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Does Terrorism affect Foreign Direct Investment?

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Abstract

The present work assesses the impact of terrorism suffered by a country directly and by neighbour countries on the capacity of attracting greenfield investment. To this end, we estimate a theoretical consistent structural gravity equation which accounts for most known estimation biases: "home bias", endogeneity and multilateral resistance. We exploit a dataset which covers domestic and foreign investment of 162 countries during 2003-2016 in both extensive and intensive margins. Our methodological strategy allows us to identify the effect of a country-specific time-varying characteristic (terrorism), while controlling for time-varying multilateral resistance. Relative to domestic firm creation, results show that terrorism refrains more the number of greenfield projects. Then, our study highlights that foreign investors are reluctant to invest in a country or in a region affected by terrorism. Though, our results also evidence that good governance appears as an effective tool to counterbalance this damage.

Key words: Home bias, gravity equation, terrorism, FDI, greenfield investments, institutions.

JEL classification: C23, F21, F23, O17

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I. Introduction

Terrorism is obviously a dramatic event provoking loss-of-life and physical and psychological injuries for the victims. As pointed by Olson (1993), a society needs to enjoy peace and stability in order to be able to prosper. Violence is one of the components that determines the grade of political risk of a country (Busse and Hefeker, 2007) and might directly restrict the firms' capacity to develop their economic activity in a profitable way (Abadie and Gardeazabal, 2003; Jensen, 2008). Terrorism may hurt directly FDI since it often directly attacks foreign firms (specifically their employees or their physical assets), which may drive those firms out of the host country and deter other firms from entering this country. Furthermore, there is also an indirect consequence in terms of expenditure because large amount of resources are invested in curtailing violence, crimes, conflicts, political instability and terrorism (Asongu and Nwachukwu, 2017). In consequence, the literature shows that terrorism can hamper countries' inward foreign direct investment (FDI), tourism and trade (e.g. Enders and Sandler, 1996; Llorca-Vivero, 2008; Mirza and Verdier, 2008; Santana-Gallego et al., 2016)

The literature has extensively studied the impact political violence on several outcomes such as growth, trade and domestic investments while the effect on FDI flows has been much less investigated. Though, the sensibility of FDI to political violence seems to vary depending on the type of violence. Witte et al. (2017) argue that the effect of violence depends on the extent to which violence poses a continuous risk to business activities. For instance, corruption and expropriation risk are continuous risks while terrorist attacks, pose discontinuous risks to MNEs. Political conflict (civil wars, territorial disputes and genocides) constitutes an intermediate case. Different

studies have focused on the effects on FDI of political violence[1] reaching contrasting results (see Li, 2015 for a survey for instance). This variability in the results may be partly explained by the heterogeneity of the violence indicators considered since the types of violence that pose a relatively continuous risk are more likely to affect the location-specific advantages of host countries. Here, we focus on the impact of terrorist attacks, the less predictable type of political violence and the less investigated issue in this literature.

Apart from the fact that the FDI-Terrorism relationship has been overlooked, this paper is also motivated by the increasing number of terrorist attacks. According to the Global Terrorism Database (LaFee, 2010), between 2003 and 2016, the number of terrorist attacks has increased from 1,272 to 13,587, being the majority suffered by developing countries. Fighting terrorism is even coined as a "global war", with relevant political and social implications (Buzan, 2006).

The present work assesses the impact of terrorism both on the extensive margin (number of projects) and on the intensive margin (amount of projects) of foreign greenfield investments relative to domestic investment. To this end, we use data from the Financial Times Ltd. cross-border investment monitor (FDI Markets, 2017) and the World Bank for domestic investment. Investments are disaggregated by countries of origin and destination for 162 countries, over the period 2003-2016.

The contribution of this article is twofold. First, we investigate in a broad and comprehensive bilateral dataset the impact of terrorism on greenfield investment with a gravity model. The analysis sheds light on the direct effect of terrorism suffered by

[1] See for instance, Burger et al. (2015), Busse and Hefeker (2007), Driffield et al. (2013), Globerman and Shapiro (2003), Goswami and Haider (2014), Li et al. (2017), Maher (2015), Mihalache-O'Keef and Vashchilko (2010) and Suliman and Mollick (2009).

countries, and in the indirect effect of terrorism suffered by neighbour countries. Furthermore, this study also looks into the role that institutional quality could play in overcoming the potential negative impact of terrorism on FDI.

Second, the present paper contributes to the FDI literature by including intra-national investments in the gravity model for greenfield investment. Not only do we consider the amount of domestic capital flows when explaining the volume of greenfield investment, we also take into account the creation of domestic firms in the explication of the number of greenfield projects. As far as we know, this is the first empirical model accounting for the "home bias" (McCullen, 1995), when addressing the determinants of greenfield investment. This strategy allows us to reach unbiased estimates consistent with the gravity model theoretical framework. That is to say, we quantify the effect a country time-varying characteristic (terrorism) at the same time that we properly control for multilateral resistance (Anderson and van Wincoop, 2003; Fally, 2015). Moreover, this strategy also overcomes the potential endogeneity issue between FDI and terrorism (Beverelli et al., 2018). Despite of these advantages, and even if this strategy has became the new normal in the trade literature (e.g. Bergstrand et al., 2015; Heid et al., 2017; Minondo, 2007), this approach has been almost overlooked by the FDI literature. In fact, to the best of our knowledge, only Heid and Márquez-Ramos (2018) have previously applied it to analyse the implications of fiscal discipline on inward FDI stocks.

All in all, our results confirm the negative impact of terrorist attacks on investment in general. Moreover, our findings stress that these events provoke a more salient effect on foreign projects than on the creation of firms at the domestic level, probably because foreign investors could prefer alternative location. However, improving the quality of governance could be an effective tool to offset this negative effect. Additionally, we have shown that the effect of terrorism is not an isolated phenomenon; terrorism in neighbour countries hampers both greenfield investments' intensive and

extensive margins. Terrorism-prone country or countries located in region ridden with terrorism could balance these negative effects by strengthening their compliance of contracts and judicial systems. Thus, policies aimed to foster FDI via pacification should attend both local governance and supranational efforts in terrorism mitigation

Our results suggest that terrorist attacks in the host country and especially in the neighbour countries repel foreign investors. These effects are sizable in absolute terms, but also when compared to domestic investment. Thus, our empirical results suggest that foreign firms are more sensitive to terrorism than domestic firms. Further, our results show that the relative negative effect of terror attacks is mitigated (augmented) by an increase (decrease) in the host's governance quality. Results are robust to different terrorism measures (i.e. the number of casualties and to the number of terrorist attacks which resulted in property destruction).

The remainder of the article is organized as follows. The next section reviews the literature on the effect of terrorism on FDI. Section III presents the empirical strategy and describes the data. Section IV reports the results and Section IV offers some concluding remarks.

II. Related Literature

Terrorism and FDI

The literature that deals with the impact of terrorism on international capital flows is limited while a handful of studies focus only on the impact of violence on aggregate FDI flows. Abadie and Gardeazabal (2008) quantify the effect of terrorism risk on FDI in a cross-sectional study involving up to 186 countries. They conclude that a significant increase in this risk can reduce the net FDI position by approximately 5% of GDP. Most of the studies do find that terrorism, and internal and external violence do have a negative impact on FDI (Bandyopadhyay et al., 2014; Bezić et al. 2016; Busse and Hefeker, 2007; Enders and Sandler, 1996; Filer and Stanišić, 2016).

Nevertheless, the impact of terrorism is not always significantly negative. Results differ depending on the sample and the measure used. Powers and Choi (2012) discover a negative effect of overall terrorism on FDI, but after singling out terrorist attacks in which the targets are businesses, the authors find that only business-related events are negatively associated with FDI. Bandyopadhyay et al. (2014) confirm that transnational terrorism has a more pronounced negative impact on FDI than domestic terrorist attacks in developing countries. The occurrence of terrorism is usually measured by the number of incidents in a country per year, thus ignoring the intensity of incidents as measured by number of casualties (Enders and Sandler, 1996). Other authors have focused on the intensity and frequency of terrorist attacks. Ouyang and Rajan (2017) demonstrate that frequent and especially intense terrorist attacks deter foreign Mergers and Acquisitions (M&As) flows while occurrence of terrorist attacks per se have no significant effect. Saeed et al. (2018) use the Number of deaths provoked by terrorism and show that severe terrorism negatively affects FDI (but the effects are weaker in developed economies).

Further, large or wealthy countries would suffer less economic consequences. Indeed, Galović et al. (2018) conclude that the impact of terrorism on FDI inflows and outflows in developed countries is significantly weaker than the impact of GDP growth on these flows. Terrorist attacks heightens the demand on the government to exert more effort toward counterterrorism and rich countries can more easily cope with these additional costs (Gaibulloev and Sandler, 2009). Moreover, these countries are endowed with some dominant advantages that are favourable to foreign firms and the origin of investors is more diversified, so their ability to attract FDI may barely be affected by terrorism. Saeed et al. (2018) discover a negative effect of violence on FDI. However, when they limit the analysis to the developed world, the effect of terrorism becomes very small or even positive. Then, richest countries could more easily absorb the economic consequences of terrorism. Indirectly, this also suggests that high-income

countries could assign more financial resources to fight terrorism. Hence, they would suffer less internal conflicts, a major cause of domestic terrorism, as confirmed by Asongu and Biekpe (2018).

Capital flows may in turn foster terrorism. Filer and Stanišić (2016) acknowledge that inflows of foreign capital can provide additional targets as well as possibly greater resentment, hence creating a motivation for attacks. Though, the benefits of FDI in terms of growth and employment may mitigate these feelings. As mentioned by these authors, the hypothesis of reverse causality is usually rejected by this literature. For instance, Li and Schaub (2004) refute the hypothesis that "globalization" would increase the number of terrorist attacks through international trade, FDI and portfolio investment. Also, for 51 African countries, Asongu and Biekpe (2018) also invalidates the hypothesis that economic globalisation would foster terrorism.

Role of institutions and Foreign aid

Good institutions and foreign aid may also mitigate the economic impact of terrorism. Oh and Oetzel (2011) gauge the role of quality of governance in minimising the negative effect of terrorist attacks on European multinational corporations' investments at the subsidiary level. Similarly, Ouyang and Rajan (2017) prove that good institutions in developing host countries, as measured by compliance of rule of law, offset the negative effects of terrorism.

Several articles emphasise the effectiveness of bilateral aid in reducing the adverse effect of terrorism on FDI. Bandyopadhyay et al. (2011) hypothesize that foreign aid could foster proactive counter terrorism strategies but also fragilize the regime of the receiver and increase the probability of being removed. Bandyopadhyay et al. (2014) focusing on 78 developing countries for 1984–2000 corroborate that foreign aid attenuates the sensitivity of FDI to terrorism and especially to domestic attacks. Lee (2017) evidences that the adverse effect of terrorism on FDI inflows is considerably reduced in countries benefiting from counterterrorism US aid.

Efobi et al. (2018) draw the attention on the role played by institutions in the relationship between FDI and foreign aid provided to support proactive counterterrorism effort. They underline that foreign aid may be effectively targeted to this end by government depending on the quality of governance. Surprisingly, the negative effect of terrorism on FDI is apparent only in the sample of countries with higher levels of control of corruption. Also, they reach the apparently result that foreign aid reduces the adverse effect of terrorism on FDI only in countries with higher levels of control for corruption. Independently of the degree of terrorism suffered, Efobi et al (2018) conclude that low institutional quality deters FDI in a larger extent, reason why terrorism would only have a negative effect on countries with high institutional quality.

The case of investments in resource sectors

More recent studies, deep into the heterogeneity among sectors in the response of FDI to conflict. In particular, resource seeking greenfield investments would be relatively insensitive to political conflict, terrorism and assassinations (Witte et al. 2017)[2]. Piazza (2016) points out a potential endogeneity bias. He evidences that oil production increases terrorist attacks, but this is explained by the fact that these countries also display worse human rights standard. Biglaiser and DeRouen (2007) find that societal conflict has a significantly positive influence on general FDI inflows for fifteen Latin American countries during the period 1980–1996, which they attribute to natural resource discoveries in Colombia, Mexico, and Peru. Maher (2015) evidences a similar perverse relation in a case study for Colombia, and Skovoroda et al. (2019) conclude that US' investments in oil and gas are attracted by conflicted states (civil war and terrorist events). Burger et al (2015) show that political instability refrain greenfield investment directed to MENA countries except in the resource and energy sector. Li et al. (2017) draw similar conclusions using a dataset of 128 developing countries.

[2] Note that the authors neither find significant effect on the intensive and on the extensive margin.

They highlight that secondary and tertiary sectors FDI react more to civil war than FDI in the primary sector of developing countries.

Terrorism Spillovers

Violence in neighbour countries might also affect foreign capital inflows. On one hand, major violence episodes from one country might have a negative impact on neighbours by making the region more unstable and less economically attractive. Ramos and Ashby (2017) refer to a "geographic halo effect" according to which "foreign investors draw overly broad impressions about a country based on high levels of violent crime in specific locations" (Ramos and Ashby, 2017, p. 287). Then, terrorism in neighbourhood would decrease FDI inflows. Filer and Stanišić (2016) point out the relevance of cultural proximity, proxied by sharing the same majority religion. They find support for negative spillovers of terrorism onto culturally (but not-geographically) close countries. Islam et al. (2008) also stress that countries suffer damage to their reputations and are less likely to be trusted when suffering terrorist attacks, or if residents from their country perpetuate terrorist attacks abroad. Consequently, their reputation and trust would fall and increase the costs of doing business in countries with similar socio-cultural profile.

On the other hand, it is also possible that instability in neighbour countries might redirect FDI into more stable countries inside the same region. Paniagua (2011), who considers the determinants of greenfield investments at the world level, gains support in favor of this last hypothesis.

III. Methodology and data

The gravity model for FDI

This study applies the structural gravity model to estimate the effect on inward FDI of the degree of terrorism suffered directly by host countries, and indirectly through the terrorism in neighbourhood. This model is also used to investigate whether the

impact of terrorism is moderated by countries' institutional quality. The gravity model is the empirical workhorse of empirical studies in international economics and has been successfully applied to explain the determinants of international bilateral flows like trade or FDI. Intuitively, the gravity equation builds on the idea that bilateral flows are directly proportional to host country economic size, and inversely proportional to economic barriers or frictions. The gravity model has solid theoretical foundations both for trade (Anderson and Van Wincoop, 2003) and FDI flows (e.g. Head and Reis, 2008; Kleinert and Toubal, 2010).

Today's gravity gold standard includes controls for the structural forces predicted by theory with a full set of fixed effects, namely country-pair, origin-time and destination-time dummies (Anderson and Yotov, 2012). Country pair fixed effects are included in the model due to the endogeneity between bilateral FDI and bilateral treaties (Baier and Bergstrand, 2007; Bergstrand and Egger, 2013), and to avoid omitted variables bias (Baldwin and Taglioni, 2006). Additionally, country pair fixed effects control for unobservable heterogeneity at the country pair level. Since they are collinear with time invariant determinants of FDI, we do not need to include the classic controls of geographic distance, common language or colonial ties. Home and host country fixed are included as multilateral resistance terms and control for third-country effects (Anderson and van Wincoop, 2003). A correct estimation of the gravity model would require home and host country fixed effects to be time-varying (Head and Mayer, 2014). However, the inclusion of time-varying multilateral resistance terms would be collinear with time-varying home or host variables. To circumvent this issue, the multilateral resistance terms is interacted with year dummies (α_{it} and α_{jt}).

Furthermore, the state of the art of gravity includes control for "home bias" (or "border effect"). In the trade literature, McCallum (1995) is the first to identify the home bias, showing that in spite of the trade liberalization between USA and Canada, trade

within Canadian provinces is 22 times larger than the one with USA states. Accordingly, the home bias quantifies the difference between international and domestic trade of each country, representing the costs faced by international trade relative to domestic ones. Relative to domestic products, foreign goods and services face additional costs to be sum to bilateral trade costs. These costs arise from consumers' preferences that are biased towards domestic goods as well from technological differences and formal or informal barriers to foreign goods (Anderson and van Wincoop, 2003; de Sousa et al., 2012; Martínez-San Román et al., 2016). This is in fact a relevant dimension to account for in the gravity model. As pointed by Berevelli et al. (2018), the set of dummies which represent the home bias in the gravity model quantify the impact of globalization on international trade. Moreover, Bergstrand et al (2015) empirically establish that not accounting for home bias implies also not controlling for declining unobserved costs of international trade relative to intranational trade. This omission would lead to an upward bias when assessing the effect of economic integration agreements on bilateral trade.

Similar to the case of international trade, MNEs are likely to face similar constrictions relative to domestic investment. For example, relative to domestic investment, MNEs' investment decisions could be hampered by formal restrictions such as the need to encounter a local partner, informal restrictions as the collusion of consumers, workers and/or domestic firms against foreign firms, or technological differences which limit the capacity of developing the MNE's economic activity in the host country. The impact of national borders on greenfield investment will approximate the degree of access that MNEs have on the domestic market through investment. Thus, in order to quantify this dimension, it is necessary to account for domestic and foreign investment and compare both. For the case of FDI, in comparison with availability of trade data, there are few indicators which quantify the formal and informal restrictions that

MNEs face when investing in different countries. In this regard, data coverage is geographically and temporarily limited. In addition, the home bias effect also captures the effects of the globalization process on FDI.

Pulling all gravity strings together, we estimate the following augmented gravity equation, which controls for structural forces, home bias and globalization bias:

$$\mathrm{FDI_{ijt}} = \mathrm{e}^{\left(\substack{\mathrm{FTA_{ijt}I_{ij}+BIT_{ijt}I_{ij}+rulelaw_{jt}I_{ij}+terror_{jt}I_{ij}+terror_{jt}rulelaw_{jt}I_{ij}} \\ \mathrm{terrorneig_{jt}I_{ij}+terrorneig_{jt}rulelaw_{jt}I_{ij}+B_{iit}+\alpha_{ij}+\alpha_{it}+\alpha_{jt}}\right)} + \varepsilon_{\mathrm{ijt}} \quad (1)$$

where FDI_{ijt} is capital flows from home country i to host country j in year t, FTA and BIT are dummies which respectively take one whenever a pair of countries have signed a bilateral Free Trade Agreement or a Bilateral Investment Treaty, *rulelaw* is an index which represents a countries' rule of law, *terror* is the number of terrorist attacks in the host country and *terrorneig* is the number of terrorist attacks in neighbour countries. *rulelaw*, *terror* and *terrorneig* are in logarithms, and all independent variables interacted with a dummy which takes 1 for those investment flows which are international ($I_{ijt}, i \neq j$). B_{iit} is a dummy which takes 1 whenever the investment is domestic in year t. The model includes a full set of origin-year (α_{it}) and destination-year (α_{jt}) fixed effects, and country pair fixed effects (α_{ij}) to reduce the risk of suffering from omitted variables bias at the country-pair level.

The dependant variable includes domestic investment (FDI_{iit}) as well as foreign investment. This allows us to improve traditional specifications, offering four empirical benefits. First, we control for home bias. In this way, under the presence of country pair fixed effects (α_{ij}), the coefficient associated to B_{iit} represents the effect over time (advantage or disadvantage) of domestic investment relative to the foreign one, on average, relative to the base period (see Bergstrand et al. (2015) for an analogous model specification for the case of trade and Heid and Márquez-Ramos (2018) for an analogous model for the case of FDI stocks).

Second, this specification allows us to identify the impact of countries' unilateral characteristics (in our case terrorism) within the framework of the structural gravity (Beverelli et al., 2018; Heid et al., 2017; Heid and Márquez-Ramos, 2018). That is, we are able to estimate the effect of time-varying host country characteristics along with destination-year fixed effects. We can do so because the interaction between the border dummy (I_{ijt}) and country-level variables (e.g. $terror_{jt}$) is not collinear with the destination-year (α_{jt}) fixed effects. However, we have to bear in mind that the econometric interpretation of the estimated elasticities is different from the standard case without domestic investment. For instance, a significant and positive coefficient associated with $FTA_{ijt}I_{ij}$ would suggest that signing a FTA increases greenfield investment relative to domestic investment. In the case of our variable of interest, the coefficient will reveal the extent to which terrorism affects FDI compared to domestic investment.

Third, our empirical approach has the advantage of dealing with the potential endogeneity issue between FDI and terrorism (Filer and Stanišić, 2016). According to Beverelli et al. (2018), the endogeneity issue is overcome with the inclusion of a complete set of fixed effects and with the international investment dummy. The origin-year and destination-year fixed effects control for all country specific links between FDI and terrorism. In addition, our variable of interest is the interaction between terrorist attacks and the international investment dummy (I_{ij}), dummy which is not correlated with the degree of terrorism and thus is fully exogeneous. Nizavola and Murtazashvili (2016) show that the interaction between a potentially endogenous variable and an exogenous one is also exogenous. Thus, we can ensure that the interacted covariates included in equation 1 are fully exogenous.

Fourth, as it was previously highlighted, the impact of terrorism on FDI could be moderated by the country's level of development, received foreign aid, institutional quality or natural resource endowment (Bandyopadhyay et al., 2011; Galović et al.,

2018; Ouyang and Rajan, 2017; Witte et al., 2017). The inclusion of country-year fixed effects permits us to control for all, reaching an unbiased estimate of the effect of terrorism on FDI, and isolating accurately the potential moderator effect of institutional quality.

The empirical equation is estimated both for the amounts of capital flows (intensive margin) and for the counts of individual foreign project (extensive margin) using the Poisson Pseudo Maximum Likelihood (PPML) estimator. Silva and Tenreyro (2006) show that PPML allows to overcome two main limitations of estimating the gravity equation with Ordinary Least Squares; not accounting for the zeros present in bilateral statistics and heteroskedasticity problems. Moreover, Fally (2015) illustrates that the PPML estimator, provided domestic trade is included, is consistent with the theoretical framework proposed by Anderson and van Wincoop (2003)[3]. Finally, clustered robust standard errors are calculated by pair of countries, and due to the significant number of fixed effects included in our models, we use the PPML high dimensional fixed effects estimators proposed by Larch et al. (2019).

Data overview

The present analysis covers 162 countries during the period 2003-2016. Statistics for the variables used are available in table 1. The bilateral greenfield investment data are retrieved from FDI Markets (2017). With regards to domestic investment, we use the Gross Capital Formation net of greenfield investment and the number of domestic firms created in a country. Both indicators are respectively gathered from World Bank's Development Indicators and Doing Business project. Due to the data availability of the latter, when analysing the extensive margin and including the number of

[3] Fally (2015, pg 80) points that "*the gravity model is micro-consistent and international trade flows sum up to output for each source country and sum up to expenditures for each destination country*". If this property is not accounted for in the data (not including domestic investment in our case), the multilateral resistance indexes implied by the fixed effects with PPML "would not satisfy the structural gravity constraints based on actual output and expenditures".

firms created domestically the sample of analysis is limited to 144 countries during the period 2006-2016. FTA and BIT dummies are respectively from Hofmann et al. (2017) and UNCTAD's International Investment Agreement database.

As a measure of countries' institutional quality, we use the Rule of law index from the World Bank's Worldwide Governance Indicators (Kaufmann et al., 2011). The Rule of Law index represents a country's quality of contract enforcement, property rights, judicial system and likelihood of crime. The choice of this indicator is based on its wide country coverage, and its relevance as determinant of FDI as shown by previous literature (e.g. Anyanwu, 2012; Bénassy-Quéré et al., 2007). To ease the interpretation, we convert the original index that ranges from -2.5 to 2.5 into a variable that is positive and equal or larger than one, and we include the converted variable in logarithms.

(Insert table 1 here)

Terrorist attacks suffered by a country are retrieved from the Global Terrorism Database (GTD) provided by the Department of Homeland Security-supported Start (LaFee, 2010; START, 2018), while the indicator of number of terrorist attacks in neighbour countries is calculated by authors. As it can be gathered from graph 1, the number of terrorist attacks at the world level has drastically increased between 2003 and 2016. On average, during this period, 55% of the attacks resulted in, at least, one casualty, and 40% in property destruction. Graph shows the top 10 countries most affected by terrorism. Together they suffered 74% and 77% of the world's terrorist attacks and fatalities. Iraq is the most affected country. All these targeted countries are developing countries from Asia, Middle East and Africa. In this regard, it is worth highlighting that developing nations suffer the most from terrorism, while developed

nations suffered from 3.9% of the total terrorist attacks and account for 0.7% of the world's victims.

Almost all countries in the world suffered from certain type of terrorist attack during our period of analysis. As a consequence, most countries have neighbours which suffer from terrorism. Graph 3 illustrates the countries which on average had the highest degree of terrorism in their neighbour countries. In this case, countries from Middle East and Asia are the most affected ones.

(Insert graphs 1, 2 and 3 here)

IV. Results

The results of our gravity equation (1) are reported in Table 2. Columns 1 and 2 show the estimates for the extensive and intensive margins, respectively. We should keep in mind that our preferred specification includes domestic investment and that all variables are interacted with an international investment dummy. Consequently, the marginal effects should be interpreted as the relative effect of foreign investment compared to domestic investment.

Focusing on the extensive margin, FTA and BIT have the same impact (on average) both on foreign and domestic investment. Rule of law follows the same pattern: the coefficient is not statistically significant, meaning that increasing (or decreasing) rule of law has the same effect on both types of investment. The first determinant affecting in a significant different manner domestic and foreign new projects is terrorism. Terrorist attacks hurt more negatively (-0.214) FDI than domestic investment. Everything else constant, an increase in terrorist attacks by one percent in the host country reduces the number of new foreign projects by 21% relative to the number of new

domestic firms. Our conjecture for this result is that foreign capitals are more mobile than domestic capital since they can consider alternative locations which are less risky. Additionally, terrorist attacks may target foreign businesses (Power and Choi, 2012). However, the interaction between rule of law and attacks displays a positive and significant sign, suggesting that the negative effect of terror attacks is mitigated by an increase in the compliance of rule of law. Conversely, in countries where rule of law decreases, the negative impact of terror is augmented. By solving the first derivative of equation (1) relative to terrorism:

$$\frac{\partial \ln(FDI)}{\partial terror} = -0.214\frac{1}{terror} + 0.156\frac{1}{terror}rulelaw$$

the estimates describe a situation where terror attacks could have a neutral effect on FDI (relative to domestic) for countries with a relative high degree of rule of law quality such as Italy. Alternatively, in countries with poor compliance of rule of law, the negative effect of terror is amplified. For example, the same number of terrorist attacks would have a different influence on FDI in countries with different rule of law. This result might explain why FDI has been more resilient to the recent wave of terrorist attacks in USA and Europe.

Our results emphasise the negative spillovers of terrorist attacks suffered in neighbour countries to attract foreign investments. Indeed, the marginal effect of a terrorist attack in a neighbour country doubles the (negative) effect of an attack within the host country. Notwithstanding, the effect of increasing the rule of law in the host has a greater effect on curving the adverse impact of neighbour attacks. In sum, attacks in neighbour countries damage more FDI (relative to domestic investment) than attacks in the host country. However, the offsetting effect associated with an increase in host's rule law is also larger. These estimates highlight the relevance of geostrategic interactions of host's governance. Countries located in an area with high density of

terror attacks, could hedge this adverse impact through better governance. Otherwise, the spillover effects might harm their attractiveness to foreign investors.

(Insert table 2 here)

On the intensive margin, the effect of neighbour attacks is dominant (column 2 of Table 2). Here, the only significant covariates are the number of terrorist attacks in neighbour countries and its interaction with rule of law. The comparison of the extensive and the intensive margin estimates stresses the role of domestic attacks on the creation of new investing partners. Terror directly suffered by a country has a significant effect deterring new investment project, but has no significant effect on the volume of capital invested. That is to say, violence scares foreign investors (more than domestic ones), but it does not reduce the volume of foreign plants' capital (relative to domestic plants). Nonetheless, the effect of attacks in the periphery of the host country deters new investment projects and reduces the scale of projects as well. This latter effect is easily offset (augmented) by an increase (decrease) in the host's governance.

The results presented in Table 2 constitute our preferred estimates of a structural gravity equation containing both the full set of controls, and domestic investment. The price to pay for a correct identification of the effect of terrorism is that the interpretation of the marginal effects is silent about the net effect of terror on FDI (as well as on domestic investment). The aforementioned interpretation of the estimates of terror elasticities is restricted to the relative impact of FDI and domestic investment. When we exclude multilateral resistance altogether, we end up with a biased estimate of the net effect of our variables of interest. We do so to get a flavour of the

effect of terror on FDI and by comparison with previous results, we obtain an educated guess about how terrorist attacks may affect domestic investment. These results are shown in Table 3. To minimize bias stemming from excluding multilateral resistance terms, we include covariates which are not completely covered by the multilateral resistance terms to alleviate any omitted variable bias, namely market size (log of sum of home and host GDP, $GDPsum$) and differences in GDP per capita ($diffGDPpc$)[4]. These variables were perfectly explained by year interactions with home and host country dummies in the previous specification, but this is no longer the case in the present model. The positive and significant results of the coefficients of $GDPsum$ and $diffGDPpc$ are in line with our expectations. We can appreciate how the effect of BIT is now positive and significant in the extensive margin. Comparing this result with the non-significant result in Table 2, we can infer that BIT has a similar effect on both domestic and foreign investment extensive margins (with the caution due to the known biases that we incur in the specification presented in Table 3). The same logic applies to the positive effect of FTA on the intensive margin: we infer with caution that trade agreements foster both types of investment. Rule of law would significantly attract foreign investment inflows, meaning that rule of law also contributes to foster domestic investment (recall that the effect was non-significant in Table 2).

Our variables of interest in Table 3 follow the same pattern as in Table 2. Terrorist attacks have a substantial negative net effect on the extensive margin. Our result also confirm that these events do not alter the amounts invested Linking these results to the ones obtained in the previous model, we gamble on that it comes from the fact that terror attacks would hurt more domestic firms than foreign firms. Turning to the quality of institutions, the enhancing effect of rule of law is confirmed, both in net and relative terms. Then, good governance can be interpreted as a premium for foreign

[4] GDP and GDP per capita are retrieved from the World Bank's Development Indicators

firms. Countries that broaden the protection of property rights for instance, would increase the likelihood that foreign (and domestic) firms set up new plants in their countries even when they face terrorist attacks. This mechanism also holds true when terrorist attacks hurt the neighbour country: good governance appears to be an effective tool to decrease the risk perceived by investors. Surprisingly, it appears that compliance of rule of law is more willing to rebuild foreign investors' trust that would have been damaged by terrorism suffered in the periphery than to gain domestic investors' confidence. In all likelihood, this result mirrors the fact that domestic projects are more resilient than foreign firms to the negative effect of terror attacks in neighbour countries.

Generally speaking, results reported in Table 3 are aligned with most of the previous literature which reports a negative effect of terrorism on FDI (e.g. Abadie and Gardeazabal, 2008; Bandyopadhyay et al., 2014; Powers and Choi, 2012). In addition, contrary to Efobi et al. (2018), but in line with Ouyang and Rajan (2017) for the case of M&As, our reached evidence supports the hypothesis that striving to improve contract enforcement, property rights, judicial system would hamper the negative impact of terrorism on greenfield investment. In addition, for both extensive and intensive margin, our findings support the hypothesis of a "geographic halo effect" (Ramos and Ashby, 2017) according to which terrorism in one country could jeopardise the attractiveness of neighbour countries in terms of FDI.

(Insert table 3 here)

In Table 4, we perform some robustness checks considering the intensity of terrorist attacks. To this end, we include alternative measures of terrorism, namely the number of casualties in terror attacks ($casualties$, $casualtiesneig$) and the number of attacks

which resulted in property damage (*property*, *propertyneig*). We use the structural gravity specification described in equation (1) including domestic investment as dependant variable. Overall, our previous results are robust to these new measures of terror attacks. We do observe, however, some interesting differences. The first trait is the intensity of terrorism would affect similarly domestic and foreign investments but terrorism in neighbouring countries would damage substantially more foreign investments than domestic investments. The effect of the number of mortal victims and attacks with property damage is negative and significant when the attacks occur in the region of the host country. The magnitude of the effect is similar to the elasticities of the number of attacks (Table 2). Our results also confirm that quality of governance improves the prospect of getting more FDI projects with larger amounts when facing intense terrorism in the periphery, as shown by the positive and significant interaction of rule of law and both deaths and property in both investment margins.

However, the picture is slightly different when we focus our attention on the effect of terrorist intensity in the host. Even if the number of casualties due to terrorist attacks would damage the host attractiveness, it has only a barely significant effect on the intensive margin. The effect of attacks with property destruction is not significant at any standard level of statistical confidence. The interaction of these variable with rule of law is still positive, but only significant to the level of p=0.1. In terms of the impact on greenfield investment relative to domestic investment, the interpretation of these results suggest that the intensity of terrorism in a country is not as relevant as the presence of terror attacks in that country. However, both terror attacks and the intensity of the terror attacks in the area deters FDI in the host country.

(Insert table 4 here)

V. Conclusions

In this study, we investigate the effect of terrorism on FDI. To this end, we exploit a bilateral greenfield investment database enriched with a dataset for domestic investments which covers 162 countries during the period 2003-2016 period. This allows us to gauge the effect of terrorism on the extensive and intensive margin while controlling for the home bias.

The main contribution of our research is the use of an empirical method that allows us to identify the effect of terror attacks at the host level, while controlling for unobservable time-varying country specific factors. Although accounting for the "home bias" and controlling for the time-varying multilateral resistance is becoming a predominant empirical strategy in the trade literature, it has been mostly unexploited for the case of FDI. In this way, we obtain theoretical consistent estimates with a very low risk of incurring in known biases related to gravity estimates (e.g., endogeneity and home bias). Accordingly, we contribute to the literature by not only analyzing the net impact of terrorism on FDI, but also the effect of terrorism on FDI relative to domestic investment.

All in all, our results confirm the negative impact of terrorist attacks on investment in general. Moreover, our findings stress that these events provoke a more salient effect on foreign projects than on the creation of firms at the domestic level, probably because foreign investors could prefer alternative location. However, improving the quality of governance could be an effective tool to offset this negative effect. Additionally, we have shown that the effect of terrorism is not an isolated phenomenon; terrorism in neighbour countries hampers both greenfield investments' intensive and extensive margins. Terrorism-prone country or countries located in region ridden with terrorism could balance these negative effects by strengthening their compliance of contracts and judicial systems. Thus, policies aimed to foster FDI via pacification should attend both local governance and supranational efforts in terrorism mitigation.

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Table 1: Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
FDI_{ij}(extentive)	60651	1.97	9.22	0	366
FDI_{ii} (extentive)	1104	32020.16	69928.65	8	662947
FDI_{ij} (intensive)	76395	106.91	588.91	0	22310.5
FDI_{ii} (intensive)	2042	101818.2	387991.4	0.23	4975392
FTA	78437	0.3	0.46	0	1
BIT	78437	0.43	0.49	0	1
rulelaw	78437	1.25	0.34	0	1.74
terror	78437	1.38	1.8	0	8.28
terrorneig	78437	3.14	2.27	0	8.99

Note: Where extensive refers to the number of projects and intensive to the capital invested, being the latter in millions US dollars. $\mathbf{FDI_{ii}}$ refers to domestic investment and $\mathbf{FDI_{ij}}$ to international investment. Then, rulelaw, terror and terrorneig are expressed in logarithms. Authors' own elaboration.

Table 2: The impact of terrorism on greenfield investment relative to domestic investment

	Extensive	Intensive
	(1)	(2)
FTA	-0.047	0.146
	(0.05)	(0.10)
BIT	-0.027	0.131
	(0.08)	(0.14)
rulelaw	-0.180	-0.995
	(0.53)	(1.10)
terror	-0.214**	0.016
	(0.09)	(0.17)
x rulelaw	0.156***	-0.058
	(0.06)	(0.12)
terrorneig	-0.444***	-0.987***
	(0.06)	(0.18)
x rulelaw	0.618***	0.618***
	(0.12)	(0.12)
Fixed effects	Country pair and country*year and border	
Domestic investment	Yes	
Observations	61755	78437

Notes:

Empirical results of the PPML estimate of equations (1).

Independent variables are interacted by the dummy which identifies international investment (I_{ij}).

Robust standard error in parentheses.

* p < 0. 10, ** p < 0. 05, *** p < 0. 01.

Table 3: The net impact of terrorism on greenfield investment

	Extensive	Intensive
	(1)	(2)
GDPsum	0.211***	0.330***
	(0.05)	(0.07)
diffGDPpc	0.349***	0.512***
	(0.07)	(0.09)
FTA	0.064	0.195**
	(0.06)	(0.10)
BIT	0.265*	0.231
	(0.14)	(0.18)
rulelaw	0.747**	0.473
	(0.31)	(0.58)
terror	-0.203***	0.033
	(0.05)	(0.09)
x rulelaw	0.164***	-0.041
	(0.03)	(0.07)
terrorneig	-0.260***	-0.241***
	(0.04)	(0.09)
x rulelaw	0.139***	0.163**
	(0.03)	(0.07)
Fixed effects	Country pair and year	Country pair and year
Domestic investment	No	No
Observations	81177	81177

Notes:

Empirical results of the PPML estimate of equation (1) without country-year fixed effects.

Robust standard error in parentheses.

* p < 0. 10, ** p < 0. 05, *** p < 0. 01.

Table 4: Different measures of terrorism

	Extensive	Intensive	Extensive	Intensive
	(1)	(2)	(3)	(4)
FTA	-0.052	0.136	-0.048	0.142
	(0.05)	(0.10)	(0.05)	(0.10)
BIT	-0.052	0.112	-0.039	0.115
	(0.05)	(0.14)	(0.07)	(0.14)
rulelaw	0.068	-0.412	-0.065	-0.883
	(0.53)	(1.01)	(0.55)	(1.08)
casualties	-0.089	-0.216*		
	(0.08)	(0.13)		
x rulelaw	0.093*	0.156*		
	(0.06)	(0.09)		
casualtiesneig	-0.340***	-0.508***		
	(0.06)	(0.13)		
x rulelaw	0.218***	0.271***		
	(0.04)	(0.08)		
property			-0.110	0.088
			(0.09)	(0.17)
x rulelaw			0.098*	-0.113
			(0.06)	(0.12)
propertyneig			-0.460***	-1.072***
			(0.07)	(0.18)
x rulelaw			0.286***	0.656***
			(0.05)	(0.12)
Fixed effects	Country pair and country*year		Country pair and country*year	
Domestic investment	Yes	Yes	Yes	Yes
Observations	61755	78437	61755	78437

Notes:

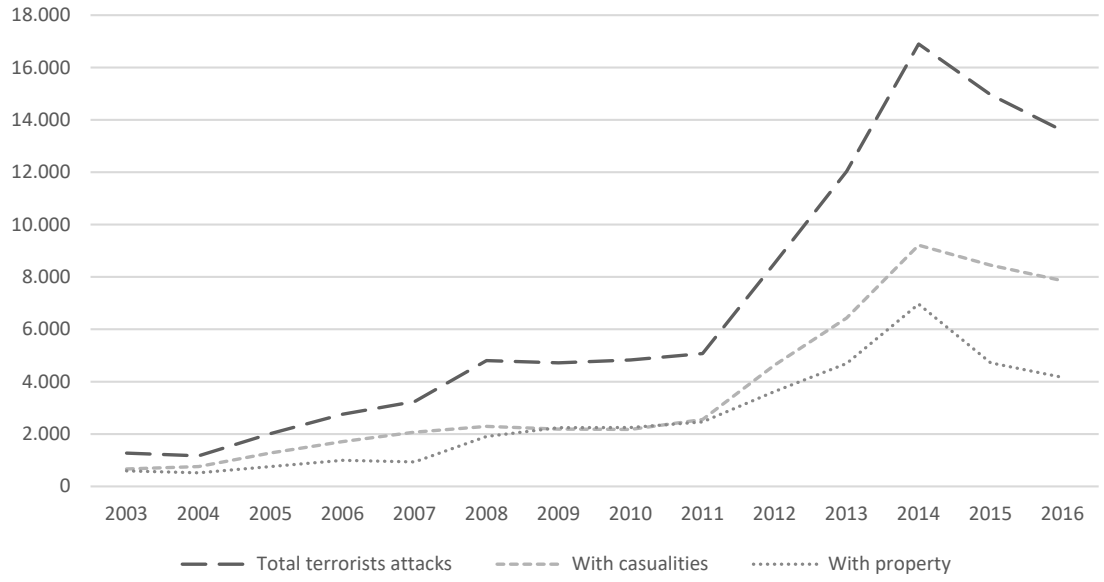
Empirical results of the PPML estimate of equations (1) with different terrorist measures.

Independent variables are interacted by the dummy which identifies international investment (I_{ij}).

Robust standard error in parentheses.

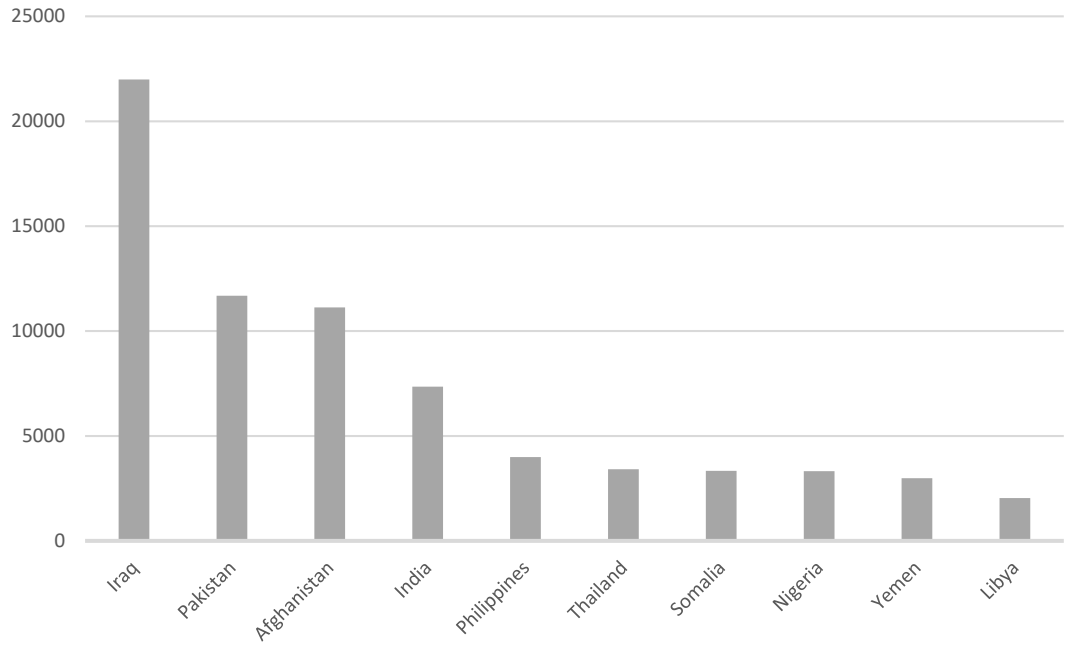
* p < 0. 10, ** p < 0. 05, *** p < 0. 01.

Graph 1: Number of terrorist attacks at the world level, 2003 - 2016



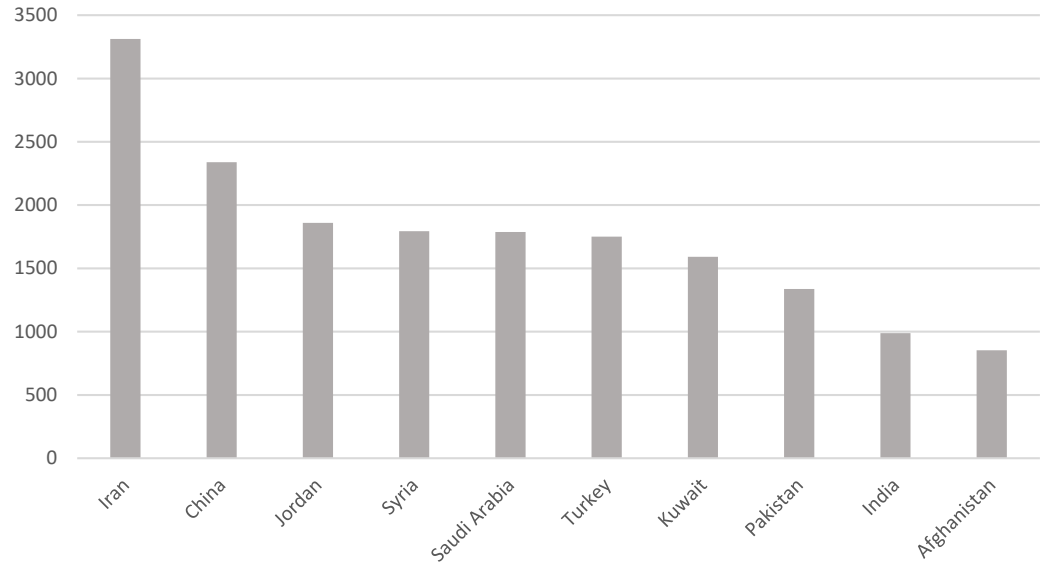
Note: Calculations based on data from the Global Terrorism Database. Authors' own elaboration.

Graph 2: Countries most affected by terrorism



Note: Calculations based on data from the Global Terrorism Database. Authors' own elaboration.

Graph 3: Countries with high level of terrorism in neighbour countries



Note: Calculations based on data from the Global Terrorism Database. Authors' own elaboration.