1)	7521	2.04	2.69	0.00	14.91	ACLED and GIS
Regional Exposure to Battles/Explosions fatalities, in fiscal Yr (t-2)	7521	1.49	1.92	0.00	8.07	ACLED and GIS
Regional Exposure to Battles/Explosions fatalities, in fiscal Yr (t-3)	7630	1.32	1.46	0.00	4.94	ACLED and GIS
Total nb of Riots/Protests during this fiscal Yr	8026	190.25	94.75	60.00	293.00	ACLED
Total nb of Riots/Protests fatalities during this fiscal Yr	8026	37.85	79.82	0.00	443.00	ACLED
Total nb of Riots/Protests during fiscal Yr (t-1)	8026	167.12	77.67	43.00	293.00	ACLED
Total nb of Riots/Protests during fiscal Yr (t-2)	8026	153.40	61.52	31.00	286.00	ACLED
Total nb of Riots/Protests during fiscal Yr (t-3)	8026	162.96	88.58	9.00	286.00	ACLED
Regional Exposure to Riots/Protests events, this fiscal Yr	8026	2.34	3.72	0.13	38.02	ACLED and GIS
Regional Exposure to Riots/Protests fatalities, this fiscal Yr	8026	2.50	3.78	0.13	38.02	ACLED and GIS
Total nb of Riots/Protests fatalities during fiscal Yr (t-1)	8026	25.28	53.92	0.00	443.00	ACLED
Total nb of Riots/Protests fatalities during fiscal Yr (t-2)	8026	45.79	57.85	0.00	199.27	ACLED
Total nb of Riots/Protests fatalities during fiscal Yr (t-3)	8026	53.88	63.05	0.00	205.14	ACLED
Regional Exposure to Riots/Protests events, in fiscal Yr (t-1)	8026	2.26	3.56	0.14	28.85	ACLED and GIS
Regional Exposure to Riots/Protests events, in fiscal Yr (t-2)	8026	2.33	4.58	0.14	43.87	ACLED and GIS
Regional Exposure to Riots/Protests events, in fiscal Yr (t-3)	8026	2.06	3.00	0.02	22.47	ACLED and GIS
Regional Exposure to Riots/Protests fatalities, in fiscal Yr (t-1)	8026	2.39	3.61	0.14	28.85	ACLED and GIS
Regional Exposure to Riots/Protests fatalities, in fiscal Yr (t-2)	8026	2.66	4.67	0.14	43.87	ACLED and GIS
Regional Exposure to Riots/Protests fatalities, in fiscal Yr (t-3)	8026	2.39	3.18	0.03	22.47	ACLED and GIS
Total nb of Violence against civilians during this fiscal Yr	7928	53.06	46.36	2.00	194.00	ACLED
Total nb of fatalities from Violence against civilians during this fiscal Yr	7928	45.14	50.89	0.00	303.73	ACLED
Total nb of Violence against civilians during fiscal Yr (t-1)	7928	60.37	43.13	2.00	145.00	ACLED
Total nb of Violence against civilians during fiscal Yr (t-2)	7928	52.40	46.84	1.00	146.00	ACLED
Total nb of Violence against civilians during fiscal Yr (t-3)	7928	40.57	40.61	1.00	183.00	ACLED
Regional Exposure to Violence against civilians events, this fiscal Yr	7928	0.64	1.22	0.01	7.56	ACLED and GIS
Regional Exposure to Violence against civilians fatalities, this fiscal Yr	7928	0.75	1.26	0.01	7.56	ACLED and GIS
Total nb of fatalities from Violence against civilians during fiscal Yr (t-1)	7928	81.60	115.94	0.00	306.00	ACLED
Total nb of fatalities from Violence against civilians during fiscal Yr (t-2)	7928	41.77	51.88	0.00	147.00	ACLED
Total nb of fatalities from Violence against civilians during fiscal Yr (t-3)	7928	48.45	39.73	0.00	106.00	ACLED
Regional Exposure to Violence against civilians events, in fiscal Yr (t-1)	7928	0.75	1.14	0.01	7.29	ACLED and GIS
Regional Exposure to Violence against civilians events, in fiscal Yr (t-2)	7928	0.62	1.07	0.00	6.58	ACLED and GIS
Regional Exposure to Violence against civilians events, in fiscal Yr (t-3)	7928	0.63	1.58	0.00	10.53	ACLED and GIS

Regional Exposure to Violence against civilians fatalities, in fiscal Yr (t-1)	7928	1.05	1.37	0.01	7.81	ACLED and GIS
Regional Exposure to Violence against civilians fatalities, in fiscal Yr (t-2)	7928	0.75	1.11	0.00	6.60	ACLED and GIS
Regional Exposure to Violence against civilians fatalities, in fiscal Yr (t-3)	7928	0.86	1.61	0.00	10.76	ACLED and GIS
Total nb of ALL conflicts fatalities during fiscal Yr (t-1)	8027	400.04	511.87	0.00	1423.57	ACLED
Total nb of ALL conflicts fatalities during fiscal Yr (t-2)	8027	285.75	331.46	0.00	955.00	ACLED
Total nb of ALL conflicts fatalities during fiscal Yr (t-3)	8027	236.32	236.94	0.00	739.27	ACLED
Total nb of ALL conflicts events during this fiscal Yr	8027	422.24	244.05	88.00	805.00	ACLED
Total nb of ALL conflicts fatalities during this fiscal Yr	8027	394.23	345.08	3.00	1404.64	ACLED
Total nb of ALL conflicts events during fiscal Yr (t-1)	8027	366.95	213.63	59.00	772.00	ACLED
Total nb of ALL conflicts events during fiscal Yr (t-2)	8027	336.73	211.13	47.00	720.00	ACLED
Total nb of ALL conflicts events during fiscal Yr (t-3)	8027	321.80	242.77	15.00	720.00	ACLED
Regional Exposure to ALL conflicts events, this fiscal Yr	8027	4.80	8.11	0.20	81.22	ACLED and GIS
Regional Exposure to ALL conflicts fatalities, this fiscal Yr	8027	6.18	8.22	0.20	81.24	ACLED and GIS
Regional Exposure to ALL conflicts events, in fiscal Yr (t-1)	8027	4.47	6.59	0.15	36.05	ACLED and GIS
Regional Exposure to ALL conflicts events, in fiscal Yr (t-2)	8027	4.30	6.71	0.15	53.29	ACLED and GIS
Regional Exposure to ALL conflicts events, in fiscal Yr (t-3)	8027	3.87	5.27	0.03	26.81	ACLED and GIS
Regional Exposure to ALL conflicts fatalities, in fiscal Yr (t-1)	8027	5.95	7.23	0.15	38.59	ACLED and GIS
Regional Exposure to ALL conflicts fatalities, in fiscal Yr (t-2)	8027	5.51	7.19	0.15	55.56	ACLED and GIS
Regional Exposure to ALL conflicts fatalities, in fiscal Yr (t-3)	8027	5.03	5.71	0.06	28.35	ACLED and GIS
Closeness to Airports, at exposure to Battle/Exp events, in fiscal Yr (t-1)	5740	0.01	0.02	0.00	0.19	ACLED and GIS
Closeness to Airports, at exposure to Battle/Exp fatalities, in fiscal Yr (t-1)	5740	0.03	0.04	0.00	0.20	ACLED and GIS
Closeness to Airports, at exposure to Battle/Exp events, in fiscal Yr (t-2)	5740	0.02	0.04	0.00	0.34	ACLED and GIS
Closeness to Airports, at exposure to Battle/Exp fatalities, in fiscal Yr (t-2)	5740	0.04	0.08	0.00	0.75	ACLED and GIS
Closeness to Airports, at exposure to Battle/Exp events, in fiscal Yr (t-3)	5740	0.02	0.04	0.00	0.40	ACLED and GIS
Closeness to Airports, at exposure to Battle/Exp fatalties, in fiscal Yr (t-3)	5740	0.03	0.07	0.00	0.60	ACLED and GIS
Closeness to Airports, at exposure to riots/protests events, in fiscal Yr (t-1)	5740	0.09	0.11	0.01	0.99	ACLED and GIS
Closeness to Airports, at exposure to riots/protests fatalities, in fiscal Yr (	5740	0.11	0.15	0.01	0.99	ACLED and GIS
Closeness to Airports, at exposure to riots/protests events, in fiscal Yr (t-2)	5740	55.12	275.15	0.01	2496.11	ACLED and GIS
Closeness to Airports, at exposure to riots/protests fatalies, in fiscal Yr (t-	5740	55.13	275.14	0.01	2496.11	ACLED and GIS
Closeness to Airports, at exposure to riots/protests events, in fiscal Yr (t-3)	5740	55.15	275.14	0.00	2496.07	ACLED and GIS
Closeness to Airports, at exposure to riots/protests fatalies, in fiscal Yr (t-	5740	55.24	275.12	0.00	2496.07	ACLED and GIS

Closeness to Airports, at exposure to Violence against civilians events, in fisc	5740	0.01	0.01	0.00	0.03	ACLED and GIS
Closeness to Airports, at exposure to Violence against civilians fatalities, in	5740	0.01	0.01	0.00	0.03	ACLED and GIS
Closeness to Airports, at exposure to Violence against civilians events, in fis	5740	0.01	0.01	0.00	0.08	ACLED and GIS
Closeness to Airports, at exposure to Violence against civilians fatalties, in f	5740	0.01	0.01	0.00	0.08	ACLED and GIS
Closeness to Airports, at exposure to Violence against civilians events, in	5740	0.01	0.01	0.00	0.06	ACLED and GIS
Closeness to Airports, at exposure to Violence against civilians fatalties, in f	5740	0.01	0.01	0.00	0.07	ACLED and GIS
Closeness to Ports, at exposure to Battle events, in fiscal Yr (t-1)	5751	0.02	0.05	0.00	0.40	ACLED and GIS
Closeness to Ports, at exposure to Battle fatalities, in fiscal Yr (t-1)	5751	0.03	0.05	0.00	0.41	ACLED and GIS
Closeness to Ports, at exposure to Battle events, in fiscal Yr (t-2)	5751	0.02	0.07	0.00	0.60	ACLED and GIS
Closeness to Ports, at exposure to Battle fatalities, in fiscal Yr (t-2)	5751	0.04	0.14	0.00	1.25	ACLED and GIS
Closeness to Ports, at exposure to Battle events, in fiscal Yr (t-3)	5751	0.02	0.07	0.00	0.63	ACLED and GIS
Closeness to Ports, at exposure to Battle fatalties, in fiscal Yr (t-3)	5751	0.03	0.11	0.00	0.95	ACLED and GIS
Closeness to Ports, at exposure to riots events, in fiscal Yr (t-1)	5751	0.10	0.57	0.00	5.87	ACLED and GIS
Closeness to Ports, at exposure to riots fatalities, in fiscal Yr (t-1)	5751	0.11	0.57	0.00	5.87	ACLED and GIS
Closeness to Ports, at exposure to riots events, in fiscal Yr (t-2)	5751	0.10	0.61	0.00	6.27	ACLED and GIS
Closeness to Ports, at exposure to riots fatalties, in fiscal Yr (t-2)	5751	0.11	0.61	0.00	6.27	ACLED and GIS
Closeness to Ports, at exposure to riots events, in fiscal Yr (t-3)	5751	0.10	0.54	0.00	5.58	ACLED and GIS
Closeness to Ports, at exposure to riots fatalties, in fiscal Yr (t-3)	5751	0.14	0.54	0.00	5.58	ACLED and GIS
Closeness to Ports, at exposure to Violence against civilians events, in fiscal	5751	0.01	0.01	0.00	0.15	ACLED and GIS
Closeness to Ports, at exposure to Violence against civilians fatalities, in fi	5751	0.01	0.01	0.00	0.15	ACLED and GIS
Closeness to Ports, at exposure to Violence against civilians events, in fiscal	5751	0.00	0.01	0.00	0.08	ACLED and GIS
Closeness to Ports, at exposure to Violence against civilians fatalities, in fisc	5751	0.01	0.01	0.00	0.09	ACLED and GIS
Closeness to Ports, at exposure to Violence against civilians events, in fiscal	5751	0.00	0.01	0.00	0.12	ACLED and GIS
Closeness to Ports, at exposure to Violence against civilians fatalities, in fisc	5751	0.01	0.01	0.00	0.14	ACLED and GIS
Closeness to Main Roads, at exposure to Battle/Exp events, in fiscal Yr (t-1)	5740	0.03	0.08	0.00	0.36	ACLED and GIS
Closeness to Main Roads, at exposure to Battle/Exp fatalities, in fiscal Yr (t-	5740	0.04	0.08	0.00	0.40	ACLED and GIS
Closeness to Main Roads, at exposure to Battle/Exp events, in fiscal Yr (t-2)	5740	0.03	0.08	0.00	0.48	ACLED and GIS
Closeness to Main Roads, at exp. to Battle/Exp fatalities, in fiscal Yr (t-2)	5740	0.06	0.14	0.00	0.86	ACLED and GIS
Closeness to Main Roads, at exposure to Battle/Exp events, in fiscal Yr (t-3)	5740	0.03	0.09	0.00	0.47	ACLED and GIS
Closeness to Main Roads, at exp. to Battle/Exp fatalities, in fiscal Yr (t-3)	5740	0.05	0.12	0.00	0.67	ACLED and GIS
Closeness to Main Roads, at exp. to riots/protests events, in fiscal Yr (t-1	5740	0.14	0.38	0.00	2.79	ACLED and GIS

Closeness to Main Roads, at exposure to riots/protests fatalities, in fiscal Yr	5740	0.14	0.39	0.00	2.79	ACLED and GIS
Closeness to Main Roads, at exposure to riots/protests events, in fiscal Yr (t-	5740	0.20	0.48	0.01	3.77	ACLED and GIS
Closeness to Main Roads, at exp. to riots/protests fatalties, in fiscal Yr (	5740	0.22	0.48	0.01	3.77	ACLED and GIS
Closeness to Main Roads, at exp. to riots/protests events, in fiscal Yr (t-3	5740	0.14	0.29	0.00	2.55	ACLED and GIS
Closeness to Main Roads, at exposure to riots/protests fatalities, in fiscal Yr (	5740	0.15	0.29	0.00	2.55	ACLED and GIS
Closeness to Main Roads, at exp. to Violence against civilians events, in fi	5740	0.02	0.04	0.00	0.20	ACLED and GIS
Closeness to Main Roads, at exposure to Violence against civilians fatalities,	5740	0.02	0.04	0.00	0.21	ACLED and GIS
Closeness to Main Roads, at exp. to Violence against civilians events, in f	5740	0.02	0.05	0.00	0.21	ACLED and GIS
Closeness to Main Roads, at exp. to Violence against civilians fatalties, in	5740	0.02	0.05	0.00	0.21	ACLED and GIS
Closeness to Main Roads, at exp. to Violence against civilians events, in fi	5740	0.02	0.06	0.00	0.29	ACLED and GIS
Closeness to Main Roads, at exp. to Violence against civilians fatalties, in	5740	0.03	0.06	0.00	0.29	ACLED and GIS

Appendix 3: Employment Results

Table A.3.: Impact of Direct exposure to all events on Employment

	1 LnD.Emp All	2 LnD.Emp Small	3 LnD.Emp Medium	4 LnD.Emp Large	5 LnD.Emp All	6 LnD.Emp Small	7 LnD.Emp Medium	8 LnD.Emp Large
Log of full-time permanent employees, FY-2 (t-3)	0.912***	0.898***	0.940***	0.955***	0.912***	0.898***	0.940***	0.955***
	[0.014]	[0.015]	[0.030]	[0.013]	[0.014]	[0.015]	[0.030]	[0.012]
Ch.in Regional Exposure to ALL events	**0.006**	**0.007**	**-0.058**	**0.012**				
	[0.022]	**[0.024]**	**[0.089]**	**[0.029]**				
Ch. in Regional Exposure to ALL fat.events					**-0.002**	**0.001**	**-0.068**	**0.008**
					[0.026]	**[0.028]**	**[0.066]**	**[0.030]**
Size	0.114***				0.113***			
	[0.025]				[0.025]			
Internationally recognized certification	0.080*	0.125**	0.007	0.051	0.080*	0.125**	0.004	0.053
	[0.047]	[0.054]	[0.038]	[0.051]	[0.047]	[0.054]	[0.040]	[0.051]
Percent of firm belonging to national government	-0.003	-0.003	0.001	-0.001	-0.003	-0.003	0.001	-0.001
	[0.002]	[0.002]	[0.001]	[0.001]	[0.002]	[0.002]	[0.001]	[0.001]
Perceived Preciseness of respondents	0.045*	0.066**	-0.039	-0.032	0.045*	0.066**	-0.036	-0.032
	[0.023]	[0.030]	[0.029]	[0.024]	[0.024]	[0.030]	[0.030]	[0.024]
Observations	6820	3045	2054	1721	6820	3045	2054	1721
R-squared	0.893	0.85	0.888	0.944	0.893	0.85	0.888	0.944
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Exposure Data are based on author's calculations from different sources: Euclidian distances from GISarcmap 10.6 software, Open Street Maps and ACLED conflicts database

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.4.: Impact of Direct exposure to events of different types on Employment – Exposure to Events

	1	2	3	4	5	6	7
	LnD.Emp	LnD.Emp	LnD.Emp	LnD.Emp	LnD.Emp	LnD.Emp	LnD.Emp
	BE	PR	V	All	Small	Medium	Large
Log of full-time permanent employees, FY-2 (t-3)	0.918***	0.912***	0.911***	0.917***	0.904***	0.940***	0.950***
	[0.014]	[0.014]	[0.014]	[0.014]	[0.014]	[0.029]	[0.012]
Change in Regional Exposure to BE n-events	**-0.016**			**-0.002**	**-0.017**	**0.082*****	**-0.028**
	[0.024]			**[0.023]**	**[0.026]**	**[0.027]**	**[0.031]**
Change in Regional Exposure to PR n-events		**0.004**		**-0.097***	**-0.098**	**-0.250*****	**0.1**
		[0.019]		**[0.058]**	**[0.068]**	**[0.046]**	**[0.088]**
Change in Regional Exposure to V n-events			**0.021**	**0.093**	**0.102**	**0.059**	**0.090****
			[0.013]	**[0.065]**	**[0.073]**	**[0.054]**	**[0.044]**
Size	0.114***	0.114***	0.112***	0.115***			
	[0.026]	[0.025]	[0.025]	[0.026]			
Internationally recognized certification	0.074	0.080*	0.082*	0.078	0.123**	0.014	0.051
	[0.047]	[0.047]	[0.047]	[0.047]	[0.054]	[0.035]	[0.052]
Percent of firm belonging to national government	-0.003	-0.003	-0.003	-0.003	-0.004*	0.001	-0.001
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.001]	[0.001]
Perceived Preciseness of respondents	0.042*	0.045*	0.045*	0.043*	0.066**	-0.04	-0.007
	[0.024]	[0.023]	[0.023]	[0.024]	[0.032]	[0.027]	[0.027]
Constant	-0.063	-0.039	-0.06	-0.163	-0.101	0.316**	0.208**
	[0.094]	[0.091]	[0.095]	[0.130]	[0.150]	[0.127]	[0.094]
Observations	6436	6819	6724	6435	2812	2007	1616
R-squared	0.898	0.893	0.893	0.899	0.862	0.89	0.945
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Exposure Data are based on author's calculations from different sources: Euclidian distances from GISarcmap 10.6 software, Open Street Maps and ACLED conflicts database

* $p<0.1$, ** $p<0.05$, *** $p<0.01$

Table A.5.: Impact of Direct exposure to events of different types on Employment – Fatalities of Events

	1	2	3	4	5	6	7
	LnD.Emp	LnD.Emp	LnD.Emp	LnD.Emp	LnD.Emp	LnD.Emp	LnD.Emp
	BE	PR	V	All	Small	Medium	Large
Log of full-time permanent employees, FY-2 (t-3)	0.918***	0.912***	0.911***	0.918***	0.904***	0.943***	0.950***
	[0.014]	[0.014]	[0.014]	[0.014]	[0.014]	[0.029]	[0.012]
Change in Regional Exposure to BE f-events	**-0.028**			**-0.034***	**-0.046****	**0.045**	**-0.043***
	[0.018]			**[0.020]**	**[0.021]**	**[0.028]**	**[0.025]**
Change in Regional Exposure to PR f-events		**0.006**		**-0.024**	**-0.015**	**-0.134****	**0.108****
		[0.019]		**[0.056]**	**[0.065]**	**[0.050]**	**[0.043]**
Change in Regional Exposure to V f-events			**0.018**	**0.041**	**0.072****	**-0.047**	**0.051**
			[0.011]	**[0.027]**	**[0.030]**	**[0.029]**	**[0.043]**
Size	0.113***	0.114***	0.113***	0.115***			
	[0.026]	[0.025]	[0.025]	[0.026]			
Internationally recognized certification	0.073	0.080*	0.082*	0.075	0.120**	0.011	0.057
	[0.047]	[0.047]	[0.047]	[0.046]	[0.053]	[0.038]	[0.054]
Percent of firm belonging to national government	-0.003	-0.003	-0.003	-0.003	-0.004*	0.001	-0.001
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.001]	[0.001]
Perceived Preciseness of respondents	0.044*	0.045*	0.045*	0.045*	0.069**	-0.036	-0.009
	[0.025]	[0.023]	[0.023]	[0.024]	[0.031]	[0.028]	[0.026]
Constant	-0.062	-0.038	-0.054	-0.109	-0.061	0.386***	0.273***
	[0.095]	[0.091]	[0.091]	[0.083]	[0.091]	[0.135]	[0.094]
Observations	6436	6819	6724	6435	2812	2007	1616
R-squared	0.899	0.893	0.893	0.899	0.862	0.889	0.945
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Exposure Data are based on author's calculations from different sources: Euclidian distances from GISarcmap 10.6 software, Open Street Maps and ACLED conflicts database

* p<0.1, ** p<0.05, *** p<0.01

Table A.6.: Impact on Employment, of direct exposure of firms and exposure via Unsafe Major Roads and Highways

	Battles and Explosions				Protests and Riots				Violence against Civilians			
	Dir. Exp.	Road Exp.	Both.	Same coeff.	Dir. Exp.	Road Exp.	Both.	Same coeff.	Dir. Exp.	Road Exp.	Both.	Same coeff.
log of full-time perm. Emp. FY-2 (t-3)	0.918***	0.926***	0.926***	0.926***	0.912***	0.928***	0.928***	0.929***	0.911***	0.927***	0.927***	0.928***
	[0.014]	[0.012]	[0.013]	[0.012]	[0.014]	[0.012]	[0.012]	[0.012]	[0.014]	[0.012]	[0.012]	[0.012]
Change in Regional Ex. to n-events	-0.016		-0.061	-0.011	0.004		-0.177**	-0.086***	0.021		-0.044	-0.033**
	[0.024]		[0.071]	[0.007]	[0.019]		[0.081]	[0.016]	[0.013]		[0.068]	[0.015]
Change in Closeness to Exp. of all rds to event		-0.014	0.016	-0.011		-0.093***	-0.047	-0.086***		-0.031**	-0.030*	-0.033**
		[0.009]	[0.032]	[0.007]		[0.017]	[0.032]	[0.016]		[0.014]	[0.016]	[0.015]
Size	0.114***	0.080***	0.081***	0.081***	0.114***	0.082***	0.081***	0.082***	0.112***	0.082***	0.081***	0.081***
	[0.026]	[0.021]	[0.021]	[0.021]	[0.025]	[0.021]	[0.021]	[0.021]	[0.025]	[0.021]	[0.020]	[0.021]
Internationally recognized certification	0.074	0.075	0.077	0.075	0.080*	0.073	0.078	0.075	0.082*	0.072	0.072	0.072
	[0.047]	[0.048]	[0.048]	[0.048]	[0.047]	[0.047]	[0.047]	[0.047]	[0.047]	[0.048]	[0.047]	[0.047]
Percent of firm belonging to national gov	-0.003	-0.004***	-0.004***	-0.004***	-0.003	-0.004***	-0.004***	-0.004***	-0.003	-0.004***	-0.004***	-0.004***
	[0.002]	[0.001]	[0.001]	[0.001]	[0.002]	[0.001]	[0.001]	[0.001]	[0.002]	[0.001]	[0.001]	[0.001]
Perceived Preciseness of respondents	0.042*	0.012	0.011	0.012	0.045*	0.012	0.009	0.011	0.045*	0.011	0.01	0.01
	[0.024]	[0.020]	[0.019]	[0.020]	[0.023]	[0.020]	[0.020]	[0.020]	[0.023]	[0.020]	[0.020]	[0.020]
Observations	6436	4976	4880	4880	6819	4976	4975	4975	6724	4976	4880	4880
R-squared	0.898	0.9	0.9		0.893	0.9	0.9		0.893	0.9	0.9	
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Proba>F-equality of coef. test			0.45				0.23				0.85	

Notes: (i) Exposure Data are based on author's calculations from different sources: Euclidian distances from GISarcmap 10.6 software, Open Street Maps and ACLED conflicts database (ii) * p<0.1, ** p<0.05, *** p<0.01