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ECONOMÍA APLICADA II

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July 2021

Working Papers in Applied Economics

WPAE-2021-2108

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ISSN 2172-3036

Asylum Migration, Borders and Terrorism in a Structural Gravity Model

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Abstract
In this paper we examine the impact of terrorism attacks on asylum-related migration flows. So far, the literature that examines the "push factors" such as terrorism explaining forced migration has omitted the fact that the vast majority of people forced to flee, tend to do it somewhere else within the country. The novel feature of our research is the estimation of a structural gravity equation that includes both international migration and internally displaced persons, a theoretically-consistent framework that allows us to identify country-specific variables like terror attacks. For that purpose, we use the information on the number of asylum applications, the number of internally displaced persons, and the number of terrorist attacks in each country for a sample of 119 origin developing countries and 141 destination countries over 2009-2018. The empirical results reveal several interesting and policy-relevant traits. Firstly, the number of forced migration abroad is still minimal compared to internally displaced persons, but globalization forces are pushing up the ratio. Secondly, terror violence has a positive and significant effect on asylum migration flows relative to the number of internally displaced persons. Thirdly, omitting internally displaced people biases downward the effect of terrorism on asylum applications. Fourthly, we observe regional heterogeneity in the effect of terrorism on asylum migration flows; in Latin America, terrorist attacks have a much larger impact on the number of asylum applications relative to internally displaced persons than in Asia or Africa.

Keywords: Asylum migration; forced migration; internally displaced persons; structural gravity; terrorism

1. Introduction
According to the United Nations Refugee Agency, since the end of the 1990s, the number of forcibly displaced people has gradually increased; in 2019, the figure reached 79.5 million, among which 2.9 million were asylum seekers (UNHCR, 2020). This phenomenon represents a social and economic challenge for both forced migrants' countries and their final destination. Accompanying this trend is the recent surge of terrorism concentrated in developing nations. According to the Global Terrorism Database (GTD), the number of terrorist attacks worldwide has doubled in the last twenty years, with 148 countries suffering at least one attack and ten countries concentrating 75 percent of all terrorist attacks. Over the past decade, terrorists killed an average of 21,000 people worldwide each year.

How many of the world's 79 million displaced people would have stayed at home with lower levels of terrorism? This paper aims to contribute to the empirical literature on the determinants of international migration, examining the impact of terrorist attacks on

international forced migration. So far, the literature that examines the "push factors" like terrorism explaining asylum migration has omitted the fact that the vast majority of people forced to flee, tend to do it somewhere else within the country. The novelty of our research is the use of the structural gravity model to estimate the effect of terrorism on Forced International Migration (FIM), i.e., asylum migration, accounting for internally displaced persons (IDP). Our sample contains 119 origin developing countries and 141 destination countries, among which 37 are developed economies during 2009-2018.

This paper constitutes the first attempt to estimate FIM with a full-fledged structural gravity model to the best of our knowledge. The gravity model of trade is the empirical workhorse of international economics. It is grounded in economic theory, and it is flexible enough to accommodate forced migration. Structural gravity refers to a particular theoretically-driven estimation method of the gravity equation that delivers unbiased and theoretically consistent estimates. The structural gravity model contains several relevant features related to the empirical analysis of international flows. Firstly, the inclusion of a full set of country and country-pair fixed effects controls for unobserved heterogeneity, multilateral resistance, and time-persistent country-pair characteristics. Secondly, the "border" effect stems from the inclusion of domestic flows in the dependent variable. Thirdly, the possibility to hedge collinearity with the fixed effects and include country-specific variables capitalizing on the "border" effect.

A structural gravity model opens the breadth of novel contributions of the study of the forced migration-terrorism link. Firstly, we find that the accumulation of terrorist attacks raises the number of asylum migration flows significantly. The estimates suggest that if terror attacks decreased by 10% in a sending country, FIM flows would be reduced by 2% on average. Secondly, the estimates reveal specific regional heterogeneity. For example, terrorist attacks have a larger effect in Latin America than in Asia or Africa. Thirdly, the paper takes a first stab at estimating the border effect in asylum migration (i.e., the preference of migrating internally). The estimates suggest that the border effect is larger than in trade and decreased in our study period.

The rest of the paper is organized as follows. Section 2 briefly reviews the empirical literature on the terrorism-migration link. Section 3 describes the empirical method, i.e., the structural gravity model applied to forced migration. Section 4 describes the data, and Section 5 reports the results, and finally, Section 6 concludes.

2. Literature review

Asylum-related migration refers to migration with the intended purpose of seeking international protection in a given country or ultimately results in an individual applying for protection in the recipient country (UNHCR, 2020). There is a relative degree of consensus in the literature that violence is a significant underlying cause of forced migratory movements (i.e., asylum) using various categorizations, e.g., generalized violence, civil war, ethnic conflict, state-sponsored terror (Hatton, 2020). Violence in the homeland causes the movement of people away from the area of conflict, either moving somewhere within the country or trying to reach a foreign destination. Several papers provide evidence in favor of the hypothesis that violence in the homeland causes fleeing home for asylum-seeking abroad.

Schmeidl (1997), Davenport, Moore, and Poe (2003), Moore and Shellman (2004), and Salehyan and Gleditsch (2006) use global samples of countries with data spanning from the 1950s to 2000s to identify the drivers of forced migration and conclude that "generalized violence" outweighed political and economic variables as the prominent driver of forced migration. Moore and Shellman (2006) investigate the circumstances that lead some countries to produce a large number of refugees and relatively few IDPs instead of a large number of IDPs and relatively few refugees. They find that civil wars tend to increase IDPs, whereas genocides tend to increase refugees.

Other papers have directly examined the determinants of asylum seekers' applications from developing countries to Western European countries. Neumayer (2005) finds that economic reasons are more important than political ones as determinants of the number of asylum seekers over 1975-1999. Among the political factors, restrictions on political rights and civil liberties emerge as the most important factor. Two recent papers suggest that political factors have become more relevant over time. Giménez-Gómez, Walle, and Zergawu (2019) find that wars, civil conflicts, violations of human rights, and oppressive regimes explain economic migration and forced displacement (asylum seekers) from 51 African sources countries into 21 European destination countries between 1990 and 2014. Kang (2020) finds that political instability of the source country is the main factor explaining the determinants of the number of asylum seekers applications to 7 EU countries from 145 origin countries in the 2008-2014 period. Paniagua, Peiró-Palomino, and Picazo-Tadeo (2021) study the effect of well-being on forced migration in OECD countries and report the impact of a composite indicator for safety (or absence of violence) containing two dimensions: assault rate and homicide rate. The authors find that the lack of violence acts as a positive pull factor and a negative push factor.

The number of papers using terrorism to evaluate the impact of violence on forced migration is scarce. Simsek (2010) uses time-series analysis to provide evidence of a positive effect of terrorist attacks on forced movements of people in Turkey, both internally and internationally. Dreher et al. (2011) examine the impact of terrorist attacks on international economic migration rates using a panel of 152 sending countries to six receiving developed countries over the 1976-2000 period. They find a robust positive relationship between terrorism and skilled migration, but not strong evidence that average emigration is related to terrorism, which indicates that the effect of terrorism on migration depends on the level of education. Hatton (2009; 2016) estimates the impact of a terror scale on asylum migration using a gravity-like model. This terror scale measures the extent of brutality, torture, and arbitrary imprisonment reported by the US State Department. He finds a positive a significant effect of this terror scale on asylum applications.

Several studies using the gravity equation highlight the negative effect of terrorism on international economic flows like trade (Bandyopadhyay, Sandler & Younas, 2018; Egger & Gassebner, 2015; Nitsch & Schumacher, 2004), tourism (Fourie, et al., 2020; Santana-Gallego & Fourie, 2020), and Foreign Direct Investment (FDI) (Hogetoorn & Gerritse, 2020; Powers & Choi, 2012). However, none of the previous papers has estimated a structural gravity model of forced migration. The only exception is Carril-Caccia et al. (2019), who estimate the effect of terrorism on FDI with a structural gravity equation that includes internal investment and multilateral resistance terms. The following section explains the benefits of estimating a structural gravity model to quantify the impact of terrorism on forced migration.

3. A structural gravity model of international (forced) migration

This study applies the structural gravity model to estimate the effect on the international forced migration of the degree of terrorism suffered by host countries. Intuitively, the gravity equation builds on the idea that bilateral flows are directly proportional to the host country's economic size and inversely proportional to economic, cultural, and political barriers.

The gravity model is the flagship method of empirical research on international economic flows for two main reasons. Firstly, it offers solid theoretical foundations for several economic flows starting with trade (Anderson and Van Wincoop, 2003) and foreign direct investment (Anderson et al., 2019), but also stemming to migration (Bertoli and Fernández Moraga, 2013), tourism (Santana-Gallego and Paniagua, 2020) and more recently asylum migration (Paniagua et al., 2021).

Secondly, the gravity model offers an empirical toolkit that delivers consistent and unbiased estimates of the variables of interest. The gold standard for gravity estimates aligns with the theory above by including a complete set of fixed effects, namely country of origin-time and country of destination-time and country-pair dummies (Head and Mayer, 2014; Piermantini and Yotov, 2016). Country pair fixed effects reduce endogeneity by controlling for unobservable heterogeneity and time-invariant determinants of migration at the country pair level. The home and host country fixed effects are doubly relevant since they control multilateral resistance and any possible country-specific variable. Therefore, the inclusion of a full set of fixed effects absorbs the usual gravity covariates (distance, common language, GDP etc.) and isolates the effect of the independent dyadic time-varying variables of interest.

Identifying country-specific variables like terrorism, which is usually concentrated in sending countries, is a challenge. To estimate the effect of terrorism, we capitalize on a second important feature of structural gravity: the inclusion of observations of domestic flows. Other studies that applied the gravity equation to study forced migration omitted the origin-year fixed effects to identify these types of variables (Hatton, 2009, 2016). However, to obtain a closed-form solution of the gravity equation, the gravity model of trade imposes a market clearing condition: all produced goods must be consumed domestically or abroad, as Anderson (2011) shows. Paniagua et al. (2021) show that this theoretical condition also applies to obtain a gravity equation for asylum migration: displaced people either seek asylum in a third country or move domestically for any given year. However, they did not include domestic forced displacements in their empirical analysis.

Including IDP in the dataset opens three interesting empirical possibilities. Firstly, we can measure the "border effect" (or "home bias"), or the relative importance of asylum seekers to IDP. Secondly, by controlling for the change of the border effect over time, we can measure the variation in unobserved costs of international migration relative to domestic ones, which is generally attributed to globalization (Bergstrand, Larch and Yotov, 2015). However, applying for asylum is not always possible for displaced people; illegal immigration is part of the reality of forced migration. Consequently, our dependent variable may understate the extent of forced migration when using asylum applications as a proxy. Therefore, the time-varying border effect also captures any changes in the amount of illegal immigration.

Thirdly, we can hedge the limitation imposed by the fixed effects due to the collinearity with country-specific variables (Beverelli, Keck, Larch and Yotov, 2018; Heid, Larch, and Yotov, 2021). Therefore, we can estimate the effect of time-varying country-specific variables like terrorism and origin-year fixed effects within the structural gravity framework. To this aim, we estimate the following gravity equation:

$$FM_{ijt} = \exp\left(terror_{it}I_{ij} + X_{it}I_{ij} + Z_{ijt} + B_{iit} + +\alpha_{it} + \alpha_{jt} + \alpha_{ij}\right) \times \varepsilon_{ijt} \quad (1)$$

where FM is forced migration, including IPD, for origin country *i*, destination country *j* in year *t*.

Our variable of interest, $terror_{it}$, is the number of accumulated terrorist attacks suffered by the origin country i in the three previous years. For identification, this variable is interacted with I_{ij}, an international indicator variable that takes one whenever forced migration is international ($I_{ij} = 1 \; \forall \; i \neq j$). We can do so because the interaction between the border international dummy (I_{ij}) and country-level variables are not collinear with the set of origin-year (α_{it}), destination-year (α_{jt}), and country-pair (α_{ij}) fixed effects included in the regression. These host country fixed effects control any country-specific time-varying variables that affect both IDP and asylum migration like GDP per capita, population, and immigration policy in host countries.

The specification also includes other country-specific control variables X_{it} (interacted with I_{ij}) and dyadic control variables (Z_{ijt}) that are not collinear with the fixed effects (α_{it}, α_{jt}, α_{ij}). As a country-specific control variable, we include the country of origin's "Voice & Accountability", an index that captures perceptions of the extent to which a country's citizens can participate in selecting their government and freedom of expression, freedom of association, and free media. The dyadic control variables are i) a dummy which takes one whenever a pair of countries have signed a Regional Trade Agreement (RTA) and zero otherwise, and ii) the stock of fellow citizens granted with the refugee status in the destination country lagged three years.

Lastly, B_{ii} is a dummy variable taking the value of one for IDP and zero otherwise, which controls for country-specific intra-national migration costs and "home-bias" effects and any other country-specific time-invariant characteristics that may drive a wedge between internal and international forced migration like the aforementioned illegal migration. To control for a parsimonious change in these variables, we interact B_{ii} with 3-year period dummies, $B_{iit} = \sum_t B_{ii} \times PERIOD_t$. These variables measure the evolution of the border effect as a measure of all these border effects.

The empirical equations are estimated using the Poisson Pseudo Maximum Likelihood (PPML) estimator. Silva and Tenreyro (2006) show that PPML allows overcoming two main limitations of estimating the gravity equation with Ordinary Least Squares; not accounting for the zeros present in bilateral statistics and heteroskedasticity problems. Finally, robust standard errors are multi-way clustered at the origin and destination country (Egger and Tarlea, 2015). Due to the significant number of fixed effects in our models, we use the PPML high dimensional fixed effects estimators proposed by Correia, Guimarães, and Zylkin (2020).

4. Data

In the present analysis, we employ an unbalanced panel covering the 2009-2018 period, 119 origin developing countries and 141 destination countries, among which 37 are developed economies according to the UNCTAD's classification (the country sample is available in Table A.1 in the Appendix).

Our primary interest is the impact of terrorism on international forced displacements after considering that terrorism also causes the domestic movement of individuals. Thus, our dependent variable is obtained from two databases. FIM, proxied by the number of asylum applications, is retrieved from the United Nations Refugee Agency. By adding the number of IDP, we have a complete matrix of displaced persons moving domestically or abroad. The number of IDP is retrieved from the Internal Displacement Monitoring Centre, being the number of IDP in a given year due to violence and conflicts. Our main explanatory is terrorism in the host country, whose indicators are obtained from the Global Terrorism Database (LaFree, 2010; START, 2018). We carry out our primary analysis using the number of terrorist attacks, and we use alternative measures (number of casualties and material damages) in the robustness part of the paper.

Figure 1 shows the evolution of the number of asylum seeker applications. In 2009 there were about half a million asylum applicants worldwide, and the number doubled in 2018. Compared to the number of domestic IDP, the number of asylum seekers is small though it grows faster: the share was 3.5% in 2009 and ten years later rose to 5.5%.

The evolution of the indicators of terrorism over the period 2009-2018 is displayed in Figure 2. The three indicators (attacks, deaths, and material losses) exhibit similar trends. Terrorism has increased over time, with a peak in 2014. Terrorist attacks are concentrated in a few countries: 20 countries accumulate 90.6% of the world's terrorist attacks, and most are in the Asian continent (see Figure 3). Interestingly, the correlation between the number of asylum seekers and the three measures of terrorism is high for 10-years period (0.80). When we use disaggregated data by country, we observe a clear positive correlation between asylum applications and terrorist attacks (Figure 4) again.

As additional control variables typically used in the asylum migration literature, we include a variable that controls for the migrant network in the host country ("lagged stock of refugees") and a variable of governance in the country of origin ("Voice & Accountability"). The first one captures the importance of diasporas and local migrant communities in destination countries as facilitators of the new arrival of refugees (Hatton, 2016). The second variable captures perceptions of the extent to which a country's citizens can participate in selecting their government, freedom of expression, freedom of association, and free media. The host country index ranges from −2.5 (the lowest score) to 2.5 (Kaufmann et al., 2011), with higher values meaning more participatory democracy and citizens´ accountability.

The rest of the gravity-type variables include economic and political enhancers or inhibitors of the free movement of people abroad. Population and gross domestic product per capita (GDPpc) are obtained from World Bank's World Development Indicators. It is expected that large countries of origin have less relative international migration mobility and more developed economies receive relatively more asylum applications. Bilateral distance and a shared border between two countries capture time-invariant transportation costs. The costs of migrating are also lower if a pair of countries share a common language, which reduces a barrier to entry and increases the likelihood that a migrant will secure employment or housing. A similar argument is valid for countries that share a colonial history, share a common legal origin, or have a religious affinity. For example, individuals in countries that share a colonial history with a potential destination will have better information about the institutions, culture, and economy of that country and will be more likely to migrate. These variables come directly from CEPII (Head & Mayer, 2014).

Regional Trade Agreements are obtained from Mario Larch's Regional Trade Agreements Database (Egger & Larch, 2008). Descriptive statistics and source links are provided in Table A.2. in the Appendix.

5. Results

The results of our empirical analysis, including IDP in the dependent variable, are reported in Table 1. As IDP is present in the dependent variable, estimated coefficients have to be interpreted as the impact of the independent variable relative to IDP. Column (1) of Table 1 reveals the magnitude of the "border" effect, that is, how many times displaced persons move more internally than abroad. The border coefficient reveals that there are 2,540 (=exp(7.84)) internally displaced people for every asylum seeker. This is the first time that the border effect of (forced) migration is estimated to the best of our knowledge. Our estimated border effect of forced migration is larger than trade's, ranging between 10 and 30 (Head and Mayer, 2014). We expected, however, a larger magnitude for forced migration since the relative difficulty of movement (domestic vs. international) is larger for distressed migration than for goods.

To estimate the time-invariant border effect (B_{ii}, described in section 3), we have to sacrifice the country-pair fixed effects. Therefore, column (1) of Table 1 includes the usual gravity variables to control for constant country-pair heterogeneity. It is nonetheless informative to observe that these variables have the expected signs. The estimated coefficients of distance, contiguity, common language, and colonial ties reveal that asylum seekers apply more to geographically close countries with a common language and colonial ties. Common legal origins and religious affinity do not appear to be significant drivers of asylum (always with respect to IDP).

As in Figueiredo, Lima, and Orefice (2016), the positive and statistically significant coefficient of RTA indicates that economic ties, and more specifically trade, are important determinants in the decision to seek asylum. However, the non-significant coefficients of GDP per capita suggest that income is not relevant, or its effect is absorbed as a fixed country cost. On the other hand, the estimated population coefficients are positive and significant for the population at the origin and negative the destination, suggesting that country size plays an important role. Displaced people of larger countries tend to cross borders much more than those of smaller countries. This makes sense because moving within a large country might be as costly as moving to a foreign country.

Along with economic and cultural factors, the quality of the institutions in origin is also an important determinant of asylum applications. In particular, the variable "voice and accountability" coefficient is negative, suggesting that the greater the difficulties in participating in selecting their government or with limitations to the freedom of expression, freedom of association, and a free media, the higher number of asylum applicants relative to IDP.

In sum, the estimates of the control variables draw a picture of asylum seekers that match the economic intuition of gravity models. However, our variable of interest (terrorist attacks) does not appear statistically significant in Column (1) of Table 1. One plausible reason is that the omission of the country pair-fixed effects is a source of significant bias for the estimates of asylum applications. Column (2) of Table 1 includes these time-invariant structural characteristics of country pairs that absorb most of the other variables.

Only terror and population surface as the single most relevant determinants of asylum flows. Including destination-year fixed effects in column (3) of Table 1 does not change their significance, albeit a lower magnitude. In column (4) of Table 1 we do not include country pair fixed effects to re-estimate the border effect with destination-year fixed. The border coefficient reveals that there are 42 (=exp(3.73)) internally displaced people for every asylum seeker. Hence, border effect of forced migration is still greater than the typical border effect of trade.

The last two columns of Table 1 introduce the preferred specification with the most demanding combination of fixed effects: country-pair, origin-year, and destination-year. To identify the coefficient of the variable terrorism, we interacted it with I_{ij}. Column (5) of Table 1 suggests that terrorism is the only variable that significantly impacts forced migration.This result holds in column (6) of Table 1 when including the time-varying border. Our best estimate reveals that an increase of 10% in the number of terrorist attacks in the source country leads to an increase in the number of asylum applicants of 2% over IDP, on average. This estimate supports the hypothesis that terrorist attacks raise the number of asylum applications relative to IDP.

The coefficients of the border estimates for the 2012-2014 and 2015-2018 periods are shown at the end of column (6) of Table 1. The estimates of the international border variables reveal that borders have fallen over 2012-2014, relative to the period 2009-2011. The effects of borders on forced migration in 2012-2014 have become 52 percent (exp(-1.25) -1 = -0.529) smaller compared to 2009-2011 period. While the international border effect fell again in 2015-2018, the estimated coefficient is not statistically different from zero.

Table 2 presents the estimates of our preferred specification restricting the sample of analysis to FIM flows of countries from Africa, Asia, or Latin America to the rest of the world. Thus, the analysis includes destination countries' within and across continents. The results highlight that regional heterogeneity is significant in the impact of terrorism on asylum migration. The impact of terrorism on forced migration is positive and large in the three continents, with elasticities of 0.319 in Africa, 0.715 in Asia, and 2.341 in South America. However, in the case of Africa, it fails to be significant. It is worthwhile pointing out that the impact of terrorism by continent is not correlated with the volume of terrorism. As shown in Figure 3, Asian countries (Iraq, Afghanistan, Pakistan, and India) concentrate most of the attacks from 2009 to 2018. Latin America is the region with the lowest stock of terror and the highest impact. The larger effect of terrorism on FIM relative to IDP in Latin America can be due to several factors. Firstly, as illustrated in Figure 5, terrorism in this region is concentrated in Colombia, while the number of terrorist attacks in other countries has been relatively low. For more than one century, Colombia has suffered from terrorism (Feldmann & Hinojosa, 2009). During our analysis period, the Revolutionary Armed Forces of Colombia (FARC) was behind most of the attacks. According to the GTD, during 2009-2018, 768 out of 1083 terror attacks were perpetrated by the FARC. This aspect of Colombia probably explains why direct and indirect victims may seek to leave their country instead of internally migrating. As a result, Colombia is the primary source of asylum seekers in Latin America during our analysis period (22% of the total). Secondly, as presented in table 2, contrary to Africa and Asia, Latin America has a decreasing border effect over our analysis period, indicating an increasing preference to migrate internationally rather than internally. This should not be surprising since most Latin American countries share a common history,

language, religion, and culture. This makes migration across countries more likely. In fact, during our period of analysis, asylum applications from Latin American countries to other Latin American countries, USA and Canada represented 87% of the total. In the case of Colombian asylum seekers, neighbor countries Ecuador and Venezuela received 64% of the applications.

Table 3 reports different robustness checks by employing alternative measures of terrorism. Each cell is an estimate of our preferred specification. First, we replace the number of terrorist attacks with the number of deceased and the number of property losses resulting from terrorist attacks during the periods t-1 and t-3. Moreover, to account that the implications of terrorism across countries may vary depending on the size of the country, we also estimate our preferred specification with three different per capita indicators (Number of terrorist attacks, number of deceased, and number of damaged property per capita). In addition, we test whether the impact of terrorism on FIM depends on the intensity of the attack. To this end, we calculate the average number of deceased per terrorist attack and the average number of damaged properties per attack. Overall, results confirm the positive effect of terrorism on FIM relative to IDP.

Table 4 asses the relevance of including IDP as part of the dependent variable. It replicates the results obtained in Table 1 with structural gravity, but we do not include IDP in the dependent variable. The results indicate that omitting IDP biases the results in those specifications that do not include country pair and origin-year fixed effects. In columns (1-3) of Table 4, the effect of terror is not statistically significant. We obtain a positive and significant result of terror only when introducing all possible fixed effects in column (4) of Table 4. Even in this case, the magnitude is lower than in the preferred estimate (0.132 vs. 0.300). However, these elasticities should be interpreted with caution because the effect of our preferred specification is relative to terror's effect on IDP, and the results of Table 4 are not. Therefore, on the one hand, the coefficient associated with terrorism in Table 4 tells us how terrorism affects forced migration from i to j. On the other hand, the associated coefficient to the variable of terrorism in Table 1 reveals the extent to which terrorism affects FIM relative to IDP.

We also replicated Table 2 (continents) and Table 3 (robustness) without IDP, obtaining the same pattern: omitting IDP biases the effect of terrorism downwards. These results are not reported for brevity but available under request.

6. Conclusions

In this paper, we investigate the effect of terrorism on asylum migration with the lens of structural gravity. The paper is novel in constructing a dataset that includes both IDP and FIM to identify the country-specific effect of terrorism attacks.

The main takeaway from the empirical exercise is that terrorism at origin countries is a robust driver of bilateral asylum migration. The results presented in the paper highlight that terrorism's effect is not homogeneous across regions. Terror attacks have a larger impact on Latin America than on Asia and Africa, respectively.

In addition, we also quantify an unexplored trait of asylum migration: the border effect. The results indicated that the border effect is significant in forced migration and higher than usual estimates of the border effect for traded goods.

The study presents evidence that could drive better-informed policies. For example, policies focused on ameliorating terrorism could be combined with asylum policies to gain effectiveness. Further, by acknowledging the border effect, policymakers have the opportunity to design better national and international interventions. Finally, the paper opens exciting avenues for new research. The study showcases the importance of adopting theoretically-driven empirical methods to understand forced international migration with terrorism. Studies that apply this methodology revisiting the literature's findings and opening new paths are undoubtedly welcome.

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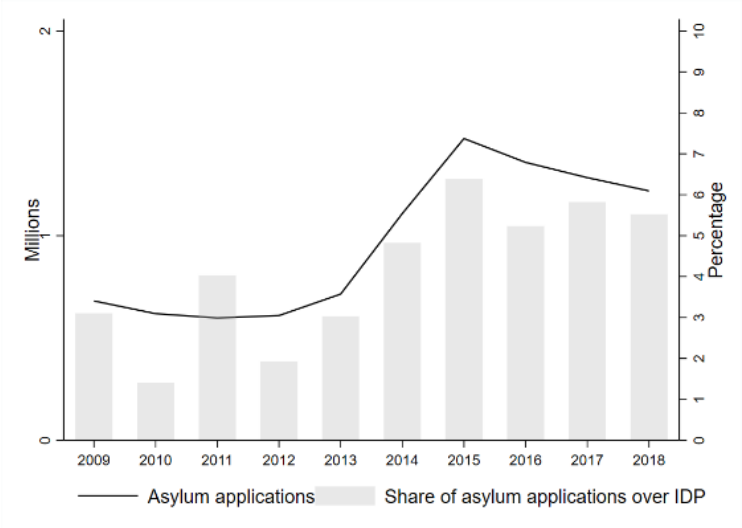
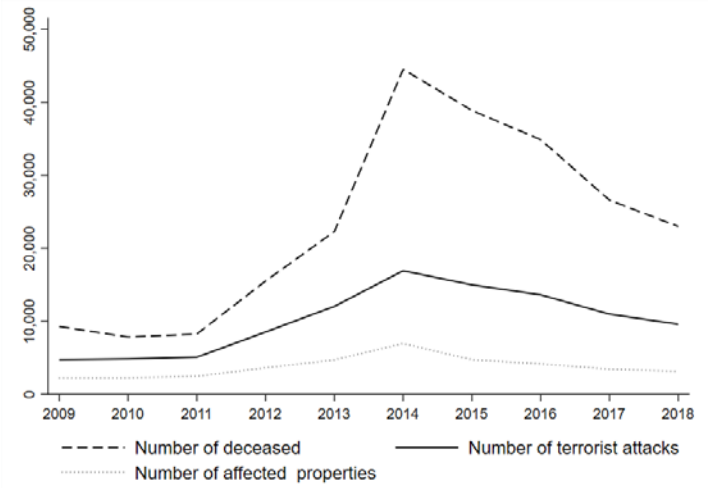
Figure 1: Evolution of asylum application and their share over internally displaced persons (IDP)



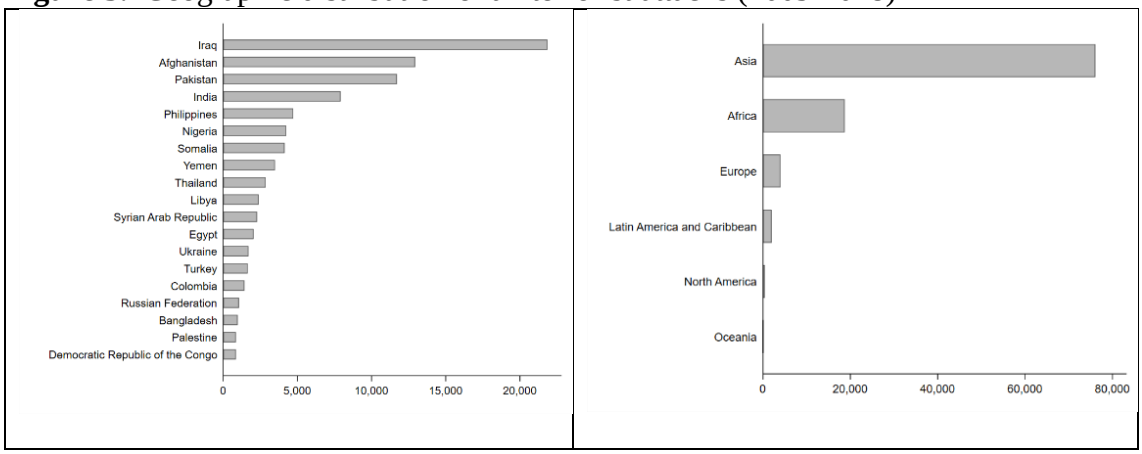
Notes: Authors' own elaboration using UNHCR and IDP databases.

Figure 2: Evolution of terrorism, 2009-2018.



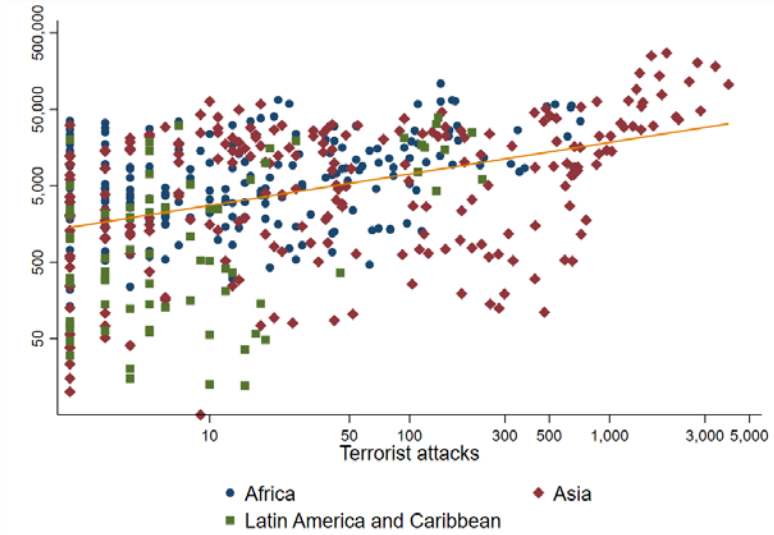
Notes: Authors' own elaboration based on the GTD. The three variables refer to the count of cases in a given year: number of deceased due to terrorism, number of attacks, and number of affected properties

Figure 3. Geographic distribution of all terrorist attacks (2009-2018)



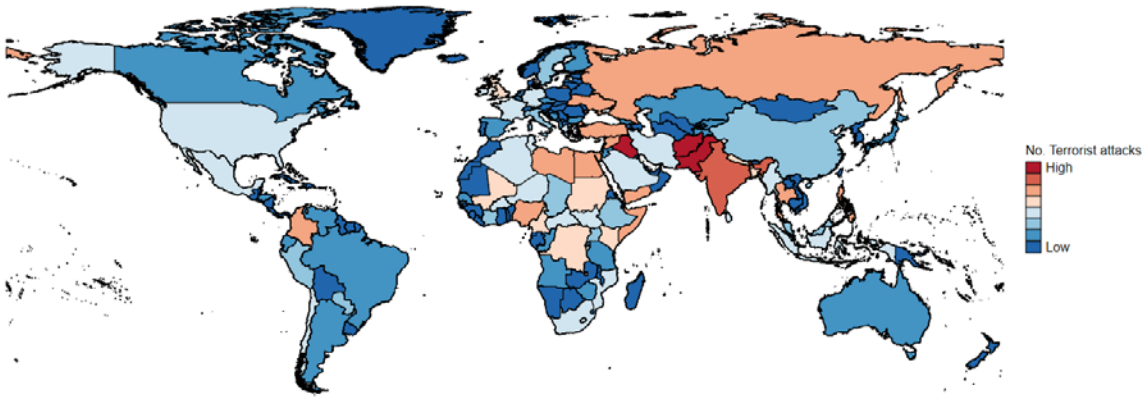
Notes: Authors' own elaboration based on the GTD.

Figure 4: Correlation between asylum applications and terrorist attacks (2009-2018)



Notes: Authors' own elaboration based on the GTD and asylum applications data from UNHCR.

Figure 5: Geographic distribution of terrorism, 2009-2018



Notes: Authors' own elaboration based on the GTD. Total number of terrorist attacks during the period 2009-2018. Legend: High +15000 attacks, 10000-15000, 5000-10000, 1000-5000, 500-1000, 100-500, 50-100, 10-50, 0-10 Low.

Table 1: Determinants of the number of asylum applications including domestic internally displaced persons. Structural gravity model.

	(1)	(2)	(3)	(4)	(5)	(6)
Total terrorist attacks in t-1 to t-3	0.063	0.315***	0.167***	-0.098	0.352**	0.300*
	(0.101)	(0.062)	(0.057)	(0.092)	(0.175)	(0.160)
Voice & Accountability	-0.718**	-0.065	-0.313	-0.019	-0.012	0.258
	(0.291)	(0.243)	(0.203)	(0.312)	(0.589)	(0.519)
Border	7.840***			3.737***		
	(1.340)			(0.794)		
Refugee population t-3	-0.005	-0.121	0.026	0.458***	0.002	-0.000
	(0.086)	(0.107)	(0.049)	(0.034)	(0.032)	(0.033)
GDP pc (Origin)	-0.341	-0.219	-0.295			
	(0.546)	(0.483)	(0.221)			
GDP pc (Destination)	0.481	0.389				
	(0.615)	(0.611)				
Population (Origin)	10.095***	9.144***	3.706**			
	(2.071)	(1.849)	(1.531)			
Population (Destination)	-5.197	-4.004				
	(3.423)	(3.175)				
Distance	-1.582***			-0.656***		
	(0.311)			(0.138)		
Contiguity	0.611*			0.022		
	(0.337)			(0.254)		
Common language	0.097			-0.078		
	(0.341)			(0.237)		
Common legal origins	0.204			0.114		
	(0.237)			(0.148)		
Colonial ties	1.522***			1.043**		
	(0.533)			(0.454)		
Religious affinity	-0.059			-0.597		
	(0.712)			(0.582)		
Regional Trade Agreement	1.420***	0.454	0.225	1.188***	-0.054	-0.036
	(0.292)	(0.450)	(0.165)	(0.331)	(0.184)	(0.180)
Border 2012-2014						-0.753**
						(0.327)
Border 2015-2018						-0.530
						(0.443)
Observations	48086	45539	45159	47525	45035	45035
Origin FE	YES					
Destination FE	YES					
Country pair FE		YES	YES		YES	YES
Year FE	YES	YES				
Origin-year FE				YES	YES	YES
Destination-year FE			YES	YES	YES	YES
IDP	YES	YES	YES	YES	YES	YES

Note: The dependent includes internally displaced persons (IDP). The variables terrorist and voice & accountability variables are interacted by a dummy that takes 1 whenever the flow is international. Standard errors are multi-way clustered at the origin country and destination country level are in parentheses; *, **, and *** represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 2: Effect of terrorism on asylum applications by continent

	(1) Africa	(2) Asia	(3) Latin America
Total terrorist attacks in t-1 to t-3	0.319	0.715**	2.341***
	(0.205)	(0.342)	(0.878)
Voice & Accountability	1.595**	0.857	-0.573
	(0.671)	(0.723)	(2.784)
Stock refugee population t-3	-0.032	-0.018	0.048
	(0.061)	(0.051)	(0.100)
Regional Trade Agreement	-0.125	0.354**	-0.261
	(0.192)	(0.145)	(0.298)
Border 2012-2014	0.499*	-0.873*	-2.206***
	(0.300)	(0.490)	(0.500)
Border 2015-2018	1.050***	-0.703	-1.743*
	(0.392)	(0.756)	(0.988)
Observations	20220	15951	5087
Origin-year FE	YES	YES	YES
Destination-year FE	YES	YES	YES
Origin-Destination FE	YES	YES	YES
IDP	YES	YES	YES

Note: The dependent includes IDP. The voice & accountability and terrorist variables are interacted by a dummy that takes 1 whenever the flow is international. Standard errors are multi-way clustered at the origin country and destination country level are in parentheses; *, **, and *** represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 3: Different measures of terrorism**.**

	Whole sample	Africa	Asia	Latin America
Panel A: Levels				
Total terrorist attacks in t-1 to t-3	0.300*	0.319	0.715**	2.341***
	(0.160)	(0.205)	(0.342)	(0.878)
No. Obs.	45035	20220	15951	5087
Total deceased in t-1 to t-3	0.233**	0.281**	0.333	0.574***
	(0.107)	(0.131)	(0.274)	(0.104)
No. Obs.	45035	20220	15951	5087
Total property in t-1 to t-3	0.296**	0.401**	0.701*	1.537***
	(0.150)	(0.198)	(0.363)	(0.386)
No. Obs.	45035	20220	15951	5087
Panel B: Per capita				
Total terrorist attacks in t-1 to t-3 per capita	0.314**	0.326	0.699**	2.288**
	(0.160)	(0.209)	(0.336)	(0.890)
No. Obs.	45035	20220	15951	5087
Total deceased in t-1 to t-3 per capita	0.239**	0.284**	0.317	0.545***
	(0.107)	(0.133)	(0.269)	(0.102)
No. Obs.	45035	20220	15951	5087
Total property in t-1 to t-3 per capita	0.309**	0.409**	0.676*	1.464***
	(0.151)	(0.202)	(0.356)	(0.395)
No. Obs.	45035	20220	15951	5087
Panel C: Intensity restricted sample				
No. Deceased per terrorist attack	0.383*	0.188	0.758	0.540*
	(0.233)	(0.123)	(0.535)	(0.283)
No. Obs.	26465	11007	12064	1323
No. Property per terrorist attack	0.432*	0.080	0.910*	1.050***
	(0.262)	(0.092)	(0.484)	(0.222)
No. Obs.	26125	10299	11879	1648

Note: The dependent includes IDP. The voice & accountability and terrorist variables are interacted by a dummy that takes 1 whenever the flow is international. Standard errors are multi-way clustered at the origin country and destination country level are in parentheses; *, **, and *** represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 4: Determinants of the number of asylum applications. Standard gravity model without IDP.

	(1)	(2)	(3)	(4)
Total terrorist attacks in t-1 to t-3	0.003	0.101	0.066	0.132***
	(0.105)	(0.069)	(0.058)	(0.047)
Voice & Accountability	-1.066***	-0.823***	-0.907***	-0.468**
	(0.213)	(0.234)	(0.225)	(0.228)
Stock refugee population t-3	0.292**	-0.114**	0.454***	0.070
	(0.115)	(0.046)	(0.054)	(0.054)
GDP pc (Origin)	-1.283***	-0.849**	-1.002***	-0.489**
	(0.481)	(0.335)	(0.299)	(0.200)
GDP pc (Destination)	1.142	0.904		
	(0.749)	(0.723)		
Population (Origin)	4.097***	2.552*	2.250*	1.994*
	(1.316)	(1.511)	(1.304)	(1.081)
Population (Destination)	-4.789*	-5.403**		
	(2.695)	(2.160)		
Distance	-0.962***		-0.575***	
	(0.143)		(0.158)	
Contiguity	0.584		0.555*	
	(0.409)		(0.321)	
Common language	0.309		0.122	
	(0.219)		(0.227)	
Common legal origins	-0.080		0.018	
	(0.151)		(0.159)	
Colonial ties	0.487		0.612	
	(0.494)		(0.446)	
Religious affinity	-0.258		-0.491	
	(0.595)		(0.560)	
Regional Trade Agreement	0.842*	0.043	1.030**	0.093
	(0.493)	(0.215)	(0.437)	(0.167)
Observations	47380	44843	46356	43921
Origin FE	YES		YES	
Destination FE	YES			
Country pair FE		YES		YES
Year FE	YES	YES		
Origin-year FE				
Destination-year FE			YES	YES
IDP	NO	NO	NO	NO

Note: Standard errors are multi-way clustered at the origin country and destination country level are in parentheses; *, **, and *** represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Appendix

Table A.1. Country sample, by continent and level of economic development

Developing countries					
Africa	**Asia**	**Europe**	**Latin America and Caribean**	**Oceania**	**Developed countries**
Algeria	Afghanistan	Albania	Argentina	Fiji	Australia
Angola	Azerbaijan	Belarus	Belize	*Kiribati*	Austria
Benin	Bahrain	Bosnia and Herzegovina	Bolivia	Papua New Guinea	Belgium
Botswana	Bangladesh	Ukraine	Brazil	Samoa	Bulgaria
Burkina Faso	*Bhutan*		Chile	Solomon Islands	Canada
Burundi	Cambodia		Colombia	Nairu	Croatia
Cabo Verde	China		Costa Rica		Cyprus
Cameroon	Hong Kong		Cuba		Czechia
Central African Republic	Georgia		*Dominica*		Denmark
Chad	India		Dominican Republic		Estonia
Comoros	Indonesia		Ecuador		Finland
Côte d'Ivoire	Iran		El Salvador		France
Democratic Republic of the Congo	Iraq		*Grenada*		Germany
Egypt	Jordan		Guatemala		Greece
Equatorial Guinea	Kazakhstan		Haiti		Hungary
Ethiopia	Kuwait		Honduras		Iceland
Gabon	Kyrgyzstan		Mexico		Ireland
Gambia	*Lao People's Democratic Republic*		Nicaragua		Israel
Ghana	Lebanon		Panama		Italy
Guinea	Malaysia		Paraguay		Japan
Guinea-Bissau	*Maldives*		Peru		Latvia
Kenya	Mongolia		*Saint Vincent and the Grenadines*		Lithuania
Lesotho	*Myanmar*		Trinidad and Tobago		Luxembourg
Liberia	Nepal		Uruguay		Malta
Madagascar	Oman		Venezuela		Netherlands
Malawi	Pakistan				New Zealand
Mali	Philippines				Norway
Mauritania	Qatar				Poland
Morocco	Republic of Korea				Portugal
Mozambique	Russian Federation				Romania
Namibia	Saudi Arabia				Slovakia
Niger	*Singapore*				Slovenia
Nigeria	Sri Lanka				Spain
Rwanda	Tajikistan				Sweden
Sao Tome and Principe	Thailand				Switzerland
Senegal	Turkey				United Kingdom
Seychelles	*Uzbekistan*				United States of America
Sierra Leone	*Viet Nam*				
South Africa	Yemen				
Sudan					
Togo					
Tunisia					
Uganda					
United Republic of Tanzania					
Zambia					
Zimbabwe					

Note: Countries in italics means that they are only source country but no destination of asylum applications. Developed nations are present only as a destination of asylum applications.

Table A.2. Descriptive statistics

Variable	Source	Obs	Mean	Std. Dev.	Min	Max
Asylum applications	unhcr.org	44,353	217.90	2386	0	271237
IDP	internal-displacement.org	682	369481	1217290	2	15900000
Log(Stock of terrorist attacks from t-1 to t-3)	start.umd.edu/gtd	45,035	2.92	2.59	0	9.22
Voice & Accountability	govdata360.worldbank.org	45,035	-0.66	0.68	-2.17	1.21
Log (Refugee population t-3)	unhcr.org	45,035	2.27	2.80	0	16.74
Log(GDP per capita) source	wdi.worldbank.org	45,035	7.68	1.11	5.36	11.35
Log(GDP per capita) destination	wdi.worldbank.org	45,035	9.51	1.40	5.36	11.68
Log(population) source	wdi.worldbank.org	45,035	16.93	1.49	11.17	21.05
Log(population) destination	wdi.worldbank.org	45,035	16.70	1.53	9.24	21.05
Log(distance)	www.cepii.fr	45,035	8.40	0.87	2.87	9.86
Contiguity	www.cepii.fr	45,035	0.05	0.22	0	1
Common language	www.cepii.fr	45,035	0.20	0.40	0	1
Common legal	www.cepii.fr	45,035	0.42	0.49	0	1
Colonial ties	www.cepii.fr	45,035	0.03	0.17	0	1
Religious affinity	www.cepii.fr	45,035	0.18	0.27	0	1
Regional Trade Agreement	www.ewf.uni-bayreuth.de/en/research/RTA-data	45,035	0.29	0.46	0	1

Notes: Authors' own elaboration. Descriptive statistics based on the sample of the preferred estimate with domestic IDP. For the variable of refugee stock in t-3, we found some difficulties in the construction of the stock of IDP at the beginning of the period because of data availability for selected country-year pairs. In order to be able to include in the analysis all countries and years, we have imputed the stock of IDP at the beginning of the period in three different ways: (1) taking the average t-1 and t+1 to fill missing data in year t; (2) adding the flow of IDP in year t to the stock of IDP in t-1 to fill missing data in year t; (3) calculating for the period of analysis the average of the share of internally displaced persons over the country population, and imputing missing values as the product of the average share and countries´ total population