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NOTE



Deprivation, instability, and propensity to attack: how urbanization influences terrorism

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ABSTRACT

The study investigates different ways in which urbanization and its tempo influence terrorist activity. In line with other researchers investigating nonlinear effects on instability, we suggest that the influence of both of them is nonlinear, with quadratic regression being more appropriate for urbanization level impact and interaction between urbanization and its tempo being more appropriate to measure the tempo's influence. Nonlinearity has been confirmed in the robustness section of the paper, in which an alternative dependent variable distribution and a greater set of control variables were used. The findings are in line with those of other researchers who found that societies, in the process of modernization, demonstrate heavier instability than societies before modernization or those after the modernization period.

KEYWORDS

terrorism; urbanization;
instability; modernization;
non-linear effects

El estudio investiga las diferentes maneras en que la urbanización y su ritmo influyen en la actividad terrorista. En consonancia con otros investigadores que estudian los efectos no lineales en la inestabilidad, sugerimos que la influencia de ambos aspectos es no lineal, con la regresión cuadrática siendo más adecuada para el impacto del nivel de urbanización y la interacción entre la urbanización y su ritmo siendo más conveniente para medir la influencia del ritmo. La no linealidad se ha confirmado en la sección de solidez del artículo, en la que se utilizaron la distribución alternativa de variables dependientes y un mayor conjunto de variables de control. Los hallazgos son coherentes con los de otros investigadores que observaron que las sociedades, en el proceso de modernización, demuestran una inestabilidad más intensa que aquellas antes o después del período de modernización.

Cette étude enquête sur les différentes manières dont l'urbanization et son tempo influencent l'activité terroriste. En accord avec d'autres chercheurs étudiant les effets non linéaires sur l'instabilité, nous suggérons que l'urbanization et son tempo ont tous deux une influence non linéaire, une régression quadratique étant plus appropriée pour mesurer l'impact du niveau

d'urbanization, et l'interaction entre l'urbanization et son tempo étant plus appropriée pour mesurer l'influence du tempo. Cette non-linéarité est confirmée dans la section sur la robustesse de l'article, dans laquelle une distribution alternative des variables dépendantes et un plus grand jeu de variables de contrôle sont utilisés. Les conclusions de l'article sont en accord avec celles d'autres chercheurs qui ont constaté que les sociétés en cours de modernization présentaient une plus grande instabilité que celles qui étaient déjà passées ou qui n'étaient pas encore passées par une période de modernization.

Introduction

Urbanization is an important factor in stimulating instability. Chiefly, two reasons stand behind this connection. First, rural–urban migration is a process connected with structural changes in society and is highly likely to produce multiple dissatisfied individuals without proper social networks (Geifman 2005; Kornhauser 1959; Korotayev et al. 2011). The prevalence of mechanic solidarity among individuals combined with the exposure of multiple groups in a dense urban area sparks anomie and tensions among those with different modes of thinking (Douglas 2012). This leads to an escalation of grievances inside the cluster of newly integrated members of society, who still suffer from various forms of socioeconomic deprivation, and this results in overall destabilization. Second, cities are also important logistically, and they are more attractive among the agents of instability for various reasons (Coward 2009). In the case of terrorist organizations, cities provide the base of human resources which is essential for their persistence; likewise, the conduction of a terrorist attack in a city means a larger contribution to the production of fear, inconvenience, and discomfort in the lives of citizens of the target country (Mccartan et al. 2008), since terrorists usually destroy strategic infrastructure and shatter residents' everyday life. In line with Mccartan et al. (2008), we define terrorism as “premeditated use of violence by subnational groups to obtain political, religious, or ideological objectives” (Mccartan et al. 2008, 61). Even though we focus, here, on terrorist attacks specifically, the conclusions that we come to can be extrapolated to other manifestations of instability as well.

Urbanization is also one of the key indicators of the modernization process. This complicates our analysis. The previously mentioned ways in which urbanization influences terrorism are linear: (a) more cities (hypothetically) mean more terrorist attacks, and (b) more rural–urban migration means greater dissatisfied first-generation proletariat. However, as Huntington (1968) as well as other researchers on economic and political determinants of instability hint, both of the alleged links can be curvilinear (Korotayev, Vaskin, and Bilyuga 2017; Korotayev et al. 2018). Just like any other indicator

of modernization, urbanization, per se, is predicted to have a specific inverted U-shaped correlation with instability. It was also stressed by Huntington that the instability coming from the destruction of mechanical solidarity and mismatch between the old ways of living and complex societies must end at some point. It was proposed that new institutions should be developed over time, and social interaction was transformed into so-called organic solidarity. In other words, individuals “learn the art of associating together” (Huntington 1968, 5). At the same time, those enjoying organic solidarity are less sensitive to terrorists’ aims of division as well as their methods. The resulting mistrust of the residents hampers terrorist activity. This means that problems, caused by increased rural–urban migration, can be at least partially neutralized; at the same time, higher rural–urban migration hastens modernity as a relatively stable haven for society. We, hence, consider in the current study the effects of both urbanization and its tempo, since the exclusion of any of these would make the research incomplete. We test for both linear and nonlinear types of relationships as well as for interaction between the level of urbanization and its tempo.

The rest of the paper is organized as follows. First, in the literature review, we display evidence and theories at hand and develop hypotheses to be tested afterward. We then describe the data we use and the modifications we make. In the exploratory part, we split the sample into several subsamples and find an upward trend in the first half and a downward trend afterward. In the rest of the paper, we use quadratic regression on the whole sample to test for curvilinearity. Following one of our reviewers’ advice, we consider the number of terrorists’ victims as well as several forms of the main independent variables. Then, we show the results of the models we estimate in the main part of the work, where we conduct negative binomial regressions. We then present our Robustness section, presented in online supplementary materials. To test the robustness of our models, we use both alternative distribution (namely, quasi-Poisson) and alternative theories to validate the results from our main part. Overall, we find nonlinear relation to be more appropriate, although linearity reveals itself sometimes. Finally, in the discussion section, we present cases that can be explained with the hypotheses that are developed and supported empirically in this paper.

Theoretical Approach

In this section, we cover three major links between urbanization and terrorist attacks. First, there are several reasons, cited in the literature, for terrorists to choose cities and dense urban areas as their targets. Second, the process of urbanization, per se, might increase the propensity of an average citizen to become a terrorist. Third, urbanization might be intrinsically linked to other parts of modernization, which, in turn, provoke terrorist attacks. We also

mention, in this section, control variables that are used in the main modeling part. Fourth, we cite alternative hypotheses that we test in the robustness part. The literature review, accordingly, comes in the following subsections: first, we explain the effect of cities' attractiveness to terrorists, second, we cover the effect of urbanization speed on terrorism. Then, in the third subsection, we focus on the effect of other phenomena and variables correlated with urbanization, and finally, we provide alternative explanations. Overall, we find that urbanization has been observed as both a positive and a negative correlation of terrorism. Due to this uncertainty, we question the linearity of the relationship between urbanization and terrorism.

Our hypotheses in this research come from the two main explanations; so, the links we test are devoted to two major predictors, which are urbanization level, on the one hand, and tempo of urbanization, on the other.

Hypothesis 1:

1.1. The level of urbanization has a positive linear relationship with the number of terror attacks and the number of terrorist killings.

1.2. The relationship between urbanization level and the number of terror attacks and the number of terrorist killings is inverted U-shaped.

Hypothesis 2:

2.1. Tempo of urbanization is positively related to the number of terror attacks and the number of terrorist killings.

2.2. The effect of tempo of urbanization is conditional on its tempo: we expect inverted U-shaped relationship.

Cities' Attractiveness

Today, the major school of thoughts on terrorism considers terrorists as rational actors. A terrorist attack, per se, is considered as a means to "bargain" with the other party, by making the average citizens fear hypothetical direct physical harm and to push the government to let the organizations achieve their aims. They also try to get more supporters, which sometimes brings ambiguity about their choices: the victim countries' citizens may sympathize with possible terrorists' supporters (Adelaja and George 2019; Mccartan et al. 2008). As for the choice of recruits, knowledgeable and skilled potential candidates are concentrated in cities, and this is important for terrorist organizations which screen the volunteers for quality, rather than accept the most likely volunteers who often lack education or ability (Bueno de Mesquita 2005). The choice of a target is calculated as well, and there are several reasons why cities are more popular as targets. First, a terrorist attack, there, could gain more attention compared to a rural

terrorist attack (Campos and Gassebner 2013; McCartan et al. 2008; Tavares 2004), and proximity to cities sometimes proves to be a positively significant predictor (Python et al. 2019a). Second, as some scholars stated, although terror originates in places with high social breakdown and resource mobilization, it is often transmitted to globally oriented, target-prone cities with high potential of conveying a global “message” (Savitch and Ardashev 2001). This might create what some researchers call “vicious cycles” of terrorism, which happen as a result of continuous terror and counter-terror actions (Beall 2006). Third, some actions of terrorists are aimed not at the creation of fear of direct physical threat, but at targeting critical infrastructure: communication, logistics systems, etc. – to hamper the victim country’s usual way of life (Coward 2009). These targets are most usually concentrated in cities. All in all, cities are more preferable as targets than rural areas; hence, the conduction of a terrorist attack is less costly in an urbanized country compared with a rural country. Since the cited evidence does not suggest that the effect is different on different levels of urbanization, the first prediction, Hypothesis 1.1, is as follows: the influence of urban population on the number of terrorist attacks is positive for all levels of urbanization.

The positive link proved itself in several studies (Tavares 2004) and the urban population as a predictor sometimes has a stronger effect than GDP per capita (Campos and Gassebner 2013). However, it also manifests ambiguity in some veiled way in research on latent anger in Africa (Adelaja and George 2019) which, in turn, stimulates unrest and, specifically, terrorism. Latent anger was found to have a significant negative relationship with urbanization, but the researchers explained this relation by the specificities of the organization of the terrorists and the execution of territorial control. Finally, one of the lines of research shows significant negative coefficients for urbanization as regards more urbanized countries (Korotayev, Vaskin, and Tsirel 2019; Vaskin, Korotayev, and Tsirel 2018). This brings us to the conclusion that the relation between the level of urbanization and the number of terrorist attacks is actually curvilinear (Hypothesis 1.2).

There were attempts to test the curvilinearity of the influence of more common determinants of terrorism. For instance, there is evidence that supports the existence of the curvilinear relationship between domestic terrorism and economic development (Enders and Hoover 2012; Enders, Hoover, and Sandler 2016; Gassebner and Luechinger 2011; Ghatak and Gold 2017; Lai 2007). Still, inspections have not yet been made into nonlinear relationships between urbanization – either its overall level or its tempo – and terrorism. Some studies used OLS methods (Tavares 2004) which may be inappropriate for the nature of the examined data (Kis-Katos, Liebert, and Schulze 2011) or inspected correlations and found no clear results for urbanization as a predictor (Newman 2006). That said, investigation of a nonlinear relationship, via more suitable statistical methods, may deserve more attention.

The nature of this curvilinearity was hinted by Huntington (1968): modernity breeds stability, but modernization breeds instability (Huntington 1968, 41; see also Korotayev et al. 2011, 2018). Concerning urbanization, we expect that instability increases at the beginning of the process (the period when modernization begins as well) and starts to decrease from a certain point. This gives us Hypothesis 1.2: the influence of the urban population on the number of terrorist attacks is positive at the beginning of the urbanization process and negative at the end of the urbanization process. Note, however, that in Hypothesis 1.1, the reason for the effect arises from the relative ease of undertaking terrorist attacks in cities. In the case of Hypothesis 1.2, though, the reason for the effect is rooted in social changes.

Some other reasons for the decrease of terrorism likelihood at high urbanization levels are related to the overall level of development in the society. As was stated, terrorist attacks serve as a form of expressing social grievances, and it is obvious that the degree of the grievances, and well as motivations of the poor, differ between agrarian and urbanized societies. We may see this for the case of Turkey in the 1970s when the country's urban centers became arenas of organized political violence. The rise of terrorism came as a result of rapid urbanization and social transformations, leading to a dramatic decrease of rural–urban migrants' quality of life compared to urban dwellers: namely, migrants formed an entire precarious class living predominantly in squatter settlement districts (Sayari and Hoffman 1994). The situation changed during the 1980s after the Turkish state had gained control over urban centers, and the number of terrorist incidents went down, which proves the claim of Charles Tilly: one of the major reasons why modern states were successful is that the object of their control had undergone changes in the process of urbanization. The concentration of population in cities became much higher, which means that it became easier for states to accumulate resources in urban centers, and to build technologies of control, too (Tilly 1992).

One potential reason for such decrease is that, starting from a certain point, it becomes hard for terrorists to gain access to recruitment and human resources in cities due to lack of trust among residents. This means that the decline in terrorism at higher levels of urbanization may be driven by parallel mechanisms: social changes provide the state with additional resources to develop coercive apparatus and other mechanisms of control, and at the same time, urban economies grow, which softens the deprivation of the unemployed and socially excluded migrants. If we look at education as a process associated with urbanization, there is evidence that it promotes terrorism in societies with less favorable conditions while reducing the number of terror attacks in more stable and developed countries (Brockhoff, Krieger, and Meierrieks 2015; Korotayev, Vaskin, and Tsirel 2019). Thus, over time, cities become more secure both because of social stabilization and the reinforcement of the state.

Tempo of Urbanization

As Kornhauser (1959) argues, “The rapid influx of large numbers of people into newly developing urban areas invites mass movements” (Kornhauser 1959, 145). Also, as Grinin and Korotayev (2009) note, political instability tends to spread at the moments of high rural–urban influx. Both Kornhauser and others, in their research, show that the problem is twofold. First, individuals, who move from home villages to cities, lack proper social networks and coping mechanisms appropriate for urban life, which makes them more vulnerable psychologically. The first wave of rural–urban migrants is also characterized by mechanical solidarity, which implies solidarity by commonality (Durkheim 1964; Huntington 1968). In rural areas, unity of individuals is observed. In urban areas, where different types of people can be observed, the conflict is imminent. It may not result in an immediate attack, but the certainly adds to frustration (Douglas 2012). As a study on terrorists at the beginning of the twentieth-century shows (Geifman 2005), terrorists – both the migrants from the villages and the others – suffered from severe psychological problems, and terrorism became one of the psyche’s defense mechanisms. In the research, it was also argued that at least half of the Socialist Revolutionary terrorists were first-generation proletariat, who came from the countryside. Second, rapid urban growth usually means that many citizens lives do not match decent living standards (Ibimilua 2011; Korotayev et al. 2011; William and Piyu 2008). They can also sometimes be discriminated against, for example, with the restrictive institution of registration (Ding and Ding 2012). This makes the first-generation urban residents specifically fertile for various social diseases. The lethality of terrorism and the frequency of lethal attacks are also proven to be driven by antagonistic mechanisms (Python et al. 2019b). It is claimed, for example, that the likelihood of an attack being lethal is higher in poorer areas that are prone to instability and conflict. Hence, the tempo of urbanization might be a useful factor for a terrorism researcher.

To our knowledge, there were a few attempts to test such a relationship directly; however, for different reasons, we consider them to be insufficient. There is no straightforward evidence that urban population growth may be the cause of the rise in terrorist attacks, as long as the mediating effect of social inequality and the inequitable access to such resources as education and basic public services take place (Østby 2016). Therefore, individual and collective inequality, as well as relative deprivation, give motivation for political violence among rural–urban migrants. Thus, the effect of such a migration is indirect. In an article by Buhaug and Urdal (2013), city population growth is tested as a predictor of lethal and nonlethal urban violence events. Although their findings show that the direct link is negligible and urban violence is unrelated to city population growth, their estimations still demonstrate that, under some conditions, urban growth may increase

the number of lethal urban violence events, which is, despite being of low significance, still observable with a positive coefficient. For example, the interaction effect of economic shock and city population growth happened to be negative. We suppose that the absence of a direct relationship may be the result of a poor choice of indicators. And it might be more apt to concentrate on the level of urbanization, instead of the city population, so that different urbanization periods are considered.

Apart from the results mentioned above, the possible link revealed itself in other qualitative research. In their research, Korotayev, Malkov, and Grinin (2014) mention that civil unrest can characterize societies at the end of the first-phase demographic transition. However, this research was not aimed at terrorism, per se, but at political violence as a whole. Focusing on purely terror events, as a subject of study, is essential, due to the difference in the nature of violence. Korotayev et al. (2019), also tried to explain the negative relationship between the urbanization rate and terrorism by a negative relationship between the urbanization rate, per se, and the tempo of urbanization. However, although noted by preceding research, the link between urbanization tempo and terrorism was not tested directly.

All in all, this brings us to the second hypothesis. On the one hand, the cited evidence does not imply the need for curvilinearity. Thus, Hypothesis 2.1 comes as follows: the tempo of urbanization has a positive influence on the number of terrorist attacks on every level of urbanization. However, if Huntington (1968) is right, it could be that the main problem is not in the changes alone. As he proposes, “instability . . . derives precisely from the failure to meet this condition: equality of political participation is growing much more rapidly than ‘the art of associating together’” (Huntington 1968, 5). If social and political institutions become more solid as modernization continues, the frustration of the first-generation urban residents could be absorbed more easily, and hence proceeding with modernization does not increase, but decreases instability. Even though the societies with strong organic solidarity (Durkheim 1964) may still produce terrorists, their activity may be seriously hampered by it due to the residents’ opposition to terrorists’ methods. Hence, Hypothesis 2.2 is as follows: the tempo of urbanization has a positive influence on the number of terrorist attacks at the beginning of urbanization, and a negative influence on the number of terrorist attacks at the end of urbanization.

Other Variables’ Effect

Following the line of reasoning by (Huntington 1968), other components of modernization could be blamed for instability and, consequently, terror attacks, and, hence, they should be taken into account.

Economic factors

Much research has been done on the influence of economic development on terrorism, and scholars have shown interest in evaluating the propensity of a country to experience more terrorist attacks, depending on either its wealth level or the tempo of development.

There has been much evidence of poverty provoking terror attacks as a part of more general consequences of poverty such as political instability and the rise of civil unrest. Poverty has been linked to terrorism by governments and has had its implications in establishing policies on reducing poverty levels worldwide (Kahn and Weiner 2002). With respect to those conventional views, researchers looked for a causality between economic development and terrorism. The findings are quite diverse though.

Some studies demonstrate that it is not actually the poorest countries that breed terrorism, but intermediate-level economies, where the need for economic improvement is highly likely (Daniel and Thomas 2013). There is evidence showing that, indeed, low opportunity costs for terror, in countries with slow economic growth, lead to more terrorist organizations there. However, this effect is only relevant after a certain level of development has been reached (Freytag et al. 2011). The authors also conclude that the causality between terrorism and economic growth does not remain stable over time and varies in different countries, which indicates the impact of shifting geographical and ideological patterns in terrorism that are associated with the end of the Cold War. The ambivalent effect of growth also proves itself via separating agriculture from industry and making a distinction between different kinds of terrorism. Seung-Whan (2015) infers that, despite the positive effect of stable economic growth in preventing domestic and international terrorism, some kinds of terrorism (suicide attacks) are still more likely to happen in prosperous countries with a steady industrial growth.

Other studies have found no evidence that economic development promotes terror. For instance, they claim that such predictors as population, ethno-religious diversity, increased state repression, and the structure of party politics are more significant predictors of terrorism compared to growth, which validates that social distinctions should be taken as explanatory factors primarily (Abadie 2006; Piazza 2006). Still, there is proof that there is a positive relationship between more countries having more favorable economic conditions or obtaining foreign aid, and the decrease in the number of terror attacks there (Azam 2012; Gassebner and Luechinger 2011). Finally, as mentioned above, some studies argue that economic development is positively correlated with terrorism at lower levels of development and is negatively correlated at higher ones (Enders and Hoover 2012, Enders, Hoover, and Sandler 2016; Gassebner and Luechinger 2011; Ghatak and Gold 2017; Korotayev, Vaskin, and Tsirel 2019; Lai 2007; Vaskin, Korotayev, and Tsirel 2018).

Our assumptions about the link between urbanization levels and terrorist attacks derive from the fact that more stable conditions are more common for the lowest and the highest levels of urbanization. Therefore, the relationship is highly likely to be positive in the first urban deciles and become negative after reaching the peak of the highest instability level at average urban deciles.

Political Factors

Another direction of research concentrates on political predictors of terrorism, and the main explanations boil down to three causal mechanisms. First, democracies prove to be less successful in dealing with terror attacks due to the lack of coercive forces (Eubank and Weinberg 1994, 2001; Schmid 1992). They impose constraints on the executive that make law enforcement more difficult and thus make it easier for terrorists to operate (Kis-Katos, Liebert, and Schulze 2011).

Second, domestic political instability and poorly managed internal political conflicts promote terror (Campos and Gassebner 2013; Piazza 2009; Tavares 2004), whereas regime durability reduces the number of terror events. This goes in line with Erica Chenoweth's research, in which she finds that cases of terrorism are most likely to happen in weak and transitioning democracies (Chenoweth 2013). In contrast, advanced democracies or full autocracies experience terrorism in a lesser degree. That said, we may suggest that terrorism is associated predominantly with the inconsistency of political institutions in intermediate regimes (Korotayev, Vaskin, and Romanov 2019). According to the results of a research by Fahey and Gary (2015), what underpins terrorism is social disorganization produced by unstable states. In the presence of political instability, such as ethnic war or regime transition, existing social organization is no longer capable of providing prosocial behavior of individuals via institutional or informal mechanisms. Their findings support Durkheim's claim: societies experiencing rapid social change cannot integrate their members properly, which leads to the proliferation of antisocial behavior of all forms, including political violence. Therefore, political instability increases the likelihood of terrorism cases due to lack of social organization (Fahey and LaFree 2015).

The third approach considers democracies to be better at reducing terrorism at the level of society via more open systems which make it possible for social groups to express their interests at fewer costs, instead of holding hard constraints and coercive power as tools of control for already existing conflicts. As some scholars state, alleviating existing conflicts and establishing social welfare policies can diminish domestic and international terrorism alike by reducing the conditions for terror as economic insecurity, inequality, poverty, and religious-political extremism (Burgoon 2006). Thus, democratic regimes provide more opportunities for nonviolent political expression, and thereby the grievances are less likely to turn into terrorism and more often result in

more peaceful forms of interest articulation (Eyerman 1998). While “terrorism is an attractive strategy for small organizations of diverse ideological persuasions who want to attract attention for their cause, provoke the government, intimidate opponents, appeal for sympathy, impress an audience, or promote the adherence of the faithful” (Crenshaw 1981, 396), giving more ways to articulate and lessen social tension may help reduce terror attacks.

Some findings show that regime type may affect terrorism differently. A recent study shows a robust inverted U-shaped impact on various terrorism measures (Gaibullov, Piazza, and Sandler 2017), whereas “strict autocracies and full-fledged democracies are much less plagued by terrorism than anocracies” (Gaibullov, Piazza, and Sandler 2017, 519; see also Slinko et al. 2017; Korotayev, Vaskin, and Romanov 2019).

Some other political explanations stem from the characteristics of potential targets and go further than the condition of internal policies and the degree of violence in society. When it comes to transnational terrorism, the likelihood of an attack rises under recent local experience with civil war battles, actual high levels of civil violence, and overall low security levels (Marineau et al. 2020).

Education

Despite the former prevailing arguments for foreign aid and education promotion on the part of developed countries as the necessary steps for fighting terrorism, more recent works demonstrate a positive link (Berrebi 2007) and claim that secondary or higher education is positively associated with participation in terrorist organizations. The explanations generally build on rational choice theory (Azam 2012) and the fact that terrorist organizations, as mentioned, recruit well-educated members strategically (Bueno de Mesquita 2005). Contrary to the proposed positive correlations, there is statistical evidence showing that education itself has an insignificant effect on terrorism; rather, education levels accelerate the effect of poor political and socioeconomic conditions as the main correlates for terror attacks (Brockhoff, Krieger, and Meierrieks 2010; Danzell, Yeh, and Pfannenstiel 2020; Krueger and Maleckova 2003). A curvilinear relationship between education levels and terrorism seems to be relevant: there is evidence that the intensity of terror attacks increases up to the level of approximately 3 to 6 years of schooling and declines afterward (Korotayev, Vaskin, and Tsirel 2019). Based on these results, we expect a positive relationship between education levels and terrorist attack intensity for lower urban deciles and a negative relationship at the highest levels of urbanization.

Group Discrimination and Civil Liberties

Any form of group discrimination is a powerful cause of frustration, anger, and, hence, extremism and terrorism (Geifman 2005; Skoczylis and Andrews

2020). In this research, we consider gender, religious, and ethnic discrimination as the most common types.

Women comprise half the population, yet they are frequently institutionally discriminated against, but it seems that they rarely reveal their anger via terrorism: compared to male terrorism, female participation is low (Ness 2007). Previously, it was noted that their labor force participation rate negatively affects the number of terrorist attacks. We suppose, the lower the gender discrimination in a country, the lower the number of terrorist attacks. The overall level of civil liberties is measured in this work based on Polity5 index, as well as an alternative measurement by Freedom House.

Other Control Variables

The size of the population has proven itself in many works concerning terrorism (Gassebner and Luechinger 2011). Its predictive value is quite intuitive: larger countries will have more terrorist attacks than other countries, both because greater opportunities are available, and as some note, “larger countries are heterogeneous and subject to more intergroup tension” (Burgoon 2006, 189). It was also hypothesized that larger countries’ terrorist attacks attract greater media attention and that it is harder to establish firm surveillance and control there; a terrorist attack in a large state is also more likely to yield a greater return (Dreher and Justina 2010; Eyerman 1998). Finally, urbanization and demographic transition are both components of modernization and sometimes coincide; it is, hence, important to consider population growth, per se, as a potential cause of the increase in terrorist activity.

In the case of transnational terrorism, the set of factors that make cities potential targets of terror attacks include accessibility, symbolism, material harm, and exclusion (Marineau et al. 2020). For instance, a smaller distance to the international border makes it possible for more terrorist organizations to access a country, while proximity to capital areas serves the purpose of message translation and symbolism, as well as higher potential material harm.

Data and Methods

We construct a time-series cross-sectional data set for 240 unique country entries from 1970 to 2018. As a response variable, we use two different measures from the Global Terrorism Database (LaFree and Dugan 2007): the number of terrorist attacks and the number of fatalities resulting from terrorist attacks in a given country in a particular year. As key predictor variables for the first hypothesis, regarding the direct impact of urbanization, we use the proportion of the urban population (UN data) and 5- and 10-year rolling average of the proportion of the urban population. Regarding the second hypothesis, we use growth rates of the share of the urban

population (UN data) and 5- and 10-year rolling average for the robustness. Note that we exclude several observations from the sample, namely the ones related to the Vatican city-state, which has a low registered population but a high number of tourists, thus leading to the bias. [Table 1](#) contains a description of our data set in terms of measurements, data sources, time span, etc., and [Table 2](#) presents descriptive statistics for the data.

Our dependent variables represent instances of terrorist attacks or killings in a given country-year which is essentially count data. In this case, the default option to draw inference is a Poisson regression. However, the Poisson distribution assumes that the mean and variance are the same, and is, hence, vulnerable to overdispersion when the latter is higher than the former. The maximum number of terrorist attacks in one country in 1 year is 3774, the mean number is 17.7 and the standard deviation equals 110.6.¹ To tackle the issue of overdispersion, for the baseline empirical modeling (results presented in the next section), we use negative binomial regression from the new *fixest* R package (Berge 2018). Even though previous researchers used different R packages for negative binomial models (for example, Zeileis, Kleiber, and Jackman 2008), we found them seriously inconvenient and inconsistent when approaching two-way fixed effects. In the robustness section that is presented as an online supplementary material, we use quasi-Poisson estimators from *glm* package (Croissant and Millo 2008).

Regarding the proposed nonlinear relationship, during the preliminary analysis, we divide the data into 20 vigintiles² to test whether the relationship is similar for different subsamples. [Figure 1](#) shows the mean number of normalized terror attacks for each vvigintile, as we observe from the plot there is a clear upward trend for the first half of the sample and fluctuations at the higher levels of urbanization. [Table 3](#) presents the results of negative binomial regressions with the number of terror attacks as a response variable and the proportion of the urban population as a predictor. The first model is estimated for the whole sample, the second for the lower level of urbanization, the third for the medium level, and the last one for the higher level of urbanization. For the whole sample, the share of the urban population is a negative yet insignificant predictor, for the lower levels of urbanization it is positive and significant. In the middle, the effect is insignificant and at higher levels of urbanization it is negative and significant at a 0.05 significance level. Thus, we assume that the relationship between urbanization and terrorist activity varies at different stages of urbanization. We also model this through a quadratic term of the proportion of urban population or through an interaction effect between the growth of the share of the urban population and the proportion of urban population itself.

¹For homicides maximum is 13965, mean 42.9, and SD 350.3.

²Based on the share of the urban population, where the first vigintile stands for the lowest levels of urbanization and the twentieth for the highest.

Table 1. Variables used in the results and robustness sections.

Variable	Years	Description	Measure	Measurement level	Source
Terrorist attacks	1970–2018	The number of terror attacks in country-year	Units	0 – lower level	Global Terrorism Database
Terrorist killings	1970–2018	The number of victims of terror attacks in country-year	Units	0 – lower level	Global Terrorism Database
Proportion of urban population	1950–2018	Share of urban population	In percentage points	0 – lower level	United Nations Population Division
Growth of urban population (proportion)	1950–2018	Change of share of urban population	In percentage points	0 – lower level	United Nations Population Division
Population	1960–2019	Size of population in country in particular year	Units	0 – lower level	United Nations Population Division
GDP per capita (PPP)	1960–2019	PPP per capita at constant 2017 prices	Dollars	0 – lower level	World Bank
Polity score	1919–2017	Polity5 score	Discrete variable	–10 – full autocracy, 10 – full democracy	Polity5 Annual Time-Series
Occupation	1919–2017	Polity5 score being –66 or –77	Binary variable	0 – lack of occupation of any sort and size, 1 – presence of occupation of any sort and size	Polity5 Annual Time-Series
War	1816–2014	Being in a state of war	Binary variable	0 – being in a state of war, 1 – lack of state of war	Correlates of War Project
State capacity	1960–2009	Index (Hanson and Sigman 2013)	Discrete variable	–4 – lower level	Hanson, Sigman, 2013
The number of refugees	1960–2017	WDI score	Population count	population count	World Development Indicators
Female labor force participation	1960–2019	Share of economically active women in the female population ages 15 or older	In percentage points	0 – lower level	World Bank
Political freedom	1972–2017	Aggregated freedom index mean score for civil liberties and political rights	Units	1 – higher level of freedom, 10 – lower level of freedom	Freedom House
Proportion of discriminated population	1946–2017	Proportion of population that experiences active and intentional discrimination to exclude it from political power	In percentage points	0 – lower level	Ethnic Power Relations Data Set Family

Table 2. Descriptive statistics of the variables.

Statistic	N	Mean	St. Dev.	Min	Pct(25)	Pct(75)	Max
Terrorist attacks	9,564	17.715	110.581	0.000	0.000	2.000	3,774,000
Terrorist kills	9,564	42.888	350.269	0.000	0.000	1.000	13,965,000
Proportion of urban population	13,916	46.529	24.983	1.700	26.018	66.773	100.000
Population	13,916	25,290,400	102,649,600	2,950	964,665	14,827,550	1,424,548,000
GDP per capita PPP	8,612	14,166.670	17,754.320	256.166	2,874,420	18,311,240	187,942,900
Polity score	8,301	0.511	7.497	-10.000	-7.000	8.000	10.000
Proportion of discriminated population	10,073	0.050	0.140	0.000	0.000	0.016	0.980
Freedom house score	7,858	7.438	4.108	2.000	3.000	11.000	14.000
Number of refugees in the country	4,510	92,412.700	354,395.300	1.000	243,250	36,871,750	4,404,995,000
State capacity (Hanson index)	7,601	-0.013	0.994	-3.512	-0.773	0.648	2.862
Female Labor Force (%)	4,413	51.334	15.991	8.026	42.242	61.228	90.770
Moving average of urban population (10-year)	12,143	46.748	24.665	1.882	26.508	66.567	100.000
Moving average of urban population (5-year)	13,128	46.628	24.845	1.796	26.273	66.750	100.000
Growth of urban population (proportion)	13,719	0.421	0.494	-24.580	0.120	0.640	3.900
Moving average of urban population growth (10-year)	11,946	0.423	0.411	-1.543	0.142	0.650	3.032
Moving average of urban population growth (5-year)	12,931	0.422	0.435	-4.612	0.130	0.644	3.292

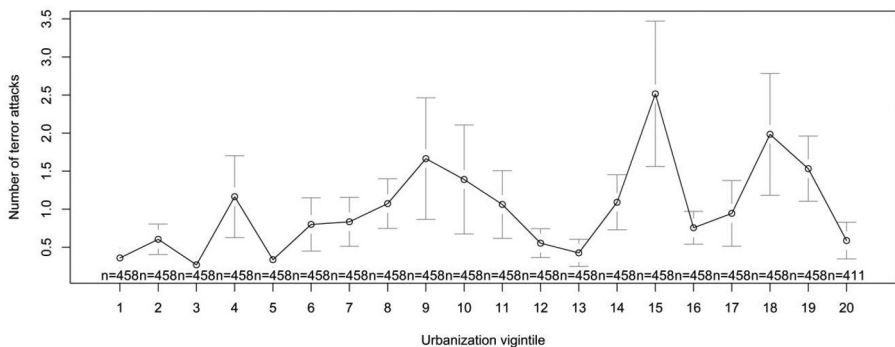


Figure 1. Number of terrorist attacks (per 1 million people) per urbanization vigintile.

We propose a sort of “competing for” pairs of hypotheses for both main predictors assuming a different (linear or nonlinear) relationship between urbanization and terrorist activity. To test them, we implement the following identification strategy. For the first hypothesis, for all combinations of response and predictor variables, we estimate, first, “linear³” relationship between an independent and dependent variable and a quadratic effect of the proportion of the urban population which is a way to directly model nonlinear relationship. For the second hypothesis, we estimate at first “linear” effect of the delta share of the urban population (proportion of the urban population included as a control) and then implement the interaction effect

Table 3. Preliminary models on subsamples.

Dependent Variable:		Terrorist attacks			
Model:	(1)	(2)	(3)	(4)	
Vigintiles:	All	(1–9)	(10–14)	(15–20)	
Variables					
Proportion of urban population	−0.0095(0.0106)	0.0680*** (0.0180)	−0.0424(0.0419)	−0.0586** (0.0242)	
Additional controls included					
Fixed-effects					
Country	Yes	Yes	Yes	Yes	
Year	Yes	Yes	Yes	Yes	
Fit statistics					
Observations	4,304	2,088	1,016	1,171	
Squared Correlation	0.44046	0.42870	0.22584	0.57513	
Pseudo R ²	0.18336	0.21007	0.21127	0.21683	
BIC	20,358.1	8,632.0	5,140.1	6,557.3	
Over-dispersion	0.61324	0.65918	0.81345	1.1561	

Heteroskedasticity-robust standard-errors in parentheses. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1.

³As we use negative binomial regression, “linear” stands for the formula in the regression without quadratic or interaction effects.

between the delta share of the urban population and the share of the urban population itself. This strategy allows us to model different effects of urbanization growth at different levels of urbanization.

Results

This section presents the results of the baseline negative binomial regression models for all the proposed hypotheses. We also present online supplementary materials with robust checks that provide additional evidence.

Urbanization and Terrorism

Table 4 presents the results for Hypothesis 1.1 considering a simple linear relationship between the urbanization level (measured as the proportion of the urban population in the total population of the country) and terrorist activity. All three predictors: a simple share of urban population and five- as well as 10-year rolling average – appear to be either negative insignificant or negative marginally significant (p -value between 0.05 and 0.1) predictors of the number of terrorist attacks. In addition, the already mentioned measures of urbanization are statistically insignificantly (positively) related to the number of terrorist killings. Thus, in five out of six tests the correlation has turned out to be insignificant and in the sixth test (with the number of terror attacks regressed against the 10-year rolling average) the main independent variable appears to be marginally significant, but in the direction opposite to the predicted one. Thus, our tests unequivocally reject Hypothesis 1.1. Note that all the models include two-way fixed effects on country and year and use heteroskedasticity robust standard errors to determine the coefficient significance.

The next Table 5 shows the results for Hypothesis 1.2. The set of models uses a quadratic term for all the predictors for both response variables. Coefficients for the share of urban population and the squared share of urban population are positive and significant and negative significant, respectively, at 0.01 significance level. The trend remains for all models (that is for all combinations of predictor and response variable). This means that the relationship between the share of urban population and terror attacks and killings follows a reversed U-shaped curve: the sign is positive at lower and becomes negative at higher stages of urbanization. Figure 2 presents the fitted values of the model normalized on the total population of the country dependent on the proportion of urban population. The trend line in the plot was drawn by LOESS estimate of the predicted values of terror attacks on the proportion of urban population. The visualization illustrates a quadratic relationship with peak value of predicted terror attacks around the proportion of urban population equal 55% of total population of the country. The result proves the hypothesis and, thus, we

Table 4. Proportion of urban population.

Dependent Variables:		Terrorist attacks			Terrorist killings		
Model:	(1)	(2)	(3)	(4)	(5)	(6)	
Variables							
Proportion of urban population	−0.0095(0.0106)			0.0222(0.0167)			
Log of population	3.667*** (0.3657)	3.759*** (0.3730)	3.827*** (0.3813)	4.553*** (0.5939)	4.675*** (0.6024)	4.822*** (0.6098)	
Log of GDP per capita (PPP)	0.5016*** (0.1712)	0.5142*** (0.1714)	0.5123*** (0.1715)	0.2762(0.2597)	0.3067(0.2590)	0.3253(0.2581)	
Polity score	0.0259*** (0.0077)	0.0266*** (0.0077)	0.0267*** (0.0077)	0.0004(0.0110)	0.0016(0.0110)	0.0029(0.0109)	
Occupied country	1.128*** (0.2943)	1.133*** (0.2942)	1.130*** (0.2938)	1.872*** (0.5463)	1.887*** (0.5465)	1.894*** (0.5468)	
Proportion of discriminated population	0.8862** (0.3459)	0.8862** (0.3443)	0.8930*** (0.3437)	0.6835(0.5668)	0.6825(0.5662)	0.6790(0.5641)	
War	1.069*** (0.0852)	1.073*** (0.0851)	1.073*** (0.0852)	1.901*** (0.1377)	1.913*** (0.1376)	1.919*** (0.1376)	
Moving average of urban population proportion (5-year)		−0.0150(0.0107)			0.0122(0.0170)		
Moving average of urban population proportion (10-year)			−0.0186*(0.0109)			0.0005(0.0172)	
Fixed-effects							
Country	Yes	Yes	Yes	Yes	Yes	Yes	
Year	Yes	Yes	Yes	Yes	Yes	Yes	
Fit statistics							
Observations	4,304	4,302	4,297	4,203	4,201	4,196	
Squared Correlation	0.44046	0.45902	0.46744	0.15914	0.19189	0.18746	
Pseudo R ²	0.18336	0.18361	0.18375	0.12350	0.12355	0.12356	
BIC	20,358.1	20,332.5	20,274.5	19,415.4	19,389.1	19,318.5	
Over-dispersion	0.61324	0.61412	0.61339	0.20891	0.20866	0.20787	

Heteroskedasticity-robust standard-errors in parentheses

Signif. Codes: ***, 0.01, **, 0.05, *, 0.1

Table 5. Quadratic effect of proportion of urban population.

Dependent Variables:		Terrorist attacks		Terrorist killings	
Model:	(1)	(2)	(3)	(4)	(6)
Variables					
Proportion of urban population	0.2454*** (0.0225)			0.2980*** (0.0369)	
Proportion of urban population ²	-0.0025*** (0.0002)			-0.0027*** (0.0003)	
Log of population	2.558*** (0.3617)	2.632*** (0.3708)	2.663*** (0.3823)	3.070*** (0.6271)	3.220*** (0.6394)
Log of GDP per capita (PPP)	0.2680* (0.1585)	0.2894* (0.1593)	0.3188** (0.1606)	0.0222 (0.2360)	0.0802 (0.2388)
Polity score	0.0243*** (0.0076)	0.0244*** (0.0076)	0.0241*** (0.0076)	-0.0013 (0.0113)	-0.0004 (0.0113)
Occupied country	0.9379*** (0.2773)	0.9364*** (0.2804)	0.9339*** (0.2831)	1.689*** (0.5427)	1.722*** (0.5484)
Proportion of discriminated population	0.9677*** (0.3490)	1.009*** (0.3547)	1.032*** (0.3552)	0.7066 (0.5827)	0.7645 (0.5971)
War	1.112*** (0.0828)	1.112*** (0.0836)	1.108*** (0.0843)	1.936*** (0.1373)	1.944*** (0.1384)
Moving average of urban population proportion (5-year)		0.2218*** (0.0231)			0.2627*** (0.0364)
Moving average of urban population proportion (5-year) ²		-0.0023*** (0.0002)			-0.0025*** (0.0003)
Moving average of urban population proportion (10-year)			0.2008*** (0.0242)		0.2286*** (0.0365)
Moving average of urban population proportion (10-year) ²			-0.0021*** (0.0002)		-0.0023*** (0.0003)
Fixed effects:					
Country	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
Fit statistics					
Observations	4,304	4,302	4,297	4,203	4,201
Squared Correlation	0.45992	0.47285	0.47759	0.15214	0.16464
Pseudo R ²	0.19215	0.19127	0.19033	0.12788	0.12732
BIC	20,164.5	20,164.9	20,132.1	19,334.3	19,320.5
Over-dispersion	0.67207	0.66617	0.65859	0.21729	0.21585

Heteroskedasticity-robust standard-errors in parentheses

Signif. Codes: ***, 0.01, **, 0.05, *, 0.1

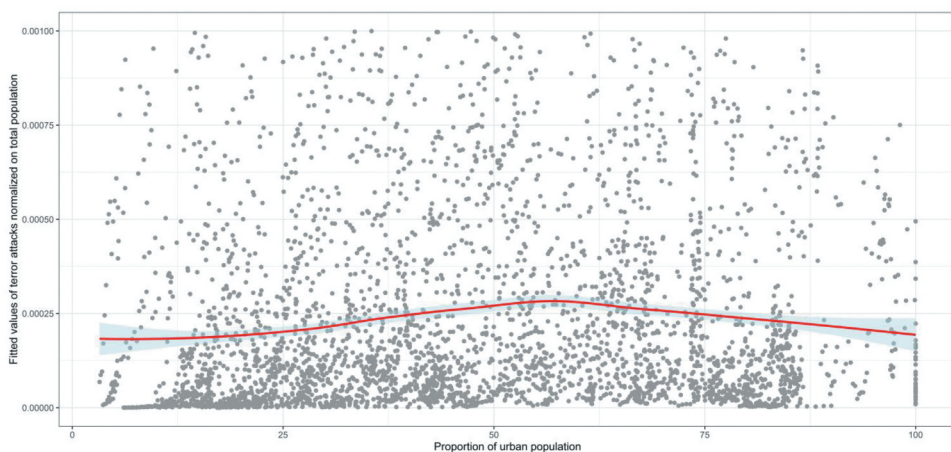


Figure 2. Predicted number of terrorist attacks (normalized on total population).

conclude that the relationship between urbanization and terrorist activity should be described as quadratic rather than a simple linear relationship.

Urbanization Growth and Terrorism

The results for Hypothesis 2.1 are shown in Table 6. Growth of urban population in a given country-year is a significant positive predictor at 0.01 significance level for both number of terrorist attacks and terrorist killings. However, the significance drops as the interval for average widens to 10 years (yet the signs remain positive). Also note that the share of urban population is mostly insignificant and even becomes negative for number of terrorist attacks. Concerning the decline in significance of wider rolling average measures a possible explanation is that the terrorist activity is dispersed with time; thus, the 10-year rolling average is measuring too general trend to predict such varying phenomenon.

Finally, Table 7 presents the results for the last hypothesis (Hypothesis 2.2) assuming the joint effect of urbanization growth and level. Both the urbanization growth (including rolling averages) and the interaction term are significant at the 0.01 significance level. While the coefficient for growth is positive, the interaction effect has a negative sign which means that the effect of the share of urban population growth becomes negative as the share of urban population increases and the strength of the relationship weakens. Next Figure 3 performs fitted values for the interaction term model. To plot the effect of urbanization growth conditional on the level of urbanization, we divided the sample into two parts. The breaking point was chosen such that after this level of urbanization effect of growth becomes negative according

Table 6. Growth of proportion of urban population.

Dependent Variables:		Terrorist attacks			Terrorist killings		
Model:	(1)	(2)	(3)	(4)	(5)	(6)	
Variables							
Growth of urban population (proportion)	0.3903*** (0.1151)			0.6659*** (0.1990)			
Proportion of urban population	−0.0135 (0.0106)			0.0149 (0.0163)			
Log of population	3.858*** (0.3806)	3.895*** (0.3866)	3.860*** (0.3872)	4.785*** (0.6190)	4.902*** (0.6251)	4.887*** (0.6210)	
log of GDP per capita (PPP)	0.4833*** (0.1703)	0.4821*** (0.1705)	0.4935*** (0.1707)	0.1763 (0.2569)	0.1364 (0.2564)	0.1665 (0.2558)	
Polity score	0.0270*** (0.0078)	0.0263*** (0.0078)	0.0260*** (0.0078)	0.0018 (0.0111)	−2.45 × 10 ^{−5} (0.0111)	−0.0010 (0.0111)	
Occupied country	1.109*** (0.2920)	1.105*** (0.2939)	1.112*** (0.2943)	1.803*** (0.5498)	1.805*** (0.5536)	1.827*** (0.5550)	
Proportion of discriminated population	0.8953*** (0.3352)	0.9071*** (0.3390)	0.9204*** (0.3449)	0.6183 (0.5457)	0.6533 (0.5511)	0.7620 (0.5675)	
War	1.058*** (0.0845)	1.061*** (0.0847)	1.067*** (0.0853)	1.874*** (0.1365)	1.866*** (0.1369)	1.882*** (0.1376)	
Moving average of urban population growth (5-year)		0.3349*** (0.1233)			0.8358*** (0.2025)		
Moving average of urban population proportion (5-year)		−0.0173 (0.0107)			0.0080 (0.0164)		
Moving average of urban population growth (10-year)			0.1601 (0.1323)			0.6804*** (0.2250)	
Moving average of urban population proportion (10-year)			−0.0192* (0.0109)			−0.0005 (0.0167)	
Fixed-effects							
Country	Yes	Yes	Yes	Yes	Yes	Yes	
Year	Yes	Yes	Yes	Yes	Yes	Yes	
Fit statistics							
Observations	4,304	4,301	4,296	4,203	4,200	4,195	
Squared Correlation	0.44100	0.47048	0.47082	0.14441	0.15552	0.15757	
Pseudo R ²	0.18389	0.18401	0.18379	0.12410	0.12439	0.12402	
BIC	20,354.3	20,320.7	20,268.9	19,411.5	19,366.6	19,302.6	
Over-dispersion	0.61653	0.61668	0.61392	0.21008	0.20997	0.20854	
Heteroskedasticity-robust standard-errors in parentheses							
Signif. Codes: ***, 0.01, **, 0.05, *, 0.1							

Heteroskedasticity-robust standard-errors in parentheses

Signif. Codes: ***, **, *, 0.1

Table 7. Interaction between proportion of urban population and urban population growth.

Dependent Variables:		Terrorist attacks				Terrorist killings			
Model:		-1	-2	-3	-4	-5	-6		
Variables									
Growth of urban population (proportion)		1.561*** (0.2680)			1.998*** (0.4370)				
Proportion of urban population		0.0044 (0.0112)			0.0425* (0.0188)				
Log of population		3.891*** (0.3691)	3.943*** (0.3745)	3.959*** (0.3810)	4.902*** (0.6143)	4.951*** (0.6198)	4.918*** (0.6208)		
log of GDP per capita (PPP)		0.4782** (0.1663)	0.4431** (0.1662)	0.4262* (0.1666)	0.1989 (0.2490)	0.0877 (0.2422)	0.0772 (0.2445)		
Polity score		0.0267*** (0.0078)	0.0262*** (0.0077)	0.0257*** (0.0077)	0.0007 (0.0111)	-0.0011 (0.0111)	-0.0025 (0.0111)		
Occupied country		1.162*** (0.2953)	1.191*** (0.3042)	1.197*** (0.3083)	1.796*** (0.5324)	1.843*** (0.5353)	1.878*** (0.5432)		
Proportion of discriminated population		0.7802* (0.3248)	0.7363* (0.3305)	0.8625* (0.3418)	0.4048 (0.5151)	0.4342 (0.5229)	0.7251 (0.5609)		
War		1.051*** (0.0827)	1.055*** (0.0827)	1.064*** (0.0840)	1.861*** (0.1345)	1.855*** (0.1344)	1.871*** (0.1362)		
Growth of urban population (proportion) × Proportion of urban population		-0.0245*** (0.0049)			-0.0289** (0.0089)				
Moving average of urban population growth (5-year)			1.816*** (0.2862)			2.630*** (0.4669)			
Moving average of urban population proportion (5-year)			0.0052 (0.0114)			0.0414* (0.0189)			
Moving average of urban population growth (5-year) × Moving average of urban population proportion (5-year)			-0.0309*** (0.0052)			-0.0382*** (0.0093)			
Moving average of urban population growth (10-year)				1.608*** (0.3298)			2.200*** (0.5468)		
Moving average of urban population proportion (10-year)				0.0019 (0.0116)			0.0270 (0.0195)		
Moving average of urban population growth (10-year) × Moving average of urban population proportion (10-year)				-0.0293*** (0.0058)			-0.0313** (0.0104)		
Fixed-effects									
Country		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics									
Observations		4304	4301	4296	4203	42	4195		
Squared Correlation		0.43786	0.46273	0.45887	0.15391	0.18151	0.17599		
Pseudo R2		0.18493	0.1854	0.18478	0.12464	0.12515	0.12446		
BIC		20338.9	20297.2	20254.5	19408.7	19359.4	19302		
Over-dispersion		0.62187	0.6241	0.6196	0.2111	0.2112	0.20916		

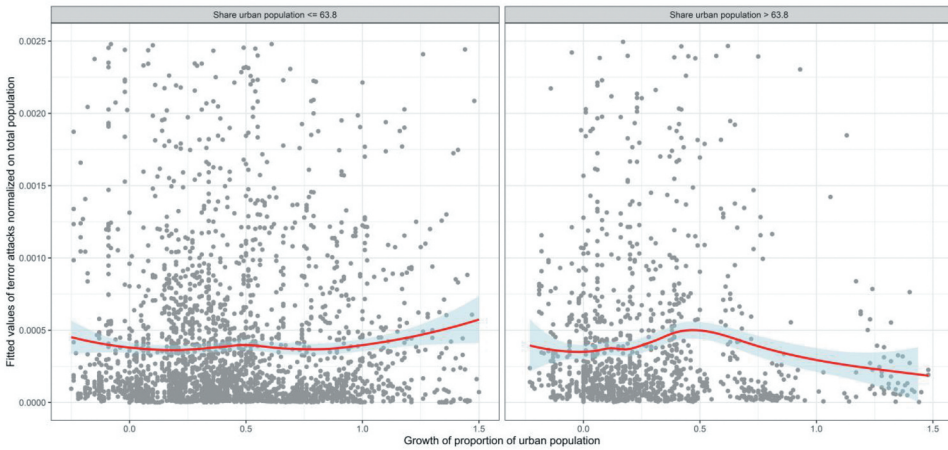


Figure 3. Predicted number of terrorist attacks (normalized on total population).

to the model estimates⁴ (see model 1 from Table 7). The left subplot stands for the trend before the breaking point while the right does for the one after. The trend on the plot was drawn by LOESS estimate of fitted values from a regression model on the growth of proportion of the urban population. The graph indicates that the effect of the growth of the share of urban population varies with the proportion of urban population itself, as it is positive at the lower stages and negative at the higher stages of urbanization. Thus, we have gained evidence in favor of this hypothesis and assume that the effect of urbanization growth is conditional on urbanization itself. In other words, at lower levels of urbanization, its growth is associated with a higher impact on terrorist activity than at higher levels.

Discussion

In this section, the results from the previous two sections are interpreted in a broader context and with more specific evidence. We illustrate our findings with several case-study examples. The majority of cases supporting the observed relationship for lower urban vigintiles predominantly include countries in sub-Saharan Africa and South and Southeast Asia (see the full list of observations in Table 4 of supplementary online materials).

As the Results section shows, we see a significant positive relationship between urbanization and terror attacks in countries where less than half of the population lives in cities.⁵ This evidence is consistent with both historical examples and the theoretical framework. It corresponds with the baseline

⁴The breaking point could be calculated from partial derivative of regression equation on growth of proportion of urban population, it is at the 63,8% urbanization rate.

⁵See Table 5.

Huntington hypothesis that the early stages of modernization are marked by destabilization and an increase in violence.

Latin American countries within the first 10 vigintiles of urbanization are in line with the drastic overall population growth in Latin America (Bongaarts 2009) from 0.17 to 0.56 billion. We observe an increase in the likelihood of terror attacks for countries in Central America and the Caribbean region in the second half of the twentieth century. El Salvador demonstrates a significant increase in urbanization from the end of the 1970s up to the early 1990s, with the share of urban population growing from 43% to 50%. These years coincide with the rise in terrorism and civil war in El Salvador – a marker of an overall destabilization process. This case corresponds with our expectations of an increase in terrorism at the end of the first phase of demographic transition, as long as fertility decline for El Salvador is estimated to have started in the mid-1960s (Reher 2004). The same link is observed for Nicaragua in 1978–1983, and it corresponds with the end of the Nicaraguan revolution in 1979 and precedes the period of armed conflict in the 1980s, which, again, confirms our hypothesis on the relationship between urbanization and destabilization. The same is true for Honduras in the last 20 years of the twentieth century, with an increase of urban population ratio from 36% to 43% and a significant rise in terrorism. However, it is important to mention that to account for instability in Central America in the 1980s and 1990s one should take into consideration some other factors other than urbanization, which, of course, requires further analysis.

Concerning the Middle East and North Africa regions we see evidence for the established relationship for Turkey in the 1970s, Iran and Syria around the start of the 1980s, and contemporary Egypt and Yemen. In Egypt, we observe a sharp increase in urban population ratio after 2009. This trend is concurrent with Hezbollah, Khan el-Khalili, and Cairo terror attacks in 2009 together with numerous terror attacks in 2012–2017 following the Arab Spring.

Concerning the latter half of the observed link between urbanization and terrorism, we propose that, starting from a certain level of urbanization, the government becomes able to regulate the society, as long as the concentration of population is high enough for officials to provide public goods effectively by using previously accumulated resources, such as education, social support programs, etc. It is important to note here that at this phase of modernization societies are more stable, and therefore urbanization leads to concentration of state control and safety. In contrast, at earlier stages of urbanization, the rise of urban population converts into “proletarianization” of cities, and the state, being itself in process of transformation, cannot keep up with the ongoing changes. This results in major social shocks and destabilization, leading to terrorism as a form of expression of social grievances.

This was the case in Columbia in the 1990s, when the state apparatus was reformed in order to increase its effectiveness and capacity. Our data shows

that after 2000 the number of terrorist attacks per year did not exceed five, while in the previous two decades, starting from 1980s, most years the number of terror attacks varied between ten and fifteen attacks a year, which proves the effectiveness of state coercive powers. It can be noticed that this relationship is relevant for other Latin American countries, such as Brazil and Chile, too, since these countries experienced rather few terror attacks after state reforms in the late 1990s.

Finally, we would like to draw the reader's attention to a work by Sciubba (2012) as she points out that cities have become different from those of the nineteenth and twentieth centuries. Theoretically, this could change the link between urbanization and terrorism. She argues urbanization would intensify and urban density would increase, which in turn could exacerbate terrorist activity. However, due to the progress in communication technologies, urban residents would be able to sustain their family ties. We suppose this might bring dual results. Potentially, it could decrease the frustration of the first-generation urban resident. Alternatively, this might not force them to learn the art of association. In other words, even though we have confidence in the presented results, we advocate for renewed research on this topic in a decade.

Conclusion

In this paper, we have carried out the first extensive analysis of the influence of urbanization on the number of terrorist attack incidents and terrorist killings. We test different hypotheses on the influence. First, the literature on terrorists as rational actors suggests that there is a greater propensity to conduct a terrorist attack in a city compared to a rural area, both for media and logistical reasons. Based on this evidence, we test the hypothesis on the existence of the linear positive effect of urbanization on terror attacks (Hypothesis 1.1). Second, we observe that problems may arise from rapid modernization, specifically, from intensive rural-urban migration, which brings many individuals to live in social and living conditions they are not used to and do not fit in. This suggestion follows the more general prediction that nations in the process of modernization are less stable than modernized or non-modernized ones and a more complex supposition that modernization has a negative influence on stability in its beginning and positive influence in its end. In that connection, we also test the hypothesis of an increase of terrorist activity at lower levels of urbanization and a decrease at higher urbanization levels (Hypothesis 1.2).

We have not found evidence to support Hypothesis 1.1 that the level of urbanization has a simple linear positive relationship with the terrorist activity for the whole range of societies at all phases of urbanization transition.

Consistently with the Hypothesis 1.2, we have found that an influx of rural residents to cities does have a consistent positive influence on the number of terrorist attacks at lower urbanization levels. We suppose that this is generally a result of frustration and lack of proper social networks of first-generation urban residents and a lack of proper living conditions in newly urbanized areas.

As predicted by two other hypotheses, we have found that the influence of both urbanization and its tempo is inverted U-shaped, with the point of inflection being slightly higher than the median (the inflection point is estimated to be at 55% urbanization rate for the model with simple urbanization level influence and 63.8% urbanization rate for the model with the joint influence of urbanization level and its growth). Following theory and case studies, an increase in the number of first-generation urban residents increases the number of terrorist attacks in the first stages of urbanization and has the opposite effect in the late stages. We explain this curvilinearity with the Huntington hypothesis on the true cause of instability: the issue is not modernization, per se, but modernization combined with a lack of political institutions. This explanation is supported by the negative or declining effects of both the urbanization level and urbanization tempo in the second half of the urbanization process.

The evidence we have found can be used extensively to further deepen our understanding of terrorism. We feel that the following research topics would be worthwhile for discussion on factors of terrorism.

- (1) Since the evidence for the negative correlation between terrorism and urbanization stems predominantly from the Latin American countries, they should be studied separately. Such an investigation would help to comprehend how modernization processes alter the nature of political violence, its actors, and determinants.
- (2) The nonlinear relationship we obtained suggests that modernization processes and terrorism share a complex relationship. To disentangle the effect of urbanization from other factors, it would be fruitful to look at the exogenous shocks in the urban population caused by crises in the agricultural sector.

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