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Domestic Terrorism in the Developing World: Role of Food Security

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Abstract

This article sheds light on the root causes of terrorism by assessing the effect of food security on domestic terrorism among developing countries. Food security is a fundamental physiological need and captures a core well-being outcome. We argue that food insecurity creates grievances among citizens and increases demand among them for action against the government. Terrorist organisations provide the opportunity for citizens to channel their grievances against the government by resolving collective action problems and mobilising citizens. We demonstrate the link between food insecurity and domestic terrorism through quantitative analyses on a sample of 70 developing countries from 1980–2011. Our findings demonstrate the deleterious effects of food insecurity on peace in the developing world.

Keywords: developing countries; food security; grievance; terrorism.

Introduction

Anecdotal evidence suggests a strong tie between food security and terrorism. Indeed, the inception of several prominent terrorist organisations can trace their roots back to food security issues. The Shining Path's emergence in Peru, for example, can be traced to subsistence issues in the country's highland areas, which created an opportunity for the organisation to recruit potential supporters. McClintock suggests (1984: 59) 'People in the southern highlands earn little, die young, are mostly illiterate, and usually exist without basic human services.' The core nature of grievances and the inability of governments to address these concerns enabled the Shining Path to garner support among peasants in the region. These grievances were exploited early on, as the Shining Path originally projected itself as a moral corrective to the state, forming support bases far from urban centres that supplied resources, including food, to the rural populace (Stiefer 2017). This case does not appear to be an outlier as emerging terrorist groups seize on a food insecure public, using money and food as incentives for joining. For example, one of the key tactics of the Islamic State when they move into an area with scarce resources is to capture access to all economic and social infrastructures, which they then use as leverage to increase their ranks. Interviews with defectors from the Islamic State point to the fact that many join the terrorist group out of desperation and hunger. 'When Daesh took over they said, "You are either with us or not." They gave no food, no jobs except to people who joined them, so the people got hungry' (Speckhard and Yayla 2015: 99). A similar rationale drives recruitment to Al-Shabaab, with one member explaining that he and his friends were lured with promises of a mobile phone and $50 a month upon joining (Botha and Abdile 2014: 5). Indeed, many recruits to Boko Haram viewed membership as an economic step forward (Mercy Corps 2016).

These examples provide tentative insight into the fundamental role of food insecurity in increasing terrorist activities and prompt us to ask whether this is part of a larger pattern. Does food insecurity promote a rise in terrorist violence? Research on the relationship between food security and conflict is well documented in revolutionary Europe and Russia (Rudé 1964; Tilly 1971), the 'IMF riots' of the 1970s and 1980s (Walton and Seddon 1994), and most recently the food price peaks of the 2000s (Weinberg and Bakker 2015; Hendrix and Haggard 2015). However, evidence of its effects on terrorism is lacking (Adelaja et al. 2019). We address this lacuna in the literature.

Drawing on Amartya Sen's (1999) work on development, we propose that food security plays an important role in enhancing human capability. We argue that the absence of adequate food is likely to increase grievances among citizens and may lead the populace to question the ability and the legitimacy of the government to provide for them. Furthermore, prevalence of grievances presents an opportunity for terrorist organisations to mobilise potential supporters to join their cause. This is especially likely among developing countries where materialistic issues that ensure physical and economic security (such as food security) play an important role (Inglehart 1977, 1997).

We assess the effect of food insecurity on domestic terrorism among 70 developing countries from 1980 to 2011, and our findings provide support to the hypothesised relationship between the two. This article makes two primary contributions to the existing literature. First, the article presents a theoretical perspective linking food security to domestic terrorism among developing countries. Second, the findings provide specific policy implications for countries facing terrorism. By demonstrating the significance of food security in reducing terrorism, we hope to provide better insight to leaders and organisations that are dealing with the challenges associated with terrorism.

More generally, this article speaks to the larger body of research on development and conflict. Food security is a core aspect of development (Sen 1999), and as such food security, poverty, and economic development are closely interlinked and cannot be separated (Tweeten 1997). This research also contributes to broader works on food insecurity and political unrest (Weinberg and Bakker 2015; Pinstrup-Andersen and Shimokawa 2008; Hendrix and Brinkman 2013; Hendrix and Haggard 2015) by focusing on the effect of food insecurity on a specific facet of political violence, namely domestic terrorism.

The article is organised in four sections. In the following section, we clarify the concepts of food security and terrorism and elaborate on our operationalisation of food security with protein supply per capita. We elaborate on how our theoretical conceptualisation and measure of food security captures one of its core pillars, food availability. The next section draws the theoretical link between food insecurity and domestic terrorism. We then discuss the data and methodology to assess the relationship between the two, followed by our empirical findings. The last section discusses the policy implications and avenues for future research.

Food Security and Terrorism: Defining the Concepts

We view food security as an important aspect of development, which is a multidimensional process and goes beyond traditional measures such as income. For instance, the Human Development Index includes other factors in its conceptualisation of development as well such as life expectancy and education levels. Sen (1999: 38) takes a broader approach and emphasises five types of development or freedoms that include political freedom as well as social protections that ensure education, health, and prevent hunger, among others. We specifically focus on one fundamental aspect of development, food security.

Commitment of organisations such as the Food and Agriculture Organization (FAO) of the United Nations and the United Nations Development Program (UNDP) to ensure global food security highlight the importance of the issue. The World Food Summit (WFS) organised in Rome in 1996 as well as the First Millennium Development Goal established in 2000 aimed at reducing the number of undernourished and hungry by half by the year 2015. However, while considerable progress has been made, 'hunger remains an everyday challenge for almost 795 million people worldwide, including 780 million in the developing world' (FAO 2015: 4). This is reflected in the 2030 Agenda for Sustainable Development as well that has 'Zero Hunger' as one of the 17 Sustainable Development Goals (SDGs) (UNGA 2015).

The concept of food security has evolved over time to incorporate food availability as well as access, utilisation, and stability (FAO 2006). We adopt the FAO's (2006) conception of food security, which refers to presence of food security 'when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life'. In particular, the definition incorporates four pillars or dimensions of food security: food availability, access, utilisation, and stability, which relate to availability of quality food, existence of adequate resources to acquire food, utilising quality food to reach nutritional well-being, and ensuring availability and access to adequate food at all times to ensure food security, respectively.[1] This conception of food security emphasises three attributes (Pritchard 2016: 2). First, food security is achieved when it meets the *needs* of the people. Second, the definition is ambitious as it seeks to include 'all people' in the global community. Third, the *quality* of food is important as the concept also refers to 'safe and nutritious food'. The academic literature has not always identified which aspect of food insecurity affects societal peace adversely (Rudolfsen 2018). This is beginning to change. For instance, Adelaja et al. (2019) differentiate between dimensions of food insecurity and its consequences for societal peace. We adopt a similar approach by linking food availability to domestic terrorism.

Our theoretical explanation that links food insecurity and domestic terrorism focuses primarily on the most fundamental aspect of food security: availability of quality food. Food availability includes domestic production, imports, as well as food aid. We measure food security with protein supply per capita (FAO 2016), which closely relates to food availability (Lele et. al. 2016). Scanlan and Jenkins (2001) use a similar measure to capture food security, specifically food availability as well as access. Even though we focus primarily on food

availability, we draw on Scanlan and Jenkins' argument (ibid.: 160) that food *availability* also captures *access* to the 'global bread basket'. As such, we contend that the two are likely to be correlated so that absence of food availability may also reduce food access to an extent.[2]

Our measure of protein supply is an appropriate measure of food insecurity for this article as lack of adequate food supply captures core grievances and primarily affects the poor for two reasons (Blaydes and Kayser 2011). First, adequate food intake remains a primary concern for the poor who are also more likely to spend any increases in their income on food as compared to the rich. Second, food is also relatively difficult to hoard, as it is perishable. Since there are limits to how much food one can consume, any prominent changes in food consumption may be indicative of changes on the national scale. Our theoretical explanation linking food insecurity to domestic terrorism focuses primarily on core grievances, which are likely to be most prevalent among the poor. Adequate food consumption is especially a concern in the developing world, making this measure appropriate given the sample under study.[3]

Food security has commanded the attention of the academic community since Maslow (1943) offered his theory about human motivation being related to food security. Maslow's hierarchy of basic human needs identifies physiological needs at the bottom of the pyramid followed by safety, love, esteem, and lastly self-actualisation needs. We place food security as a physiological human need in Maslow's hierarchy. The supreme importance of food is underscored by Maslow, who states, 'For the man who is extremely and dangerously hungry, no other interests exist but food. He dreams food, he remembers food, he thinks about food, he emotes only about food, he perceives only food and he wants only food' (Maslow 1943: 374).

Food security is perceived as a primary end as it relates to one of the most basic physical capabilities of individuals. Without adequate food, individuals can be deprived of the ability to pursue a better quality of life that includes improved health, access to educational opportunities, economic self-sufficiency, contributing to the economy in meaningful ways, and advancement of the self as well as the society as a whole. Maslow echoes this sentiment as he states, 'A person who is lacking food, safety, love, and esteem would most probably hunger for food more strongly than anything else' (ibid.: 373).

Amartya Sen, one of the prominent developmental scholars, also emphasises the significance of food security for individual capability and development and views development as 'a process of expanding the real freedoms that people enjoy' (Sen 1999: 36). In recent empirical research, several studies focus on the causes or consequences of food security (Scanlan and Jenkins 2001; Hendrix and Brinkman 2013; Hendrix and Haggard 2015; Adelaja et al. 2019, among many others). We contend that Sen's (1999) reference to food security and Maslow's (1943) emphasis on physiological needs place food availability as an underlying need for survival.[4]

We see political leaders addressing food shortages domestically as well as demonstrated by the Chinese Communist Party (CCP) in China where the party initiated rural reform policies between 1949 to 1956 to address lack of adequate food and recognised its significance in bringing about development more generally (Shue 1980: 22). This approach is consistent with Sen's emphasis on adopting a broad approach to addressing hunger, which includes addressing the causes of poverty and enhancing better access to food through a variety of policies (FAO 2013).

Turning next to terrorism, we define it as an act that involves the premeditated use or threat of violence by subnational groups or individuals for the purpose of obtaining a political, religious, or social objective by intimidating a large audience beyond that of the immediate victim (Enders and Sandler 2006: 3). This definition captures the key elements of terrorism in that every attack involves a victim, a perpetrator, and an audience. Victims are generally assumed to be civilians and non-combatants, though non-combatants can sometimes include both civilian police and military assets outside of war zones (US National Counterterrorism Center 2007). Perpetrators of terrorist violence can involve any variety of groups, individuals and states (Clutterbuck 1994; Hoffman 2006), though it is assumed to be utilised primarily by non-state actors. Finally, and crucially, every attack involves an audience beyond the immediate victim. There are multiple groups that are signalled by an attack, but attacks serve primarily two audiences – sympathisers of the victim, who are meant to be intimidated by the terrorist act, and sympathisers of the perpetrator, who serve as potential recruits for future terrorist attacks (Rosendorff and Sandler 2004; Schmid 2005). For the purposes of this study, we are equating terrorism exclusively with instances of actual terrorist violence, though we recognise that many countries also criminalise actions that enable violence, such as financing, planning, and recruitment efforts (US Department of State 2011).

Figure 1 displays the number of domestic terrorist attacks within OECD and non-OECD countries from 1980 to 2011. Domestic terrorism is a terrorist incident in which the nationalities of the victim and perpetrator are the same as the venue of the state in which the attack occurred. Both groups of countries have been witnessing acts of domestic terrorism in recent years. However, it is a much more frequent phenomenon in the developing world as compared to the developed world and this warrants a closer look.

Figure 1

Food Security, Development, and Terrorism: A Review of the Literature

The relationship between food insecurity and political violence is nuanced, involving a circular link in which food insecurity can act simultaneously as a source of grievance in certain cases while mitigating instances of conflict in others (Flowers 2016). Research on the relationship between food insecurity and conflict has examined various types of conflict, including civil war, intrastate communal conflict, urban unrest, and, more recently, terrorism. And while the causal chain is often not attributed to a single variable, there is convergence in the literature in associating the key elements with some forms of political violence, including the effects of food and fuel prices, droughts, and their interaction with state institutional characteristics.[5]

Despite the large body of work examining the links between food security and conflict, few contemporary studies have directly examined its relationship with terrorism. Those that have generally find that food insecurity, specifically lack of food access, increases grievances among individuals, which terrorist organisations exploit for recruitment purposes either by providing resources that the state cannot (Adelaja et al. 2019), or that food price volatility and food price increases enable terrorist organisations to serve as agents of collective action and increase terrorist violence (Piazza 2013).

We specifically focus on the impact of food availability on domestic terrorism. Due to the fundamental necessity of food to an individual's wellbeing (Maslow 1943), we can situate the discussion of food insecurity within the 'root causes' literature on terrorism. The 'root causes' of terrorism hint at some causal relationship between underlying social, economic, political, and demographic elements and terrorist activity (Newman 2006: 749). The scholarly debate over the root causes of terrorism, particularly concerning the effects of state economic conditions, is a well-worn path fraught with contradiction. The 'economic inequality-political conflict puzzle' (Lichbach 1989) captures the sentiment of scholarly research by stating that many assume a relationship exists, but there is a lack of consensus on the nature of the dynamic. The empirical literature on this debate diverges into two strands of research — the 'relative deprivation' thesis (Gurr 1970), which examines the capacity for political violence, and the 'political opportunity' thesis, which examines the circumstances favourable to political violence (Tilly 1978).

Regarding relative deprivation, it is important to realise that objective poverty is not sufficient to induce terrorism (Crenshaw 1981). Instead, the focus is on the relativity aspect – that is, the difference between the standards that a group perceives they 'ought' to be living by and the standards that they actually *are* living by. When this perceived imbalance ratio grows to a certain threshold, political violence is more likely (Huntington 1968; Piazza 2006).

Applying this logic to terrorism, Piazza (2011) finds states featuring economic policies that benefit certain subsets of their population over others can cause aggrieved minority groups to turn to terrorism. Similarly, Callaway and Harrelson-Stephens (2006: 685) find a nonlinear relationship between subsistence rights and terrorism in Northern Ireland. Subsistence levels that sit between the extreme ends of low and high represent emerging middle classes whose expectations have risen faster than their economic well being – the Red Brigade and Baader-Meinhof are exemplary of this theory, as their members tended to be working or middle-class students and intellectuals (Combs 2003).

Regarding the opportunity thesis, state contextualisation of political events and institutional structures are the main facilitators of violence. The institutional environment within democracies, for example, provides ample opportunity for terrorist attacks (Enders and Sandler 2006). The protections offered to citizens by democracies, such as freedom of speech, association, and civil and political rights, are the same qualities that protect terrorists and facilitate their operation, providing them with the opportunity to attack, an argument that has found both support (Eubank and Weinberg 2001; Savun and Phillips 2009) and refutation (Eyerman 1998; Abrahms 2007). Additionally, the ability of state institutions to insulate their populations from economic shocks is crucial. Blomberg et al. (2007) find that stronger institutions provide incentive for groups to use terrorism to change the status quo, since it is unlikely that a full rebellion would topple the state.

In light of the evidence, it is implied that social welfare and other policies designed to remedy poverty and mend sociodemographic divides may have direct and indirect impacts on terrorism as well. Burgoon (2006) and Krieger and Meierrieks (2010) take this logical next step and find that welfare indeed works to reduce the frequency of terrorist incidents, however the exact process by which this is achieved is unclear. Welfare can be theorised to affect terrorism in a number of ways. Welfare transfers are found to alleviate the economic inequality-political conflict puzzle by reducing relative deprivation and discontent that lead to civil and ethnic conflict (Gurr 1970; Auvinen and Nafziger 1999; Fearon and Laitin 2003). Additionally, welfare can reduce religiously inspired terrorist acts. In the absence of state infrastructure, fundamental religious organisations often step into the vacuum to provide social services (Townsend 1994; Landau 1993; Gruber 2003). Indeed, Piazza (2011) states that the existence of terrorist organisations helps aggrieved populations overcome barriers to collective action, resulting in terrorist attacks. The Islamic State, for example, offers refugees food and cash up to $1000 (Steinbuch 2017), and Boko Haram provides meals and loans to prospective recruits, among other goods (Meagher 2014).[6] These examples are indicative of rising contemporary terrorist groups' desires to compete with states (Rosen 2015; Piesse 2017). Such actions can lead to the deepening of religious belief and participation, potentially increasing the probability of religious-extremist motivated violence that could be reduced with the introduction of state-run welfare infrastructure as a substitute (Burgoon 2006). Religion can also serve as an explanation, a rallying point for identity, or a source of empowerment to some who are disoriented from sweeping socio-economic change. In the face of overwhelming population growth and urban-to-rural migration, Pakistan, for example, has seen a number of its poor becoming susceptible to the appeals of extremist groups who provide explanations for the state's failure to address the grievances of the poor (Khan and Azam 2008: 73).

However plausible these arguments are, they have yet to be explored directly. Indeed, some argue that the roots of terrorist violence are more in the political and social realm than the economic (Krueger and Maleckova 2004; Piazza 2006). Furthermore, even if there is an economic aspect to terrorism, it is not conclusively shown that welfare is a mechanism of alleviation. Welfare and other social policies, especially when employed in developing states, can be targeted at elites and specific ethnic groups, exacerbating horizontal inequality (Stewart 2000; Piazza 2011). Thus, it is important to understand which components of welfare are the most influential.

Much as the concept of democracy is comprised of multiple institutional and cultural elements, the concept of welfare is an amalgamation of various policies, each with possible cultural overtones. It could be that some welfare policies work at cross-purposes, both engendering and hampering terrorism, as has been found when deconstructing democracy in such a manner (Li 2005). Overall, the studies on welfare spending and terrorism (Burgoon 2006; Krieger and Meierrieks 2010) demonstrate that greater welfare spending is associated with fewer instances of terrorism plausibly because a government that spends more on welfare to address the socio-economic grievances of its populace is more likely to maintain peace within the country. The notion of welfare is a relatively broad concept with theoretically plausible contradictory effects. We hope that our focus on food availability, on the other hand, will provide us with a deeper understanding of the nature of grievances that motivate individuals to resort to terrorist activities.

Food Security and Terrorism: A Theoretical Link

We argue that food insecurity creates grievances among citizens and increases demand among them for action against the government. Terrorist organisations provide the opportunity for citizens to channel their grievances against the government by resolving collective action problems and mobilising citizens. We elaborate on the link between the two in this section.

Governments are generally considered responsible for ensuring provision of basic necessities such as public health and education (Baum and Lake 2003) and they have a variety of tools at their disposal to enhance societal wellbeing. Citizens may look to their governments for ensuring that the people have adequate food because the lack of it leaves few, if any, opportunities for people to prosper. It creates a sense of deprivation and is indicative of serious grievances among the populace. The lack of essential provisions hurts public perception about the government (Bueno de Mesquita et al. 2003; Taydas and Peksen 2012) and may suggest that the government is either unable or lacks the motivation to provide for its citizens. This especially applies to food insecurity where the inability of the government to ensure adequate food availability may lead citizens to question the government's legitimacy and capacity to deliver essential provisions to the masses. Similarly, the lack of motivation on the part of government to ensure food availability may be indicative of governmental priorities to an extent. This could be suggestive of neglect for societal needs, which arguably should be a priority for governments over other domestic and foreign policy goals. Both scenarios, the inability or the lack of incentive on the part of government to ensure food security of the populace, increase the demand among

citizens to resort to violent tactics such as terrorism. Emphasising the role of physiological needs in motivating human action, Maslow states, 'All capacities are put into the service of hunger-satisfaction, and the organization of these capacities is almost entirely determined by the one purpose of satisfying hunger' (Maslow 1943: 373). We argue that food security, and specifically, food availability, is a core physiological need and lack of it may provide the necessary motivation for citizens to join or sympathise with a terrorist organisation.

Much like rebel groups that use pecuniary awards (Gates 2002) and the promise of better performance than governments (Weinstein 2007) to recruit supporters, deprivations that hinder physical security of individuals such as food insecurity may be used as a recruiting tool by terrorist organisations as well to get people to rally behind their cause. These extremist organisations lower the opportunity costs of collective action by serving as a focal point for individual grievances. Furthermore, their appeal is heightened by the provision of goods and opportunities that extremist organisations provide but the state cannot. This is especially applicable to food availability, which is a core human need. Thus, lack of food availability can stimulate grievances that terrorist organisations exploit for their own purposes.[7] The argument is backed by case evidence. Interviews with former al-Shabaab fighters in Somalia, the most-food insecure nation in the world, reveal that socio-economic conditions were the most common motivator for joining (Botha and Abdile 2014).[8]

The dynamic between food security and domestic terrorism is especially likely among developing countries where people have materialistic concerns that emphasise economic and physical security (Inglehart 1977, 1997).[9] Developing countries are societies where essential needs such as food security still play an important role and are a primary consideration for individuals. It is in developing societies that the opportunity for terrorism arises due to the low bureaucratic and administrative capacity of the state (Hendrix and Young 2014). Low capacity on this dimension leads to a state's inability to mitigate violence due to the lack of resources that enable it to respond to dissent and channel popular aggression. (McBride et al. 2011). In effect, a state with low administrative capacity cannot 'see' its population (Scott 1998). These problems are exacerbated by states that regularly violate human rights, as Callaway and Harrelson-Stephens (2006) find that repressive states that violate civil and political rights, in addition to an inability to provide basic needs to their populace, are more likely to experience terrorism. Hence, the ability of a state to absorb protests and incorporate individuals into the polity lowers the chances of people seeking redress outside of the system by violent means (Essman 1994).

Prevalence of food insecurity can be attributed to international factors as well as domestic shortcomings, reflected both in terms of a state's colonial past as well as the power dynamics of the global system, in which developed countries drive inequality by structuring the international system to benefit themselves at the expense of the global poor (Callaway and Harrelson-Stephens 2006).[10] However, citizens hold primarily national governments responsible for lack of adequate public goods and services (Baum and Lake 2003). As a result, citizens are especially likely to direct their grievances against their national governments versus international actors. Moreover, we also rely on Gurr's (1993) relative deprivation model and Crenshaw's (1981) models of group grievance, which assumes political violence to be directed locally and motivated by local conditions involving local actors (Piazza 2011: 343).

Our theory rests on the logic of grievances that are exploited by terrorist groups who lower the opportunity costs of engaging in violence against the state by providing resources to the aggrieved population. It is important to note that our conceptualisation of terrorism stresses that it is a tactic of political violence that can be employed alongside other violent and non-violent strategies.[11] Thus, disentangling the specific causal mechanisms of terrorism from other forms of political violence at the state level is a particularly nebulous endeavour. Though our theory provides a causal process for terrorism, it is entirely possible that it can lead to other forms of political violence.

Burgoon (2006) identifies an alternative theoretical link where he discusses the plausibility that states with generous welfare policies may enhance capacity of individuals by providing access to greater resources and time and this in turn may increase terrorist violence.[12] However, he eventually asserts that the benefits associated with greater welfare spending will deter terrorist activity. A robust welfare state may enhance food availability by ensuring food supply for citizens through adequate food production domestically, for instance.[13] It is possible that food security may enhance capacity of individuals, which in turn could plausibly enable individuals physically to pursue terrorist violence in light of other grievances. However, food security only ensures physical capacity and may not enhance capacity in other aspects such as time and additional resources that come with greater welfare spending. Thus, the capacity enhancing effects of welfare spending in terms of having access to more resources and time is less likely to be prevalent in the case of food security. On balance, we argue that the relationship between food security and terrorism in the developing world can be better explained through the grievance mechanism than the capacity mechanism. Based on our theoretical expectations, we hypothesise that *lower levels of food security will lead to higher levels of domestic terrorist attacks among developing countries*.

Data and Methods

We assess the relationship between food security and domestic terrorism on a sample of 70 developing countries from 1980 to 2011.[14] The unit of analysis is country-year. The dependent variable consists of a raw count of terrorist attacks within a country-year and are taken from the Global Terrorism Database (GTD), collected by the Center for the Study of Terrorism and Responses to Terrorism at the University of Maryland (START 2016). We choose it as our data source because its selection criteria fit with our previous conceptualisation of terrorism. It also includes additional filtering criteria that allow us to limit the data exclusively to acts carried out for the purposes of attaining a political, economic, religious or social goal that includes evidence of an intention to coerce or intimidate a larger audience. Additionally, we isolate the data to only include acts that were carried out outside the context of legitimate war activities. Ambiguous cases are excluded. We focus on instances of domestic terror only, as the outlined theory is meant to capture the preferences of civilians within a state where the government is either unable or unwilling to provide food security. Therefore, utilising filtering mechanisms within the GTD, we only examine acts in which the victim, terrorist perpetrator, and attack venue are of the same nationality. The list of non-OECD states in the sample is provided in **Appendix B**.[15]

The primary independent variable is food security – more specifically, we focus on food availability. We measure food security with protein supply in grams per day per capita, and the data come from the Food and Agriculture Organization (FAO 2016). FAO food balance sheets provide the most comprehensive yearly estimate of food consumption from a supply perspective and previous research uses similar measures to capture adequate food intake (Blaydes and Kayser 2011; Scanlan and Jenkins 2001).[16] The variable relates closely to food availability (Lele et. al. 2016: 18), which is the primary focus in this article.[17]

The remaining variables represent a framework that attempts to capture the social and institutional factors that make the occurrence of domestic terrorism more likely. The regressions to follow largely replicate a model put forth by Qvortrup and Lijphart (2013) that intends to model the expected value of engaging in domestic terrorism against the expected value of not engaging in terrorism. The controls are intended to be representative of the standard framework of variables shown to have explanatory value in previous studies. From there, additional controls are included as further checks of robustness.

The first three variables capture institutional respect for human security. As noted in the theory, grievances over food security can be exacerbated by states, particularly regarding the degree of repression and respect for civil rights. To address this, a regime indicator (polity2) from the POLITY IV database variable is included to measure the level of *democracy*, as its inclusion is consistent with past studies examining the link between democracy and terrorism (Li 2005; Piazza 2008; Savun and Phillips 2009). It ranges from -10 (full autocracy) to 10 (full democracy). The characteristics of democracy, freedom of association and expression, the assurance of free and fair elections, and the rights of citizens to participate in the electoral process, are widely debated between two opposing viewpoints. The first viewpoint sees these characteristics as having an enabling, positive effect on terrorism, giving individuals the capacity to carry out attacks more freely than if conducted in a relatively more authoritarian system. Conversely, the opposing viewpoint frames these characteristics as a political release valve, allowing individuals an avenue to air grievances instead of resorting to violence. Considering the competing theories regarding the relationship, we conduct a two-tailed test.

The positive link between democracy and respect for human rights is well established (Henderson 1991; Poe et al. 1999), yet democracies are not incapable of using repressive coercion (Kibris 2011; Conrad et al. 2017). To capture ties to repression more properly, two additional measures are included. *Executive constraints* is included from the POLITY IV database to measure the ability of the legislature to check executive power, as unchecked executives are less likely to promote civil rights (Li 2005). This variable ranges from 1 (unlimited executive authority) to 7 (executive subordination). The data for both variables come from POLITY IV (Marshall et al. 2016).

The third variable is a more explicit measure of governmental repression. A measure of *physical integrity* is taken from the Cingranelli-Richards (CIRI) Human Rights Dataset (Cingranelli et al. 2014). This variable is an additive index of instances of torture, extrajudicial killing, political imprisonment, and disappearance. It ranges from 0 (no government respect for these rights) to 8 (full government respect for these rights). Previous research using CIRI data to explore the link between government oppression and terrorism found a complex and interconnected relationship (Piazza and Walsh 2009, 2010; Walsh and Piazza 2010). We make no directional assumption of causality here beyond including human rights abuses as a control.

To capture economic and sociodemographic characteristics, a logged measure of a state's *GDP per capita* is included. This variable generates mixed effects in the literature (Testas 2004; Li 2005; Abadie 2006). Since our focus is on food security within developing countries, this measure is included as a robustness check to model the effect of the primary variable of interest independently of developmental characteristics. A measure of *urban population* is a percentage of a state's population living in urban areas and is expected to have a positive effect on terrorism, as urbanisation's trend towards aggregation and complexity increases the wealth and accessibility of targets for potential terrorists (Urdal 2006; Qvortrup and Lijphart 2013; Crenshaw 1981; Adelaja et al. 2019). We include a country's *total population* as an additional measure of population constraints. We hypothesise that larger populations lead to an increase in domestic terrorism. The causal mechanisms behind this stem from a wider audience and target pool (Coggins 2015), though this variable can also capture the grievances that arise in a country with a significant gap between the supply and demand of public goods (Adelaja et al. 2019). The data for all three variables come from World Development Indicators (World Bank 2016).

Finally, a variable measuring the occurrence of *civil war* is included. It is a dummy variable with a 0 indicating no civil war and a 1 indicating its presence and the data are available from PRIO (Gleditsch et al. 2002). Terrorism is prominently used before, during, and after civil war in conflicts worldwide (Findley and Young 2012: 286). Thus, we expect a positive relationship between terrorism and the presence of civil war. A full summary report of descriptive statistics is presented in **Appendix A**.[18] The summary statistics for terrorist attacks display a conditional mean far lower than the variance, indicating overdispersion in the count variable. To control for this, we utilise a negative binomial regression model with fixed effects. To control for time dependence and address reverse causality to an extent, all independent variables are lagged one year. Across all models used, the alpha value differs significantly from 0, indicating that the negative binomial model is preferred over Poisson.

Results

Our primary hypothesis seeks to assess the effect of food security on domestic terrorism among non-OECD countries. Our main tests are presented in **Table 1**. Model 1 presents the baseline findings without the theoretical variable of interest and model 2 includes the variable of interest. The primary results in model 2 indicate that food security is statistically significant where higher levels of food security are associated with fewer domestic terrorist attacks. This provides support for our primary hypothesis. Food insecurity, particularly lack of food availability, is indicative of physical and economic insecurity among masses and may be a reflection of a government that is incapable or lacks the motivation to ensure basic provisions for its citizens. This is likely to increase grievances and create opportunities for terrorist groups to recruit potential supporters, consequently increasing the probability of domestic terrorism. The findings do not provide support to the alternative argument, which suggests that food security could enhance capacity of individuals, thus increasing terrorist attacks. Overall, the findings are consistent with our theoretical expectations about the effect of food security. Substantively, a one unit increase in protein supply decreases the rate of terrorism by 1.7%. When applying this to the data on protein supply within non-OECD countries, increasing protein supply by one standard deviation results in a 35.4% decrease in the rate of terrorism, holding all other variables constant, which is a substantial effect.

Regarding the control variables, greater executive constraints are associated with higher number of terrorist attacks. It is widely regarded that terrorism favours power vacuums best represented by failed or transitioning states (Atzili 2010; Fukuyama 2004). Greater executive constraints may present opportunities for terrorist activities, especially among developing countries. A higher level of democracy is associated with fewer terrorist attacks, although the variable is not significant.[19] Total population is not significant in the majority of the models.

GDP per capita has the same effect across the majority of the models, where countries with higher levels of GDP are less likely to face attacks of domestic terrorism, plausibly because countries that are more developed are less likely to have grievances that may result in acts of domestic terrorism. However, it is only significant in the baseline model. The effect of physical integrity index, which measures human rights violations, is negatively associated with terrorism. Countries with better human rights relations are less likely to face domestic terrorist attacks, presumably because if governments are more respectful of citizens' human rights, people are less likely to resort to violence. Urban population is significant where a higher percentage of population living in urban areas is likely to increase the number of terrorist attacks. Urban environments present favorable targets due to the potential for high fatalities and public attention that such attacks would garner (Crenshaw 1981; Jenkins 1978).

Lastly, civil war is positive and significant across most models. It also has a substantial effect – countries in the midst of civil war experience more than twice the number of domestic terrorist attacks than countries at peace. This should come as no surprise, for though civil wars account for 25% of our observations, the mean of attack ratio during a civil war period compared to a peace year is almost 30 to 1, highlighting the close, interrelated dynamic between the two types of violence. Furthermore, every country in our sample has experienced civil conflict at some point. In addition to the fact that many groups employ terrorism alongside civil war (Findley and Young 2012), the presence of civil conflict can deplete state capacity, further disrupting food security and fomenting grievances among a dissatisfied populace, setting the state for additional terrorist violence (Gupta et al. 2007).

Table 1

Primary findings in **Table 1** include country-fixed effects to assess whether changes in food security within a country influence the number of terrorist attacks. **Table 2** presents negative binomial coefficients without country-fixed effects and with year (model 1) and region dummies (model 2) to ensure that the primary findings are not being driven by a particular year or region.[20] The effect of food security remains the same in models 1 and 2 where food security has a significant and negative effect on domestic terrorism.

Table 2

Table 3 presents additional robustness tests with negative binomial coefficients. Model 1 includes a lagged dependent variable (LDV). A LDV serves two purposes. It can address serial correlation as well as account for alternative determinants of the dependent variable that are not included in the model. However, a drawback of including a LDV is that it might reduce the effect of substantively important independent variables (Achen 2000). We do not attempt to adjudicate the merits or demerits of including a LDV here. However, we present findings with a LDV as a robustness test in model 1. Food security continues to be negative and statistically significant, indicating that higher levels of food security are associated with few domestic terrorist attacks among non-OECD countries.

Model 2 presents the primary findings with five additional controls, namely, inequality, youth employment, FDI, ethnic or religious diversity, and regime durability.[21] Countries with higher levels of *inequality* may increase grievances and increase the likelihood of terrorism (Piazza 2013). We measure inequality with the GINI index (World Bank 2016). FDI as a percentage of GDP captures economic openness and the existing studies demonstrate a link between the two (Bandyopadhyay et al. 2013). Greater economic openness may enhance economic growth, which could reduce the probability of terrorism (Freytag et al. 2011), but it could also increase pressure on governments to enhance social spending and constrain the ability of governments to do so as well (Burgoon 2006). The data come from World Bank (2016). Unrest due to diversity such as ethnic tensions (Choi and Piazza 2016) may increase probability of terrorism. We control for *ethnic diversity* to capture this perspective (Alesina et al. 2003). We control for youth employment, as it is theorised that states with large populations of unemployed youth can drive terrorism (Urdal 2006). Finally, the regime durability variable measures durability with the number of years since a regime change where a regime change refers to a 3-point change in the polity score and the data come from POLITY IV (Marshall et al. 2016). None of these controls reach statistical levels of significance but our primary independent variable continues to have a significant effect on domestic terrorism.

Model 3 tests the primary hypothesis by using an alternative measure of the independent variable, food supply per capita per day (FAO 2016). Here again we continue to find support for the effect of food security on domestic terrorism. Overall, the series of robustness tests indicate that specific grievances, specifically food security, play an important role in identifying the root causes of terrorist violence among developing countries.[22]

Table 3

Lastly, we consider the probability of reverse causality where domestic terrorism may affect food security. It is plausible that prevalence of domestic terrorism may disrupt economic activities and hurt the economy, which in turn could create food insecurity. Additionally, terrorist organisations may hinder the transport of essential food items with the objective to delegitimise the government and try to generate support for their cause among the population. Given the lack of adequate instruments for terrorism among developing countries, we utilise the strategy adopted by Hendrix and Young (2014) who address reverse causality between state capacity and terrorism through an error correction model. Prevalence of reverse causality will indicate that changes in the number of terrorist attacks or the number of terrorist attacks in the previous year explain changes in food security after controlling for food security in the previous year.[23] The results however indicate that neither of the

two terrorism variations (the changes in number of terrorist attacks or lagged values of domestic terrorism) are statistically significant. On the other hand, the level of democracy in the previous year and change in GDP per capita and population are strong predictors of food security. Overall, the error correction model indicates a lack of support that domestic terrorism is a strong predictor of food security.

Table 4

Conclusion, Future Research, and Policy Implications

Prevalence of domestic terrorism has vast implications for peace and security, especially in the developing world. Even though the extant literature has advanced our understanding of the causes of terrorism, we know relatively little about specific identifiable grievances that motivate such action. This article seeks to fill this lacuna by demonstrating the deleterious effect of food security, and more specifically food availability, on domestic terrorism among developing countries. Our findings contribute to the larger body of research on development and conflict. We focus on a particular facet of conflict, domestic terrorism, and we add to a growing body of research that links food insecurity to violence, more generally (Weinberg and Bakker 2015; Pinstrup-Andersen and Shimokawa 2008; Hendrix and Brinkman 2013; Hendrix and Haggard 2015).

The policy implications of this study suggest that lack of food availability has consequences for peace and security. Tackling the challenges associated with terrorism needs to be two-fold. Governments obviously need to take measures to prevent terrorist attacks to maintain peace and security. In addition to that, the findings of this article suggest that governments also need to develop long-term strategies to meet the core needs of the masses, especially food availability. To this end, we echo Sen's perspective on adopting a holistic approach to end hunger, which include policies that focus not just on food production but also poverty, education, health care, family planning, and approaching food security as a right-based issue (FAO 2013). Governments have access to a range of policy instruments to ensure food security of the masses, which may include implementation of nutritional programmes that are targeted towards children, pregnant mothers, and provision of quality food to the general population, among others (Shekar et al. 2016).

Overall, domestic governments, international organisations, and foreign powers need to address both the security as well as the core grievance aspects of domestic terrorism in the developing world. Perhaps one of the most pressing and fundamental issues linking the issues of food security to contemporary counterterrorism efforts is that of climate change. There is a growing body of evidence that suggests the impact of climate change will be most acutely felt in the developing world (Busby and von Uexkull 2018). The effects of climate change are predicted to exacerbate the limited state capacity of developing nations, further contributing to the source of grievances that allow terrorist organisations to flourish (Smith 2007). Evidence indicates that this is leading to a rise in militant Islamist extremism in the developing world – 'climate-induced drought' has been linked to the growth of ISIS in the Middle East, and the evaporation of Lake Chad in Nigeria has bolstered recruitment efforts by Boko Haram (Gerretsen 2019). As a result, local and global efforts are needed to halt rising temperatures. The most sweeping of these, the Paris Agreement, sets a specific target of holding the increase in the global average temperature to 1.5℃ above pre-industrial levels (United Nations 2016). However, the specifics of change are left up to the individual states, and without enforcement mechanisms, many countries, most conspicuously the US and China, are defecting on their obligations (Sengupta 2018). These developments point to increasing relevance of terrorism in the developing world and the important role that food security plays in mitigating its spread.

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Notes

[1] See Gibson (2012) for a discussion of all four dimensions of food security.

[2] Indeed, it is plausible to have a scenario where there is food availability but access is limited due to limited purchasing power, for instance. However, the four dimensions are related in that food availability is one of the more fundamental aspects of food security, the absence of which may also affect access, utilisation, and finally stability.

[3] We use the World Bank (2016) classification of OECD and non-OECD countries to distinguish between developed and developing countries. The difference between developed and developing countries relates primarily to the income level of individual countries. Adequate food intake is especially likely to be a concern among developing countries where resources are relatively scarce. The WHO's recommended requirements for adequate protein intake are based on age and weight of an individual (WHO, FAO, UNU 2007). For instance, for a male adolescent between 15 and 18 years of age and 66.5 kg in weight, the recommended protein intake is 57.9 grams per day. Similarly, for a female adolescent of the same age and 56.4 kg in weight, the recommended protein intake is 47.4 grams per day (WHO, FAO, UNU 2007: 243–44). Among non-OECD countries, protein supply per capita per day ranges from a minimum of approximately 29 grams to a maximum of 117 grams with a mean value of 64 grams (FAO 2016).

[4] Our measure of protein supply aligns well with the fundamental nature of food security that Sen (1999) emphasises as well as with physiological need in Maslow's (1943) hierarchy of human needs.

[5] For a more thorough discussion on the links between food security and various forms of conflict, see Pinstrup-Andersen and Shimokawa (2008), Besley and Persson (2008), Hendrix and Glaser (2007), Hendrix and Brinkman (2013), Kahl (2006), Schomerus and Allen (2010), Theisen (2012), and Hendrix and Salehyan (2012).

[6] Though the Islamic State is responsible for numerous transnational attacks against the West, the vast majority of their violence is directed at domestic targets in the developing world (Alexander and Moore 2015).

[7] This exploitation of food insecurity can extend to cases of suicide terrorism as well, for though the individual carrying out the attack perishes, the family of the attacker often receives material rewards in addition to an increase in status (Levitt 2008).

[8] 27% of respondents listed this as their primary reason. The second most common response was religious and economic factors (25%). When combined, these two categories account for more than half of the respondents out of the ten reasons given for joining.

[9] Inglehart (1977, 1997) argues that individuals in developed versus developing societies have distinct values, where the developed countries exhibit postmaterialistic values that emphasise self-expression such as environmental issues, women's issues, among others, while developing countries exhibit materialistic values.

[10] See Gibson (2012) for an extensive review of international actors such as organisations as well as countries and their policies in influencing food security.

[11] The failure of the new Iraqi government to provide basic resources to its population gave rise to organisations that employ a variety of violent tactics. For example, the Islamic State began as an offshoot of the terrorist group, Al-Qaeda, in Iraq and quickly grew into an insurgent movement intent on controlling territory and functioning as a state (Cronin 2015). To that end, they engage simultaneously in traditional warfare tactics and terrorist activities.

[12] Adelja et al. (2018) find that food availability enables terrorist organisations to thrive in areas where resources are relatively easily available while lack of food access may make it easier for terrorist organisations to recruit potential supporters and increase terrorist violence. However, the authors note that the theoretical link between food availability and terrorism is not clear, as greater food availability may also reduce grievances that subsequently reduce terrorism (Adelja et al. 2018: 6).

[13] A generous welfare state may also enhance other dimensions of food security as welfare spending could ensure food access by increasing purchasing power of citizens, enhance food utilisation by ensuring clean water, healthcare, and sanitation, among others, and lastly, food stability by ensuring adequate food at all times.

[14] Our sample ends at 2011 due to data availability for our main independent variable. The start year is a reflection of methodological changes in data collection on the dependent variable. For more information on this, see Mahoney (2018).

[15] The list of countries is based on **Table 2**, model 2.

[16] See Bladyes and Kayser (2011) for a good summary of some of the issues associated with the FAO data.

[17] We discuss the conceptualisation and measure in more detail in the second section above.

[18] Descriptive statistics are based on model estimation from **Table 2**, model 2.

[19] Understanding terrorism and its link to wealth and stages of democratic development is an avenue of research more fraught with conflict than consensus. For a comprehensive review of this relationship, see Chenoweth (2013).

[20] Region dummies for Latin America and the Caribbean, Africa, South Asia, Middle East, and Eastern Europe and Central Asia are included. East Asia and Pacific is used as the reference category.

[21] This model does not use country-fixed effects as our measure for diversity is time invariant, making a fixed effects estimation an inappropriate technique.

[22] Regressions were run using transnational terrorist attacks as the dependent variable and we found that our main independent variable exhibited no significant influence.

[23] The choice of control variables is similar to Blaydes and Kayser's (2011) model specification.

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Figure 1: Number of Domestic Terrorist Attacks 1980–2011

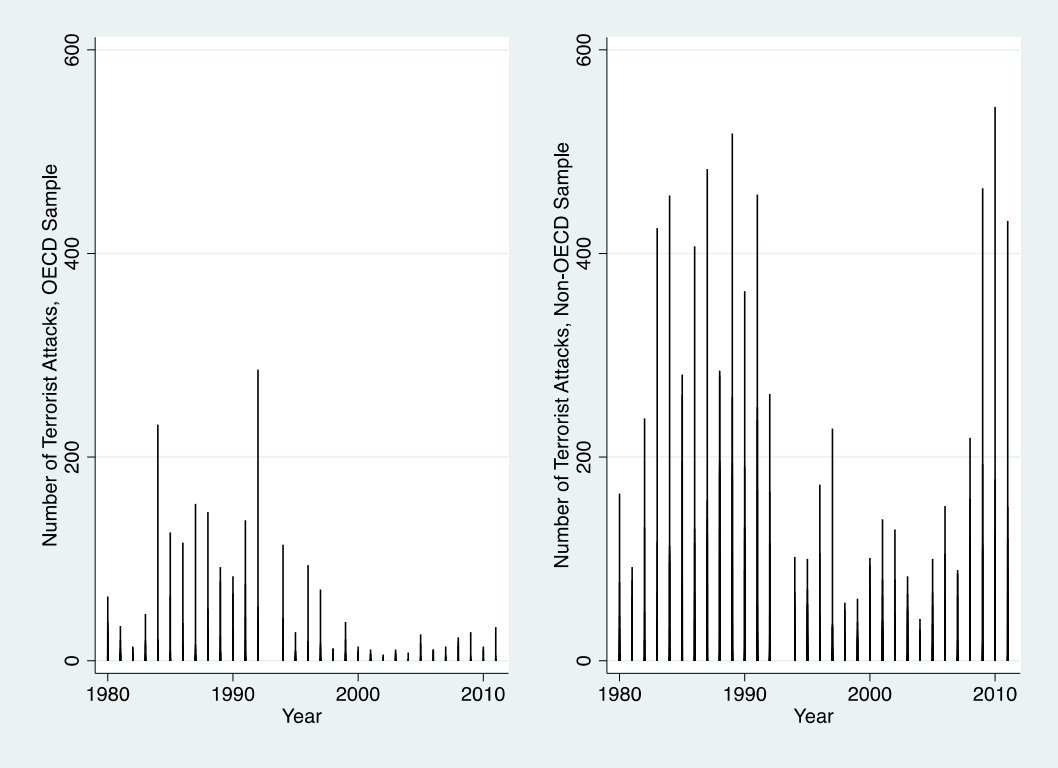

Table 1: Negative Binomial Results for Non-OECD Countries

	Model 1: Non-OECD Baseline	Model 2: Non-OECD Treatment
Protein supply pc/day	—	-0.017***
		(0.006)
Executive constraints	0.162**	0.168**
	(0.07)	(0.071)
Democracy	-0.024	-0.031
	(0.023)	(0.023)
GDP pc	-0.178**	-0.113
	(0.081)	(0.09)
Physical integrity	-0.21***	-0.213***
	(0.029)	(0.023)
Total population	-0.01	0.011
	(0.042)	(0.045)
Urban population	0.01**	0.013***
	(0.004)	(0.005)
Civil war	0.977***	0.97***
	(0.113)	(0.116)
Constant	-0.828*	-0.727
	(0.859)	(0.900)
Number of observations	1892	1728
Number of countries	78	70
Wald X^2	280.69***	281.11***
Log likelihood	-2410.0041	-2323.2335
Country-fixed effects	Yes	Yes

Note: Standard errors in parentheses: $p > 0.10$*; $p < 0.05$**; $p < 0.01$***

Table 2: Robustness Tests – Time Dummies and Region Dummies

	Model 1: time dummies	Model 2: region dummies
Protein supply pc/day	-0.026***	-0.027***
	(0.006)	(0.006)
Executive constraints	0.085	0.128*
	(0.07)	(0.071)
Democracy	0.014	-0.014
	(0.024)	(0.024)
GDP pc	0.065	-0.008
	(0.101)	(0.091)
Physical integrity	-0.254***	-0.219***
	(0.03)	(0.03)
Total population	0.116***	0.125**
	(0.045)	(0.054)
Urban population	0.014***	0.008
	(0.005)	(0.006)
Civil war	1.028***	1.027***
	(0.118)	(0.118)
Constant	-3.03***	2.894**
	(0.972)	(1.12)
Number of observations	2491	2491
Number of countries	107	107
Wald X^2	477.20***	341.04***
Log likelihood	-2653.413	-2729.6088
Time dummies	Yes	No
Region dummies	No	Yes

Note: Standard errors in parentheses: $p > 0.10$*; $p < 0.05$**; $p < 0.01$***

Table 3: Additional Robustness Tests

	Model 1: LDV	Model 2: additional controls	Model 3: alternative IV
Lagged terrorist attacks	0.004***		
	(0.0004)		
Protein supply pc/day	-0.014**	-0.026***	
	(0.006)	(0.008)	
GINI		-0.001	
		(0.013)	
FDI as %GDP		-0.134	
		(0.092)	
Ethnic diversity		-0.03	
		(0.40)	
Youth unemployment		0.002	
		(0.007)	
Regime durability		-0.011*	
		(0.006)	
Food supply pc/day			-0.0004**
			(0.0002)
Executive restraints	0.113	-0.041	0.165**
	(0.07)	(0.118)	(0.071)
Democracy	-0.018	0.037	-0.0281
	(0.023)	(0.04)	(0.023)
GDP per capita	-0.075	0.222*	-0.121
	(0.086)	(0.131)	(0.095)
Physical integrity	-0.163***	-0.133***	-0.229***
	(0.03)	(0.05)	(0.0301)
Urban population	0.008*	0.003	0.011**
	(0.005)	(0.007)	(0.005)
Civil war	0.931***	0.943***	0.983***
	(0.117)	(0.174)	(0.116)
Total population	0.073	0.267***	0.01
	(0.046)	(0.077)	(0.046)
Constant	-1.942**	-5.638***	-0.433
	(0.898)	(1.889)	(0.887)
Number of observations	1,728	1,127	1,728
Number of countries	70	89	70
Wald X^2	460.17***	106.16***	275.73***
Log likelihood	-2296.95	-1368.75	-2325.20
Country-fixed effects	Yes	No	Yes

Note: Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 4: Error Correction Model

	Model 1: D. Protein supply pc/day
L. Democracy	0.032**
	(0.014)
L. GDP per capita	-0.131
	(0.122)
L. Population	-.295
	(0.273)
L. Number of terrorist attacks	-0.003
	(0.002)
D. Number of terrorist attacks	0.000
	(0.003)
D. Democracy	-0.004
	(0.032)
D. GDP per capita	0.963***
	(0.35)
D. Population	-10.73*
	(5.593)
Constant	-3.226
	(4.305)
Number of observations	2,550
Number of countries	109
R-squared	0.001
Country-fixed effects	Yes

Note: Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Appendix A: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Number of domestic terrorist attacks	1728	10.96	45.28	0	544
Protein supply per capita per day	1728	64.23	15.31	29.42	117.09
Executive constraints	1728	4.14	2.07	1	7
Democracy	1728	1.10	6.76	-10	10
(log) GDP per capita	1728	7.07	1.17	4.63	10.90
Physical integrity	1728	3.91	2.09	0	8
Total population	1728	16.48	1.52	13.33	21.01
Urban population	1728	47.13	22.83	4.78	98.24
Civil war	1728	.25	0.43	0	1

Appendix B: List of non-OECD countries in the sample

Algeria
Angola
Argentina
Azerbaijan
Bangladesh
Bolivia
Brazil
Cambodia
Central African Republic
Chad
China
Colombia
Costa Rica
Cuba
Cyprus
Dominican Republic
Ecuador
Egypt
El Salvador
Ethiopia
Gabon
Georgia
Ghana
Guatemala
Guinea
Haiti
Honduras
India
Indonesia
Iran
Iraq
Jamaica
Jordan
Kazakhstan
Kenya
Kuwait
Laos
Latvia
Lebanon
Lesotho
Liberia
Macedonia
Malawi
Malaysia
Mali
Morocco
Mozambique
Nepal
Nicaragua
Niger
Nigeria
Pakistan
Panama
Paraguay
Peru
Philippines
Russia
Rwanda
Saudi Arabia
Senegal
South Africa
Sri Lanka
Swaziland
Thailand
Uganda
Uruguay
Venezuela
Yemen
Zambia
Zimbabwe