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Abstract

In this article, we use Fixed Effect Poisson Regression (FEPR) with robust standard errors, to study the economic, social, and institutional determinants of internal conflict in 58 fragile states over the period 2004 to 2017. We show that effective institutions (measured by judicial effectiveness) and higher incomes can help reduce conflict in these countries. By contrast, democracy does not seem to mitigate violence, with democratic experiences generally showing an increase in conflicts in fragile countries. It also appears that human capacity development does not contribute to conflict reduction. This implies that fragile states must first improve the social, economic, and institutional conditions of their population before they can reap the benefits of political reforms and of education. The same is true for economic reforms in the context of globalization, which also do not seem to help reduce violence in fragile countries.

Keywords

Conflict, Fragile States, Economic Reforms, Education, Democracy, Institutions.

JEL Codes

C23, D74, O10.

1. Introduction

Over the past decade, the Uppsala Conflict Data Program (UCDP) has recorded an upward trend of violence in the world. The number of armed conflicts increased from 33 in 2006 to 49 in 2016. The number of terrorist actions reached a peak in 2014, with the death of more than 100,000 people that year (Allansson et al, 2017). In addition to human suffering, civil strife causes considerable damage to economies due to its negative effects on infrastructure, public spending, political stability, foreign direct investment, trade, and growth. As a result, while extreme poverty is declining worldwide, it is increasing in fragile countries affected by conflicts (World Bank, 2018). Conflicts also have a destabilizing effect on neighboring countries, with political instability in a country threatening the stability of the entire region (Teydas et al, 2011). Civil unrest in Syria, for example, has led many other states and international organizations to participate directly in the conflict. If left unchecked, nearly half of the world's poor will live in fragile countries facing conflict situations by 2030 (World Bank, 2018), and the expansion of armed conflict around the world will cause more harm to populations (Pettersson et al, 2019).

Several studies have suggested that armed conflict and terrorism¹ occur in fragile countries which have poor social, economic, and political conditions (World Bank, 2011 and 2018). Collier (2007) states that “seventy-three percent of people of the bottom billion have recently been through a civil war or are still in one”. Stewart (2002) notes that most of the economies with the lowest level of human development have been confronted with civil wars over the last three decades. Ostby (2008) shows that poverty, inequality, and dependence on natural resources are at the root of most conflicts in the world. Lai (2007) states that low income levels and high income inequality are positively associated with terrorism. Countries with fragile political conditions are also more vulnerable to domestic violence. Coggins (2015) found that political collapse has a positive correlation with terrorism. Newman (2007) and Piazza (2008) confirm that it is easier for terrorist groups to establish their organizations in failed states.

However, economic growth and wealth are not always a source of peace and non-violence in fragile countries, as Caruso and Schneider (2011) explain in their theory of “immiserizing modernization”. When growth changes the distribution of wealth, as described by Olson (1963), it can lead to social and political unrest fueled by groups of people who lose from the change. If perceived as a threat, economic reforms may lead to unrest as well, as explained by Freytag et al (2011) for globalization. Gur (1970) confirms that when individuals feel economically disadvantaged, they may be willing to fight to change their situation. When inequalities create grievances among the poor, recruiting them to fight the government, in the hope of a better life, becomes easy for terrorist organizations.

Rational Choice theory provides an explanation for the emergence of civil conflicts in fragile countries by suggesting that human actions are based on the “calculation of risk, cost and incentive” (Teydas et al, 2011). Wintrobe (2006) assumes that extremists are rational and choose the best way to achieve their goal. Becker (1968) argues that individuals commit a crime if the expected benefits outweigh the costs. Caplan (2006) suggests that terrorist activities are the product of a cost-benefit analysis. The benefits derived from these activities are increased power and wealth. Similarly, the “opportunity-based approach” indicates that the most important factor in becoming a rebel is the expectation of personal gain or reward (Teydas et al, 2011). Collier and Hoeffler (2004) argue that “rebellion can occur when lost

¹ Conflict and terrorism are used interchangeably in this article.

income is low". Freytag et al (2011) suggest that if the opportunity cost of terror is high, people will choose material wealth rather than mental reward.

In this study, we explore the social, economic, and institutional determinants of conflict in 58 fragile countries. The goal is to identify the explanatory factors of violence so that governments can reduce the sources of instability. The literature shows that countries with poor economic, social, and political conditions are more exposed to the risk of conflict. It may be thought that governments counter these risks by improving the standard of living of the population. Freytag et al (2011) and Burgoon (2006) show that public spending and social protection policies reduce violence by improving people's socio-economic conditions. George (2018) suggests that in failed states, an effective counter-terrorism measure is to build reliable institutions. Providing better living conditions for citizens, equal opportunities to generate wealth, investing in human development, political rights, and effective institutions, could help governments to decrease the people's grievances and increase the opportunity cost and risk of violence, thus isolating the terrorists from their supporters.

In this study, we use Tavares (2004) definition of terrorism - "the premeditated use, or threat of use, of extreme violence to obtain a political objective through intimidation or fear directed at large audience". We use the annual number of conflict-based incidents from the Global Terrorism Database (GTD) as a proxy for conflict. We analyze the development of violence for 8 different groups of countries from 2004 to 2017: (i) Total sample of fragile countries, (ii) Islamic fragile states, (iii) fragile countries with more than one main religion², (iv) States affected by major conflicts³, (v) Middle East and North African (MENA) fragile countries, (vi) Asian fragile countries, (vii) African fragile countries, (viii) Latin American fragile countries. These countries were selected from the Fund for Peace (FFP) database, which publishes annually a fragility index for 178 countries around the world.

In the empirical part of the study, we show that effective institutions (measured by judicial effectiveness) and higher incomes can help to reduce conflict in the most fragile countries. However, democracy does not seem to mitigate violence, with democratic experiences generally showing an upsurge of fighting in fragile countries. It also appears that the development of human capital does not contribute to the reduction of conflicts, which implies that fragile states must first improve their social, economic and institutional conditions before they can benefit from the fruits of reforms and of education of populations. The same conclusion can be drawn for economic reforms in the context of globalization. These reforms do not seem to help reduce violence in fragile countries.

These results are important in the context of the increasing number of conflicts around the world, which undermine progress in improving living standards and reducing poverty in fragile countries. They help to understand the difficulties faced by governments in reducing violence in their country and point to ways for a progressive approach to long-term conflict resolution. The results are robust because they are tested on several panels of countries of different characteristics and based on different appropriate quantitative methods.

The rest of the article is organized as follows. Based on the literature, Section 2 summarizes our theoretical framework and the reasons that motivate violence in fragile countries. Section 3 presents our model of conflict and defines the variables used in the analysis and the data sources. Section 4 highlights

² Countries where more than 10% of people belong to a different religious group

³ Countries which have 5 or more terrorist events in at least one year.

the methodological aspects related to our estimates of violence. Section 5 presents the results of the empirical analysis for our various samples of countries. The last section concludes with our main findings and policy recommendations.

2. Conflict Motivation: A Theoretical Framework

Conflict motivation can be studied using the Rational Choice Theory framework. Rational behavior implies that individuals perform a cost-benefit analysis before acting. In the case of terrorism, the expected benefits of opposition to government include a redistribution of power and wealth; the costs include a reduction in resources and sanctions (Frey and Luechinger, 2003; Harrison, 2006).

Sanctions can be legal or military. LaFree et al (2009) state that these sanctions can have two contradictory effects on violence: a “deterrent” effect, or an “amplification” effect. Deterrence models assume that the threat or imposition of a sanction changes the behavior of individuals. According to Nagin and Paternoster (1993), deterrence works when the expected benefits of illegal actions are lower than the expected costs. LaFree et al (2009) define two types of deterrence: “specific” deterrence which dissuades individuals from repeating their act, and “general” deterrence which discourages members of a society from opting for a given action by fear of possible sanctions. Dezhbakhsh et al (2003) confirm that the probability of arrest, conviction, or execution results in a significant decrease in the crime rate of a population.

On the contrary, Higson-Smith (2002) puts forward the idea that conflict may get worse as a result of government sanctions. This is the case, for example, when terrorists use the public's potential for sympathy to recruit new members, or when terrorists become more radicalized by sanctions. Sherman (1993) explains that deterrence or amplification effects depend on how offenders accept sanctions. If they do not consider them to be legitimate, it will create new grievances. The hostile reaction to sanctions may be “specific” when offenders view the sanctions as unfair and continue their activities, or “general” when society considers the sanctions unjustified and then supports activists. If, in a society, the legal system is ineffective and the activists consider the sentence illegitimate, they can seek support from the general public to legitimize their actions. People who have grievances, but who do not trust the legal system, may also find it legitimate to achieve justice by force.

With regard to the cost/benefit ratio of terrorist action, Freytag et al (2011) focus on the trade-off between loss of material wealth (the opportunity cost of terrorist action) and mental reward (the benefit of terrorism). They suggest that if the opportunity cost of terror (such as the likelihood of sanctions or loss of income) outweighs the benefit, people will choose to preserve their material wealth rather than the mental reward of a terrorist action. On the other hand, in the case of poverty or a slowdown in economic activity, as the relative price of material wealth increases, citizens will opt for conflict more easily, seeing it also as a means of imposing change in addition to seeking a mental reward.

This may also be the case after economic reforms. Caruso and Schneider (2011), in their theory of “immiserizing modernization”, explain that reforms can lead to a decrease in the wealth of some stakeholders, which can lead to more conflicts because of the lower opportunity cost of violence for these categories. Wintrobe (2006) confirms that trade reforms, and globalization in particular, can be seen as a threat of loss of income for part of the population. By limiting the economic opportunities of the affected population, in addition to reducing the opportunity cost of violence, economic reforms can create

grievances against the government, thus increasing the risk of conflict (Harrison 2006). Violence in these cases can also be seen as a way to resist change. Blomberg and Hess (2008) and Kurrild-Klitgaard et al (2006), however, find an inverse relationship between trade reform and conflict, which would make reform an opportunity rather than a threat, reducing violence and promoting development. More generally, adverse socio-economic conditions can lead to violence by making conflicts more profitable because of potential positive spin-offs, particularly with regard to the redistribution of wealth, but also because of low direct costs, including the low cost of recruiting terrorists.

Bernholz (2004) describes the ideological content of certain conflicts through the concept of "supreme values". These values refer to one or more objectives that are preferred above all others, and whose achievement is more important than any other value (Wilkins, 2011). Black (2001) suggests that these extreme beliefs (e.g. religious) are based on deeply inculcated doctrines to achieve the goals of extremist groups (Wintrobe, 2006). Bernholz (2004) states that people with supreme values, may want to implement these values by force. In this case, if the grievance concerns problems other than poverty, for instance injustice or unequal treatment of certain regions, ethnic groups, or religions⁴, an increase in wealth increases the resources for terrorist organizations and terrorist activities. Wintrobe (2006) adds that terrorist activities are based on a compromise between "autonomy" and "solidarity". A person can give up his beliefs (autonomy) to experience social belonging and solidarity.

3. Presentation of the Model and of the Variables

3.1. The Model

The equations used to study the determinants of conflict in fragile states are as follows:

$$Conf_{it} = \alpha_0 + \alpha_1 (GDPc_{it}) + \alpha_2 (Edum_{it}) + \alpha_3 (Open_{it}) + \alpha_4 (Pop_{it}) + \alpha_5 (Contracts_{it}) + \alpha_6 (Demo_{it}) + \varepsilon_t \quad \text{Eq (1)}$$

$$Conf_{it} = \alpha_0 + \alpha_1 (GDPc_{it}) + \alpha_2 (H_{it}) + \alpha_3 (Open_{it}) + \alpha_4 (Pop_{it}) + \alpha_5 (Contracts_{it}) + \alpha_6 (Demo_{it}) + \varepsilon_t \quad \text{Eq (2)}$$

Where *Conf* is the count data variable for measuring conflict, *GDPc* the logarithm of real GDP per capita, *Edum* the average years of education, *H* the human capital index, *Open* the indicator of trade openness, *Pop* the logarithm of population, *Contracts* the proxy for judicial effectiveness, and *Demo* the democracy variable. *i* is the cross sections index, *t* the time dimension and ε the error term. α_0 to α_6 are the parameters to estimate.

3.2. The Variables

3.2.1. Annual Conflict-Based Incidents as Proxy for Internal Conflict

This study uses the annual conflict-based domestic incidents from the Global Terrorism Database (GTD, 2018) as a proxy for conflict as proposed by Enders et al (2011). The conflict-based incidents in the GTD codebook are defined as “the threatened or actual use of illegal force and violence by a non-state actor to attain a political, economic, religious, or social goal through fear, coercion, or intimidation”. The time period for the annual data is from 2004 to 2017 (see descriptive statistics in Table A.1 in the Appendix).

⁴ See Huntington (1996), Piazza (2008), Basuchoudhary and Shughart (2010), Krueger and Maleckova (2003), or Kurrild-Kligaard et al (2006) for the political, ethnic, and institutional causes of conflict.

3.2.2. GDP per Capita as Proxy for Income and Wealth

The empirical evidence for the impact of income and wealth on internal conflict yields mixed results. Some of the literature finds poverty and low income a cause of violence. Humphreys (2003) indicates that low resources increase the likelihood of civil wars. Collier and Hoeffler (2004) show that low incomes increase conflict. By contrast, Caruso and Schneider (2011) find a positive relationship between increased income and the number of people killed in conflict-based incidents. Freytag et al (2011) and Shahbaz (2012) confirm that there is a positive correlation between increasing GDP per capita and increased violence. Piazza (2008) however does not find a significant association between the two variables. Freytag et al (2011) and Lai (2007) show on their side that the use of the quadratic form of GDP per capita inverts the sign of the relation. They conclude that a country must go beyond a certain threshold of development to counter conflict by an increase in wealth. In this study, we hypothesize that economically disadvantaged people in fragile states develop grievances against their government, and that poor economic conditions make violence more likely because direct costs (including terrorist recruitment) and opportunity costs are low

GDP per capita is our measure of income and wealth. The data comes from WDI (2017). For some countries, we collect data from national sources and other international institutions for missing values. The study uses the logarithm of the variable in real terms (see the descriptive statistics in the Table A.1 in the appendix). We assume a negative influence of this variable on our variable of conflict.

3.2.3. Effective Judiciary as a Proxy for Deterrence

Countries with fragile institutions are vulnerable to violence (Ross 1993, Basuchoudhary and Shughart 2010). It is easier for terrorist groups to operate in states where institutions are weak (Newman, 2007, Piazza, 2008). People who have grievances and who do not trust the institutions may also find it legitimate to use force. If the justice system is effective and the penalties are perceived as just, the threat of punishment can change the behavior of individuals. Freytag et al (2011) state that the possibility of punishment is a cost to terrorists. Dezhbakhsh et al (2003) confirm that the likelihood of punishment leads to a decrease in crime in a country. George (2018) shows that in failed states building reliable institutions is a counter-terrorism measure.

We use the "Time for Enforcing Contracts" variable from the "Doing Business" database as an indirect indicator of the ineffectiveness of the judiciary. If the judiciary punishes in a timely manner, the population will be reluctant to use violence. On the other hand, if the justice system is ineffective and terrorists may not be punished, then it is easier for them to continue the conflict. If the justice system in a country is effective and citizens trust its decisions, it will deter terrorism (see descriptive statistics in Table A.1 in the Appendix). In this study, we assume a positive impact of the judicial ineffectiveness variable on conflict.

3.2.4. Education and Human Capital as Proxy for Human Development

Human development might be seen as a way to reduce violence. Higher human development can limit the risk of conflict by reducing people's grievances (Bravo and Dias, 2006; Kurrild-Kitgaard et al, 2006). Educated people may also be less likely to choose terrorism because they can use their own reasoning to form their own opinion. This is especially true in the case of conflicts based on supreme values where education can help develop critical thinking and reject extremism (Ghosh et al, 2017). Educated people

can also use their knowledge to improve their economic and social situation (Berrebi, 2007). Advances in education thus increase the opportunity cost of civil conflict by providing better opportunities for people (Freytag et al, 2011).

At the empirical level, Hamilton and Hamilton (1983) note that illiteracy is positively correlated with terrorism. Collier and Hoeffler (2004) and Azam and Thelen (2008) highlight the negative impact of education on conflict. However, Brockhoff et al (2015), Berrebi (2007), Testas (2004) and Nasir et al (2011) show a positive relationship between education and conflict. Brockhoff et al (2015) show that in countries where social, economic, political, and demographic conditions are unfavorable, education can exacerbate discontent. If access to education does not translate into the expected better life, it will increase frustration and conflict. People may consider joining terrorist organizations if career path returns are below expectations (Krueger, 2008). In addition, terrorist groups may have an interest in recruiting educated people, as this can increase the chances of success of their activities, as well as contribute to a better image for their propaganda in the media (Krueger and Maleckova, 2003).

We use two different indexes for human development as explanatory variable for conflict: (i) The average number of years of schooling of population aged 25 or older from the United Nations Development Program (UNDP) ⁵; (ii) The Human Capital index of the Penn World Table (PWT 9.1, Feenstra et al, 2015) ⁶ (see descriptive statistics in Table A.1 in the Appendix). We assume that education provides people with more information and encourages them not to choose terrorism, as well as more economic opportunities which increases the opportunity cost of conflict. A negative sign in the equation is expected.

3.2.5. Trade Openness as Proxy for Economic Reforms

The influence of economic reforms on violence is another dimension studied in the literature. The impact of trade reforms and globalization has been the subject of discussion. Trade reforms can be a factor of growth and modernization of the economy (Frankel and Romer, 1999; Dollar and Kraay, 2003). New opportunities created by trade can reduce the discontent of the population and increase the opportunity cost of violence, thus reducing the risk of conflict. Blomberg and Hess (2008) and Kurrild-Klitgaard et al (2006) find an inverse relationship between trade openness and conflict which would confirm that reforms can help reduce violence.

Another part of the literature, however, emphasizes the destabilizing effect of economic reforms. Caruso and Schneider (2011) state that reforms can reduce the wealth of some stakeholders. Freytag et al (2011) and Wintrobe (2006) confirm that globalization can be seen as a threat to part of the population. In this case, reforms can lead to political and social unrest fueled by groups of people who lose or fear losing because of change (Harrison, 2006; Gaibullov and Sandler, 2019).

In this study, we assume that trade openness reduces violence and promotes a country's development. A negative relationship with conflict is expected. We use the ratio of exports plus imports to GDP (in real terms), as proxy for trade reform and globalization. The data are from National and International sources (see descriptive statistics in Table A.1 in the Appendix).

⁵ <http://hdr.undp.org/en/content/human-development-index-hdi>

⁶ www.ggd.net/pwt

3.2.6. Democratic Accountability as Proxy for Democracy

The impact of the political regime on terrorism and conflict in a country is another dimension whose empirical evidence is contradictory. Some of the literature emphasizes that democratic regimes allow people to express their demands and be heard, thereby reducing the grievances they may have towards the government. This is the case of Eyerman (1998) and Li (2005) who highlight a positive relationship between democracy and the absence of violence. However, other authors point out that it is easier and cheaper for extremists to engage in terrorist activities when they enjoy more civil liberties and political rights. For instance Li and Schaub (2004) and Rizvi and Véganzonès-Varoudakis (2019) note an increase of violence in fragile countries during democratic periods. Eubank and Winberg (1998) find that terrorism occurs more often in democracies than in more authoritarian regimes. Li (2005) and Muller (1985) demonstrate a non-linear relationship between political repression and violence.

We use the Democratic Accountability variable, derived from the International Country Risk Guide (ICRG), as an indicator of the type of regime, to explain internal conflicts in fragile states (Howell, 2011). A high value indicates more democracy and vice-versa (see descriptive statistics in Table A.1 in the Appendix). We assume a positive relationship of the variable with the conflict variable for our different samples of fragile countries.

3.2.7. The role of Population

As well as the above variables we also study the impact of the size of a country's population on the development of conflicts in that country. Krueger and Maleckova (2003), Burgoom (2006), Freytag et al (2011), Piazza (2008) and Richardson (2011) point out that more populated countries tend to have more violence. Gaibulloev and Sandler (2019) and Taydas et al (2011) argue that it is difficult for governments to manage, serve, and respond to the demands of all in the case of large populations, particularly because of a great diversity. In this study, we assume a positive relationship between population and conflict in fragile countries. We use the logarithm of the WDI (2017) variable (see descriptive statistics in Table A.1 in the Appendix).

3.3. Estimation of the Model: Methodological Aspects

This study focuses on fragile countries which were selected from the Fund for Peace (FFP) database that publishes annually a fragility index by country: the Fragile States Index (FSI)⁷. We selected 58 countries for which the index was above 70⁸ for the analysis. We analyze the development of terrorism from 2004 to 2017 for 8 different groups: (i) Total sample of fragile countries, (ii) Islamic fragile states, (iii) Fragile countries with more than one important religion⁹, (iv) States affected by major conflicts¹⁰, (v) Middle East and North African (MENA) fragile countries, (vi) Asian fragile countries, (vii) African fragile

⁷ The Fragile States Index (FSI) is an annual ranking of 178 countries based on the different pressures they face. The FSI is calculated from 12 key qualitative and quantitative indicators, political, social, and economic, from a variety of public sources. For more details see <https://fragilestatesindex.org/data/>

⁸ The Fund for Peace (FFP) defines 10 levels of fragility according to the FSI score: Very high alert (above 110); High alert (between 100 to 110); Alert (90 to 100); High warning (80 to 90); Elevated warning (70 to 80); Warning (60 to 70); More stable (40 to 60); Very stable:(30 to 40); Sustainable (20 to 30); Very sustainable (less than 20).

⁹ Countries where more than 10% of people belong to a different religious group

¹⁰ Countries that have 5 or more terrorist events in at least one year.

countries, and viii) Latin American fragile countries (see the lists of countries in Table A.2 in the Appendix).

Since we use the annual number of conflict-based incidents from the Global Terrorism Database (GTD) as proxy for violence, this implies that our dependent variable is a non-negative integer (count data)¹¹. Fixed Effect Poisson Regressions (FEPR) is used with robust standard errors to address the issues related to count data. Many empirical researches have used Poisson regression or Negative Binomial Regression (NBR) for count data models¹². Berrebi and Ostwald (2011) suggest that NBR offers potential efficiency gains, but that the consistent estimates provided by Poisson regression are more valuable than efficiency. Wooldridge (1999) confirms that Poisson regression with fixed effects is robust and consistent for count data models. Although the problem of underdispersion/overdispersion when applying Poisson regression has been highlighted in various studies, FEPR with clustered standard errors retains consistency and allows us to estimate our model with robust standard errors (Simcoe, 2008)¹³.

In the regressions, we use two proxies of human capital: (i) The average number of years of schooling of the population aged 25 or older (*Edum*), published by UNDP, available for all 58 countries, (ii) The Human Capital Index (*H*), published in the Penn World Table (PWT), available for only 51 countries¹⁴. In order to be able to compare the results with the two human development proxies, we perform two sets of regressions incorporating *Edum* (one set, on the 58 countries of the initial sample (specification 1), another set, on the 51 countries of the PWT (specification 2)), as well as a third set of regressions including *H* on the 51 countries of the PWT (specification 3).

4. The Results of the Estimations

Table 3 presents the results for the total sample of countries, Table 4 for the Islamic States, Table 5 for the countries with more than one main religion, and Table 6 for the countries affected by major conflicts. The results for the regions are presented in the Appendix: Table A.3 for MENA, Table A.4 for Asia, Table A.5 for Africa and Table A.6 for Latin America.

For almost all of our specifications and our groups of countries, income, ineffectiveness of the justice system, and size of the population are correlated with the development of conflict in fragile states. These results corroborate the findings of Humphreys (2003), Collier and Hoeffler (2004), Lai (2007), and Ostby (2008), who show that low incomes are positively associated with violence. When poverty is high, disadvantaged people may develop grievances against their government. In this case, the use of violence is more likely as the opportunity cost of terror and the cost of recruiting terrorists are low. As a result, income is a policy variable that governments can use to reduce violence in fragile states.

Our results also show that another way to reduce conflict in fragile countries could be to improve institutions, especially the justice system. Our results are consistent with those of LaFree et al (2009) and

¹¹ For more details on count data regression see Cameron and Trivedi (2013)

¹² See George (2018); Piazza (2008) in particular for Negative Binomial Regression

¹³ Regressions using the Negative Binomial Regression (NBR) method were also performed for our analysis. The results are consistent with those obtained with fixed effect Poisson regressions (FEPR) on the orientation of the relationship between the explanatory variables and the internal conflicts, except in the case of the trade openness variable which has less variation and has a positive influence on violence. The results are not shown here due to space constraints, but are available upon request.

¹⁴ Data for Azerbaijan, Belarus, Guinea, Guyana, Lebanon, Libya and Moldova are not available for the Human Capital Index (*H*) in the PWT.

Dezhbakhsh et al (2003) who confirm the dissuasive effect of the threat of sanctions. According to Freytag et al. (2011), the possibility of punishment by the government increases the opportunity cost and risk of violence. If the legal system punishes in a timely manner, the population will be reluctant to resort to violence and terrorists will be reluctant to continue the conflict. More generally, our results confirm that countries with fragile institutions are vulnerable to violence (Ross 1993, Basuchoudhary and Shughart 2010).

With regard to the population size variable, our results are in line with those of Gaibulloev and Sandler (2019) and Taydas et al (2011) who show that fragile countries with big populations are more exposed to violence.

Our results for education and democracy are less stable than those obtained for population, institutions, and income. Education and democracy correlate closely with conflict for the total sample, the Muslim states, and the countries with more than one main religion, but correlate less for the regions¹⁵. This may be due in part to the smaller sample size, as well as to the fact that some regions are less affected by conflict (e.g. Latin America). Education, however, appears to be a more robust dimension than democracy in explaining violence (for both human capital indicators or for the human capital index only).

Our results also show that the education and democracy variables appear to be positively related to conflicts. The impact of these two factors on violence has been discussed in the literature. Our findings confirm that education in fragile countries does not translate into an opportunity to improve living conditions or as a means of reinforcing critical thinking against terrorism, as in Berrebi (2007) and Brockhoff et al (2015). In a state with adverse social, economic, and political conditions, education can increase frustration if the situation of educated people does not improve, especially as they are more aware of the limits of their government. This conclusion can be extrapolated to democracy, which gives more voice to discontented groups, thus increasing violence, as in Eubank and Winberg (1998) and Li and Schaub (2004). This means that when fragile countries go from autarchy to democracies, they face more conflict. Our results mean that education and political rights do not have the desired effects in fragile states which must first improve the social, economic and institutional conditions of their population before they can benefit from political reforms and education. This is also the case for economic reforms, as our trade openness variable shows no impact on violence in most of our country samples (except the MENA and Africa regions), as in Gaibulloev and Sandler (2019).

A more detailed analysis shows interesting differences between country groups. The impact of income, while relatively stable in most of our samples, seems to be stronger in countries with more than one major religion. This is an interesting finding that shows that public policies aimed at improving the income and living conditions of people would be more effective in these particularly fragile countries. This may also be the case for our Asian region, for which the estimated coefficient of the GDP per capita variable seems particularly strong for specification 3. This instrument, however, seems less effective in the case of our Latin American countries for which this coefficient is much lower. In the case of Africa, income seems to play an opposite role, by increasing violence in our sample of countries. This may be due to the extreme poverty and fragility of many African economies, as suggested by Freytag et al. (2011) and Lai (2007), which shows that a country must exceed a certain level of development before an increased income

¹⁵ We recall that the results of the regional panels are presented in the Appendix

translates into a reduction in violence. In these African countries, an overall increase in income may also be followed by an increase in inequality, or the perception of inequality, as proposed by Olson (1963). This is the case, for example, if the richest people become even richer. Changes in the distribution of wealth or the perception of not getting the expected share of income can then lead to more grievances and violence in society, as in Blomberg and Hess (2008).

The results are rather similar across our groups for the population size variable, whose impact is stronger in countries with more than one main religion, and in the Asian, African, and Latin-American regions. This may be due to the fact that several highly populated countries are located in these groups, illustrating the difficulties faced by governments in meeting the needs of a large, diverse population.

The results are more diverse for the judicial system. Improving the effectiveness of justice has more impact in Muslim states and countries with more than one main religion, as well as in the MENA and Africa regions. This is interesting because countries in these groups are more involved in conflict and exposed to violence. Improving the justice system and institutions in general would be an effective way to combat terrorism in these fragile states. Interestingly, the deterrent effect of possible sanctions does not seem to work in the case of the Asian region. In the countries of our sample, the effectiveness of justice increases violence, which underlines the back-lash effect of the sanctions on terrorism and the involvement of certain populations in conflicts, as proposed by Higson-Smith (2002).

The two education variables, the human capital index (published by the PWT), and the average number of years of schooling of the population aged 25 and older (UNDP) are almost always significant for our first four groups of country, but not in the case of the regions. As mentioned earlier, this may be due to the reduced number of observations. It may also be related to the fact that religion is mostly the driving force of conflict in these four groups. In this case, education can serve the cause of terrorists by allowing certain segments of the population to be more involved in violence. For the four country groups, the estimated coefficient differences are not very significant, except for countries with more than one main religion where the impact is smaller. The same conclusions can be drawn for democracy, with a stronger impact in Muslim countries.

Finally, as mentioned above, economic reforms do not seem to contribute to an increase or reduction of violence in our various samples of countries, with the exception of the MENA and Africa regions. In the countries of our African sample, reforms, as measured by the trade openness indicator, are perceived as a positive economic opportunity, reducing the grievances of the populations and increasing the opportunity cost of resorting to violence, as in Blomberg and Hess (2008) and Kurrild-Klitgaard et al (2006). By contrast, in the MENA region, trade reforms are seen as a threat of negative change, which contributes to an increase in conflict, as in Freytag et al. (2011) and Wintrobe (2006). MENA countries seem particularly reluctant to reform, as many observers have shown (Aysan et al, 2009; Nabli and Véگانзонès-Varoudakis, 2007; Sekkat et al, 2007). However, this impact is less than the positive impact of the reforms on the reduction of violence in the Africa region.

Table 1: Fixed Effect Poisson Regression for Total Fragile Countries

Variables	Specification 1	Specification 2	Specification 3
lpop	4.318*** (0.70)	4.491*** (0.86)	2.944*** (0.79)
lgdpc	-1.164*** (0.32)	-1.063*** (0.37)	-0.479** (0.24)
Edum	0.758*** (0.17)	0.681*** (0.18)	
H			4.957*** (0.98)
Contracts	1.353* (0.77)	1.360* (0.79)	1.111 (0.88)
Open	-0.32 (1.00)	-0.457 (1.03)	0.093 (0.99)
Demo	0.113** (0.06)	0.087* (0.05)	0.262*** (0.06)
Observations	812	714	714
Number of counnum	58	51	51

Note: Dependent variable is annual number of terrorist-based incidents, robust standard errors are given in parenthesis, significance level: ***, **, * is less than 1%, 5% and 10% respectively.

Table 2: Fixed Effect Poisson Regression for Muslim Fragile Countries

Variables	Specification 1	Specification 2	Specification 3
lpop	4.431*** (0.92)	4.652*** (1.08)	2.734*** (0.88)
lgdpc	-1.251*** (0.27)	-1.108*** (0.30)	-0.556** (0.26)
Edum	0.591 (0.40)	0.452 (0.42)	
H			4.629*** (1.63)
Contracts	2.425*** (0.81)	2.518*** (0.92)	2.094*** (0.67)
Open	-0.082 (1.13)	-0.384 (1.22)	0.205 (1.20)
Demo	0.158** (0.06)	0.135** (0.06)	0.286*** (0.06)
Observations	350	294	294
Number of counnum	25	21	21

Note: Dependent variable is annual number of terrorist-based incidents, robust standard errors are given in parenthesis, significance level: ***, **, * is less than 1%, 5% and 10% respectively.

Table 3: Fixed Effect Poisson Regression for Fragile Countries Affected by Major Conflicts

Variables	Specification 1	Specification 2	Specification 3
lpop	4.312*** (0.70)	4.486*** (0.86)	2.942*** (0.79)
lgdpc	-1.166*** (0.32)	-1.065*** (0.37)	-0.479** (0.24)
Edum	0.761*** (0.17)	0.683*** (0.18)	
H			4.962*** (0.98)
Contracts	1.339* (0.78)	1.338* (0.81)	1.089 (0.89)
Open	-0.323 (1.01)	-0.462 (1.03)	0.093 (0.99)
Demo	0.113** (0.06)	0.086* (0.05)	0.262*** (0.06)
Observations	588	560	560
Number of counnum	42	40	40

Note: Dependent variable is annual number of terrorist-based incidents, robust standard errors are given in parenthesis, significance level: ***, **, * is less than 1%, 5% and 10% respectively.

Table 4: Fixed Effect Poisson Regression for Fragile Countries with more than One Main Religion

Variables	Specification 1	Specification 2	Specification 3
lpop	8.312*** (2.87)	11.147*** (1.78)	9.497*** (1.61)
lgdpc	-1.531*** (0.08)	-1.571*** (0.09)	-1.090*** (0.09)
Edum	0.725*** (0.26)	0.499** (0.21)	
H			3.794*** (0.94)
Contracts	2.976 (2.57)	4.961** (2.20)	3.977* (2.19)
Open	1.867 (1.63)	1.834 (1.72)	1.907 (1.41)
Demo	-0.155 (0.45)	-0.409 (0.45)	-0.412 (0.40)
Observations	238	224	224
Number of counnum	17	16	16

Note: Dependent variable is annual number of terrorist-based incidents, robust standard errors are given in parenthesis, significance level: ***, **, * is less than 1%, 5% and 10% respectively.

5. Conclusion

In this article, we use Fixed Effect Poisson Regression (FEPR) with robust standard errors, to study the social, economic, and institutional determinants of conflict in 58 fragile states divided into 8 groups. We explore different reasons for conflict in fragile countries and analyze different theories and empirical determinants.

We show that poverty and weak institutions (weak justice systems in particular) are two important dimensions which contribute to violence in our sample of fragile countries. These results are consistent with those of Collier and Hoeffler (2004), Lai (2007), and Ostby (2008), who show that low incomes are positively associated with terrorism. When poverty is high, disadvantaged people are especially likely to resort to violence since the opportunity cost of terrorism and the cost of recruitment of terrorists are low. Our results are also consistent with those of LaFree et al (2009) and Dezhbakhsh et al (2003), who confirm the deterrent effect of the threat of sanctions. According to Freytag et al (2011), effective justice increases the opportunity cost and risk of violence.

On the other hand, improving education and democracy does not seem to help reduce violence in fragile states, and both of our proxy variables show a positive relationship with conflict. These results confirm those of Berrebi (2007) and Brockhoff et al. (2015) who show that education in fragile countries can increase frustration if the situation of educated people does not improve, especially as they are more aware of the limits of their government. This conclusion can be extrapolated to democracy, which gives more means of expression to the discontented and the extremists, thus increasing the violence (Eubank and Winberg, 1998 and Li and Schaub, 2004). Our results imply that education and political rights do not have the desired effects in fragile states, which must first improve the social, economic, and institutional conditions of their population before they can reap the benefits of political reforms and of education. This is also the case with economic reforms, as our trade openness indicator shows no impact on violence in most of our groups (except MENA and Africa).

Although this general pattern works quite well for most of our country groups, some groups experience somewhat different situations. This is the case for countries with more than one major religion, where improving incomes and efficiency of justice are more effective in reducing violence than in the other groups. This is an interesting finding which governments could take into account to fight against terrorism in these particularly fragile countries. Muslim states are also particularly sensitive to the deterrent effect of sanctions, which for government could be an effective means of combating violence. Muslim countries also experience an increase in violence during more democratic times. These findings confirm that in countries which are particularly vulnerable to terrorism, political rights cannot be reintroduced until after the restoration of order and effective institutions.

The MENA and Africa regions, which are also very affected by conflicts, have their own specificities as well. As in the case of the two previous groups, improving the effectiveness of justice has a significant impact on violence, which confirms that institutions are important in the fight against conflict in the most affected countries. The Africa region has two other particularities, which may be due to the extreme poverty and fragility of most of its countries. In this region, income seems to play an opposite role, increasing violence, contrary to what is seen in other countries. Olson (1963) describes this situation in which an overall increase in income is followed by an increase in inequality or perception of inequality.

A change in the distribution of wealth can then lead to grievances and violence, as Blomberg and Hess (2008) have shown. Also in Africa, economic reforms are perceived as an economic opportunity, reducing citizens' grievances and increasing the opportunity cost of resorting to violence, as Blomberg and Hess (2008) and Kurrild-Klitgaard et al (2006) have shown. We can therefore note the specificity of Africa and of the policies to be put in place by governments, which differ to some extent from those in other countries. By contrast, in the MENA region, trade reforms are seen as a threat of adverse change, which contributes to worsening conflicts, as in Freytag et al (2011) and Wintrobe (2006).

Conflicts in fragile states cause great suffering for people, as well as delays in development. If nothing is done, the World Bank (2018) predicts that nearly half of the world's poor will live in fragile countries facing conflict situations by 2030. This study highlights some tools governments could use to try to limit violence in their country. Improving the standard of living of people and restoring strong and reliable institutions are measures that seem to bear fruit in most fragile countries, with a certain specificity of Africa that we have mentioned. These results are in line with the work of Burgoon (2006) and Freytag et al (2011) who show that public spending and social protection policies can reduce violence, and George (2018) who suggests that in failing states, an effective counter-terrorism measure is to build reliable institutions. On the other hand, the question of the role of education, political rights, and economic reforms is more complex to deal with. If in the short term these instruments do not seem to help in the reduction of conflicts and terrorism in the countries concerned, it may be thought that the priority of fragile states is to provide their populations with a safer economic, political, and institutional environment before these populations can benefit from the fruits of more advanced reforms.

Appendix

Table A.1. : List of Countries

Total Fragile Countries (58)	Muslim Fragile Countries (26)	Fragile Countries with more than 5 events one year (41)	Fragile Countries where more than 10 % people belong to a different religious group (18)	African Fragile Countries (23)	MENA Fragile Countries (13)	Asian Fragile Countries (8)	Latin-American Fragile Countries (10)
Algeria	Algeria	Algeria	Burkina Faso	Angola	Algeria	Bangladesh	Colombia
Angola	Azerbaijan	Bangladesh	Cameroon	Burkina Faso	Egypt Arab Rep.	China	Dominican Rep.
Azerbaijan	Bangladesh	Burkina Faso	Demo Rep. of Congo	Cameroon	Iran Islamic Rep.	India	Ecuador
Bangladesh	Burkina Faso	Cameroon	Ethiopia	Demo Rep. of Congo	Iraq	Indonesia	Guatemala
Belarus	Egypt Arab Rep.	China	Ghana	Ethiopia	Jordan	Pakistan	Guyana
Bolivia	Gambia	Colombia	India	Gabon	Lebanon	Philippines	Honduras
Burkina Faso	Guinea	Demo Rep. of Congo	Indonesia	Ghana	Libya	Sri Lanka	Mexico
Cameroon	Indonesia	Egypt Arab Rep.	Kenya	Guinea	Saudi Arabia	Vietnam	Nicaragua
China	Iran Islamic Rep.	Ethiopia	Lebanon	Kenya	Morocco		Paraguay
Colombia	Iraq	Guatemala	Mozambique	Madagascar	Syrian Arab Rep		Venezuela
Demo Rep. of Congo	Jordan	Honduras	Nigeria	Mali	Tunisia		
Dominican Rep.	Lebanon	India	Sierra Leone	Mozambique	Turkey		
Ecuador	Libya	Indonesia	Sri Lanka	Namibia	Yemen Rep.		
Egypt Arab Rep.	Mali	Iran Islamic Rep.	Syria	Niger			
Ethiopia	Morocco	Iraq	Tanzania	Nigeria			
Gabon	Niger	Jordan	Togo	Rep. of Congo			
Ghana	Nigeria	Kenya	Uganda	Senegal			
Guatemala	Pakistan	Lebanon	Vietnam	Sierra Leone			
Guinea	Saudi Arabia	Libya		Sudan			
Guyana	Senegal	Mali		Tanzania			
Honduras	Sierra Leone	Mexico		Togo			
India	Sudan	Morocco		Uganda			
Indonesia	Syria	Mozambique		Zimbabwe			
Iran Islamic Rep.	Tunisia	Niger					
Iraq	Turkey	Nigeria					
Jordan	Yemen Rep.	Pakistan					
Kenya		Paraguay					
Lebanon		Philippines					
Libya		Rep. of Congo					
Madagascar		Russia					
Mali		Saudi Arabia					
Mexico		Sri Lanka					
Moldova		Sudan					
Morocco		Syrian Arab Rep.					
Mozambique		Tanzania					
Nicaragua		Tunisia					
Niger		Turkey					
Nigeria		Uganda					
Pakistan		Ukraine					
Paraguay		Venezuela					
Philippines		Yemen Rep.					
Rep. of Congo		Zimbabwe					
Russia							
Saudi Arabia							
Senegal							
Sierra Leone							
Sri Lanka							
Sudan							
Syrian Arab Rep.							
Tanzania							
Tunisia							
Turkey							
Uganda							
Ukraine							
Venezuela							
Vietnam							
Yemen Rep.							
Zimbabwe							

Table A.2. : Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
trsm	714	86,7	297	0,00	3367
lpop	714	17,3	1,29	14,1	21,0
lgdpc	714	7,61	1,05	2,80	9,98
Edum	714	6,24	2,45	1,30	12,0
H	714	2,10	0,53	1,11	3,4
Contracts	714	1,95	0,84	0,73	4,0
Open	714	0,55	0,29	0,12	2,21
Demo	714	3,45	1,32	0,04	6,0

Table A.3. Fixed Effect Poisson Regression for MENA Fragile Countries

Variables	Specification 1	Specification 2	Specification 3
lpop	3.613*** (0.95)	3.603*** (1.08)	3.107* (1.74)
lgdpc	-1.246*** (0.29)	-1.101*** (0.35)	-0.650* (0.37)
Edum	0.654 (0.49)	0.531 (0.52)	
H			2.608 (2.62)
Contracts	3.023*** (0.95)	2.882*** (1.04)	2.967** (1.26)
Open	-1.299 (0.83)	-1.771* (1.06)	-1.277* (0.66)
Demo	0.425 (0.32)	0.293 (0.20)	0.31 (0.20)
Observations	182	154	154
Number of counnum	13	11	11

Note: Dependent variable is annual number of terrorist-based incidents, robust standard errors are given in parenthesis, significance level: ***, **, * is less than 1%, 5% and 10% respectively.

Table A.4. Fixed Effect Poisson Regression for Asian Fragile Countries

Variables	Specification 1	Specification 2	Specification 3
lpop	6.625 (6.38)	6.647 (6.43)	9.469** (3.75)
lgdpc	0.811 (2.61)	0.796 (2.63)	-6.162** (3.02)
Edum	-0.065 (0.59)	-0.061 (0.59)	
H			17.302** (7.36)
Contracts	-3.839 (4.23)	-3.869 (4.35)	-13.662* (7.06)
Open	1.124 (1.70)	1.126 (1.70)	0.511 (1.20)
Demo	0.059 (0.33)	0.058 (0.33)	0.237 (0.21)
Observations	126	112	112
Number of counnum	9	8	8

Note: Dependent variable is annual number of terrorist-based incidents, robust standard errors are given in parenthesis, significance level: ***, **, * is less than 1%, 5% and 10% respectively.

Table A.5. Fixed Effect Poisson Regression for African Fragile Countries

Variables	Specification 1	Specification 2	Specification 3
lpop	7.706*** (2.81)	7.740*** (2.82)	10.258*** (3.06)
lgdpc	4.221 (2.60)	4.284* (2.59)	4.821* (2.64)
Edum	0.356 (0.53)	0.346 (0.53)	
H			-2.613 (3.15)
Contracts	7.592*** (2.46)	7.696*** (2.46)	8.226*** (2.87)
Open	2.652* (1.41)	2.714* (1.43)	2.640* (1.37)
Demoa	-0.249 (0.22)	-0.243 (0.23)	-0.116 (0.24)
Observations	294	280	280
Number of counnum	21	20	20

Note: Dependent variable is annual number of terrorist-based incidents, robust standard errors are given in parenthesis, significance level: ***, **, * is less than 1%, 5% and 10% respectively.

Table A.6. Fixed Effect Poisson Regression for Latin American Fragile Countries

Variables	Specification 1	Specification 2	Specification 3
lpop	12.429*** (4.23)	12.339*** (4.28)	14.316 (15.42)
lgdpc	-0.243** (0.11)	-0.248** (0.12)	-0.259* (0.14)
Edum	-0.211 (0.41)	-0.198 (0.41)	
H			-2.018 (7.25)
Contracts	1.193 (0.94)	1.21 (0.94)	1.123 (1.18)
Open	0.517 (1.04)	0.671 (1.24)	0.635 (1.36)
Demo	0.302 (0.34)	0.306 (0.34)	0.326 (0.40)
Observations	154	140	140
Number of counnum	11	10	10

Note: Dependent variable is annual number of terrorist-based incidents, robust standard errors are given in parenthesis, significance level: ***, **, * is less than 1%, 5% and 10% respectively.

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