Not all bad? Terrorism's effect on outward FDI stocks

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The Impact of Domestic and Transnational Terrorism on Outward Foreign Direct Investment

Abstract

This paper considers the impact of terrorism on a nation's outward FDI. Using data from the Global Terrorism Dataset, UNCTAD, the World Bank, and CEPII, I use a Poisson Pseudo Maximum Likelihood regression model to find that domestic terrorism increases the outwards FDI of all nations, while terrorism as a whole reduces outwards FDI during the Cold War for non-OECD nations. The former result is hypothesised to be caused by terrorism-induced changing relative costs of domestic-based production chains and foreign-based production chains, resulting in domestic firms shifting production overseas, reflecting the open economy channel found in previous literature. The latter result is hypothesised to be as a result of increased terrorist effectiveness during the Cold War.

Contents

1 Introduction

Terrorism and foreign direct investment (FDI) are intertwined: firms investing in countries minimise risk, risk increasing with terrorism. Equivalently, the presence of multinational companies (MNCs) in a country can make its native population more likely to resort to terrorism as they may consider their country now under the influence of foreigners.

The world is increasingly globalised, making global production chains more efficient. Outward FDI (OFDI) – the level of direct investment by domestic investors in overseas – is a tool for firms to expand profits and provide their products to a larger market. Since 1980, OFDI stocks relative to GDP have increased eightfold for OECD nations and fourfold for non-OECD nations. Despite this, the literature on terrorism's effect on FDI mostly considers either FDI inflows or net FDI (NFDI). Its effect on OFDI is interesting, since domestic firms may relocate abroad, *increasing* OFDI. Dau et al. (2018) gives Grupo Carso as an example, which successfully moved some operations abroad to reduce terrorism's risk. OFDI does not merely represent capital flight – it is beneficial for a country, increasing local employment growth (Federico and Minerva, 2008), wit close association with high GDP, domestic savings, and FDI inflows (Bano and Tabbada, 2015).

As defined by Li and Schaub (2004), terrorism is the "use of extra-normal violence or force to obtain an ... objective through ... intimidation". There is a distinction between domestic and transnational terrorism: domestic terrorist attack are where the perpetrators, victims, supporters, and targets are from the attacked country. Conversely, for transnational terrorism, at least one of those categories involves a party from abroad.

It is established that terrorism pushes inward FDI away from developing nations, yet the effect on FDI outflows is unclear. After 9/11, U.S. FDI outflows fell, but he U.S. is an edge-case nation so no global conclusions can be drawn from Enders et al. (2006). In this study, I argue that, in some cases, terrorism at home increases OFDI as firms substitute away from terrorist-caused heightened domestic costs and towards lower cost foreign economies.

Moreover, most work looks solely at transnational terrorism, not domestic, since the most used dataset is 'International Terrorism: Attributes of Terrorist Events' (IT-ERATE). This only includes transnational terrorism and its "near canonical" reputation means is often seen as the only reputable source (Sheehan, 2012). This is inaccurate as the Global Terrorism Database (GTD) includes *all* terrorism. Thus, my study benefits from an extension of data.

First, I provide a summary of previous literature, before discussing my hypothesis in further detail. I describe my econometric model in Section 4, followed by the data, and my results. I end by discussing the robustness of my results, their limitations, and potential further work.

2 Literature Review

Previous literature argues that transnational terrorism may lead to a reduction in NFDI stocks – inward minus outward FDI stocks. An early result was Enders and Sandler (1996), finding that transnational terrorism reduced NFDI by 13.5% and 11.9% in Spain and Greece respectively. However, its scope is limited without domestic terrorism. Foreign firms are directly affected only by transnational terrorism: by definition an attack on an MNC is transnational. However, domestic terrorism affects MNCs indirectly: destroyed infrastructure causes disruption, taxes levied for counterterrorism reduces profits, while counterterrorism itself is the most important dimension of attracting FDI - more so than the scale of attacks (Mancuso et al., 2010).

Ali (2010) agrees by asserting that the cause of the 58% fall in Pakistani inward FDI in 2009 was caused by the perception of failed counterterrorism, despite attacks being directed against government and military targets, with commercial losses as collateral. Firms pay higher wages to compensate employees for working in terrorism-prone regions (Powers and Choi, 2012), so despite no direct attacks, a decision not to invest is one of profit maximisation. No econometric analysis was undertaken in Ali (2010) so causation is murky: it is unclear how much terrorism reduced FDI. Sandler (2014) agrees that terrorists do not primarily attack businesses: of four target types identified, businesses are the second least attacked since 1980[1]. Dau et al. (2018) say that terrorists 'asymmetrically' target firms due to them being a 'vital economic lifeline', though this conflicts with the data: since 1968, there have been approximately 2,800 attacks on businesses, while as many as 4,000 attacks each on private parties and officials.

It is rare for papers to get similar numbers: terrorist-induced NFDI reduction varies countries, terror campaigns, and time periods. In Bandyopadhyay et al. (2011), by conducting a dynamic panel investigation, the long-run impact of a one standard deviation increase in domestic terrorist incidents on NFDI as a percentage of GDP was 1.307% while for transnational terrorism this was 1.057%. This paper does not discern between OECD-membership status – a limitation, since the composition of NFDI in developed and developing countries differs, as does overall importance of

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[1]Appendix 1 Figure 6 for graph

NFDI. Developing countries finance investment with FDI inflows (Majeed and Ahmad, 2007) so NFDI comprises more of GDP. Therefore, NFDI volatility causes growth volatility, while large economies are largely unaffected.

Abadie and Gardeazabal (2008) found a larger impact on NFDI: a one standard deviation increase in terrorist risk being associated with an NFDI fall of 5% of GDP. They estimated a stochastic version of an AK endogenous growth model with cross-country regressions. For Collodel and Kotzé (2014), the study suffers with overly broad cross-country regressions so little nuance. Across countries, FDI's effect is not homogeneous: foreign-owned diamond mines or oil rigs are more likely to cause unrest than call centres. This study also does not discern between transnational and domestic terrorism, another weakness since motives and effects differ.

Abadie and Gardeazabal (2008) hypothesised that NFDI's fall is to the 'open-economy channel' whereby, in a capital mobile world, more risk sees MNCs moving investments abroad to lower risk countries: a substitution of economic activity away from vulnerable sectors occur (Sandler and Enders, 2008). Firms invest overseas for 'location-specific' advantages (Powers and Choi, 2012) which are eliminated when transnational terrorism is present, so firms are less willing to invest. Powers and Choi also used lagged FDI as a control variable to limit the autocorrelation that FDI stock data is prone to.

Most studies concern NFDI, not FDI outflows alone. One of the few is Enders et al. (2006) who find that 9/11 had little lasting impact on U.S. OFDI flows, using time series methodology. Also, for the OECD, U.S. FDI reductions increase with the violence of the attack. This is a useful study of OFDI, though the U.S. is an outlier in economic size, so results cannot be generalised to other economies.

Studying outwards FDI, Thomas and Narayanan (2017) study Indian manufacturing firms, finding a complementary relationship between OFDI and exports. Firms undertaking OFDI are larger, invest in more technology, and more productive than firms which do not. They show that the liberalisation of trade during the late 1980s accelerated OFDI's growth. Cieślik and Hien Tran (2019) use the Poisson Pseudo-Maximum Likelihood (PPML) estimation technique to find that market size, skilled labour abundance, trade cost, and geographic distance are main determinants of OFDI.

There are endogeneity concerns about studies on terrorism and FDI. Profit-maximising MNCs relocate operations overseas to avoid the terrorist attacks which increase costs. However, for many countries, poorer ones specifically, terrorism is likely to be caused by FDI. Foreign business presence leads to ideas of American-led western imperialism

amongst the native population, resulting in extremist political groups. For existing terrorist organisations, attacks on western assets guarantees greater media attention (Radić et al., 2019), acting as an advertisement to increase their publicity and to gather international patronage. Powers and Choi (2012) lag their explanatory variables in order to give a one-way direction of causality. Bandyopadhyay et al. (2011) suggests an instrumental variables approach as others do (Collodel and Kotzé (2014), Tavares (2004)), as well as the GMM estimation technique. Herzer (2011) shows that Hijzen et al. (2007) apply matching and differences-in-differences analysis, while they use the dynamic ordinary least squares estimator, which is asymptotically unbiased and normally distributed even if in the presence of endogenous regressors.

3 Hypothesis

Firms invest abroad to expand into a foreign market and to obtain lower marginal costs. The former is horizontal FDI, while the latter is vertical. Horizontal FDI arises in order to circumvent costs associated with exporting: trade barriers and transportation costs. Vertical FDI arises as different countries have different marginal costs of production, which MNCs exploit for higher profits. For example, if a production chain has a labour intensive stage and a capital intensive stage, it produces the former in a labour capital abundant economy and the latter in a capital abundant economy.

Terrorism at home affects the decision-making for whether to engage in either type of FDI as it imposes extra costs through various channels. Firstly, increased labour costs. Firms which may engage in OFDI are more likely to invest more in technology, recruiting skilled workers to perform R&D (Thomas and Narayanan, 2017). These workers are wealthy enough to move from terrorist-affected regions. Thus, to keep them, firms pay higher wages to compensate for terrorism's risk. Other costs include the direct cost of damage done by terrorist attacks, which is more likely to occur in non-OECD nations – this is mitigated with insurance (Uddin et al., 2021), though this involves additional costs. Additionally, plants must be defended, resulting in higher wage costs as security guards are recruited, and there may be indirect extra transport costs due to infrastructure damage. Counterterrorism also induces costs through higher taxes, additional red tape for government security checks, or additional transport costs due to checkpoints.

These extra domestic costs from terrorism affects both types of OFDI. Firms choose whether to establish foreign horizontal FDI operations based on whether the savings by switching from exports to local production – decreased transport costs and tariffs –

outweigh the high fixed costs of establishing a new plant (Protsenko, 2004). For an exporting firm, terrorism may increase transportation costs as well as local costs of production, so investing abroad becomes the profit maximising strategy, increasing horizontal OFDI.

Deciding to engage in vertical FDI means weighing whether the lower production costs in their potential destination outweighs the costs of a fragmented production chain – extra transport costs and additional costs of acting abroad. Terrorism results in the relative production costs of the potential foreign economy decreases versus the higher cost domestic economy, so the firm finds that relocating part of the production chain is the profit-maximising strategy. Again, OFDI is increased.

4   Methodology

I use data on 161 countries over 40 years, from 1980 to 2019. 1980 is the start data as it is the first year in which FDI data is available. 2019 is the most recent year in which there is data available for most countries.

I use a dynamic panel data model using country and year fixed effects. Panel data allows for greater variation in variables, so identification of trends is easier. Country- and time-fixed effects allows me to control for the different economies of nations as well as business cycle fluctuations, with (Powers and Choi, 2012) suggesting that fixed effects gives more consistent estimates.

FDI stocks include zero observations so I employ the PPML estimator which specifically addresses the problem of zero values within the data (Stojkov and Warin, 2018). It is robust to heteroskedasticity and allows dealing with zero data and fixed effects. Additionally, FDI is highly right-skewed in its distribution, which PPML also addresses Bruno et al. (2021).

Following Powers and Choi's (2012) example, I lag the explanatory and control variables to limit endogeneity, as well as because there is a year's lag between an incident and its effect on FDI (Enders and Sandler, 1996). Egger and Gassebner (2015) also find that terrorism has little effect on trade in the short-run, only in the medium run, since in the short-run firms have fixed factors of production only reacting in the medium- and long-runs.

Two dummy interactions are included, for the Cold War, and OECD membership. It is clear from Section 5.1 that FDI differs greatly between OECD and non-OECD

nations, not all of which is captured by controls included, while the end of the Cold War coincides with the creation of new nations with unique post-planned economy characteristics. Both are interacted with the terrorism variables – terrorism's effects vary over time with the geopolitical scene, as well as between nation-types. In a diversified OECD economy, terrorism should have less of an impact than in a weaker non-OECD economy.

With the interaction terms included, together with year- and time-fixed effects, my econometric model is of the following form:

$$
\begin{aligned}
\text{FDIstk}_{it} = {} & \alpha + \beta_1 \text{Terror}_{it-1} + \beta_2 \text{Terror}_{it-1}\text{OECD}_{it-1} + \beta_3 \text{Terror}_{it-1}\text{CW}_{t-1} \\
& + \beta_4 \text{Terror}_{it-1}\text{OECD}_{it-1}\text{CW}_{t-1} + \beta_5 \text{OECD}_{it-1} + \beta_6 \text{CW}_{t-1} \\
& + \beta_7 \text{OECD}_{it-1}\text{CW}_{t-1} + \beta_Z X_{it-1} + \alpha_i + \delta_t + \varepsilon_{it},
\end{aligned}
$$

where Terror_{it-1} is any of all terrorist incidents, transnational terrorist incidents, and domestic incidents. OECD_{it-1} equals 1 if a nation is an OECD member during the previous year, 0 otherwise, CW_{t-1} equals 1 if the year is 1992 or earlier, X_{it-1} are the control variables, and α_i and δ_t is year- and country-fixed effects, respectively. Variable description and summary statistics are in Appendices 3 and 4. Due to heteroskedasticity in the data, I use Huber-White robust standard errors.

5 Data

5.1 Dependent variable: FDI stocks

The FDI stock's data originates from the U.N. Council on Trade and Development (UNCTAD) and represents the outward FDI stocks of a country. OFDI gains a lasting interest in a foreign firm, requiring at least 10% of equity to classify as an FDI flow, that is, a change in the FDI stock. FDI stocks are measured relative to national GDP to neutralise differences in economic sizes.

Global FDI stocks have been growing mostly stably. The dot-com bubble caused stagnation around 2001, while in 2008 and 2018 there were large decreases in real FDI stocks, of 21.7% and 8.3% respectively[2], though FDI following each reverted to trend. 2008 was caused by the financial crash, and the latter by a low rate of return on FDI and lower labour-cost arbitrage opportunities (UNCTAD, 2018).

FDI stocks as a percentage of GDP are smaller in non-OECD than OECD nations (Figure 1). Annual non-OECD FDI stock growth is also lower relative to GDP, at 5.4%
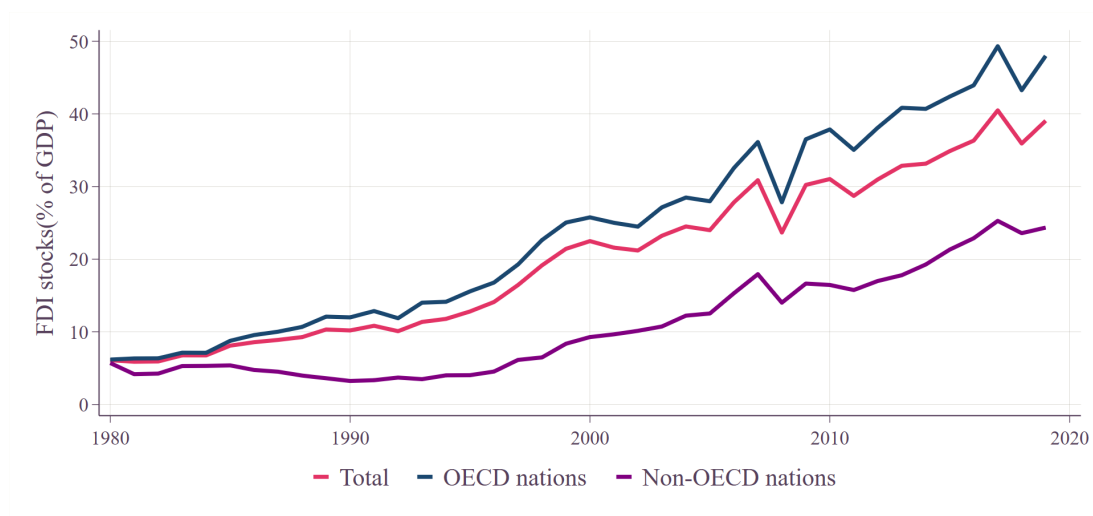
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[2]Appendix 1 Figure 5

Figure 1: *FDI stocks relative to GDP by OECD-membership status,* 1980–2019

vs. 5.6% over the whole time period respectively. Thus, while in 1980 non-OECD nations had a mean of 5.7% FDI stock as a percentage of GDP versus 6.2% for OECD nations, by 2019 this gap increased to 24.4% versus 48.0%, respectively.

5.2 Main independent variable: Terrorism

The GTD collects records of 200,000 terrorist attacks. I use data on annual incidents per country per year, the casualties caused, and the number of incidents resulting in property damage by country by year. The last two variables are assessed in the robustness section. All terrorist variables are split between transnational and domestic incidents, though there are attacks where it is unknown whether they were transnational or domestic ('unknowns'). Thus, the number of transnational and domestic incidents do not sum to the total so I look at the variables encompassing transnational and domestic attacks, as well as the combined number.

5.2.1 Incidents

Annual attacks (Figure 2) change around major events. The Cold War saw state-sponsored terrorism (Enders and Sandler, 1999), with attacks concentrated mostly in Latin America. Its end saw a large decrease in attacks for the next decade.

After 9/11, terrorism was concentrated in Afghanistan, Iraq, and Nigeria – the latter with the rise of Boko Haram[3]. The number of attacks slowly rose throughout the decade from 2004 onwards, corresponding to the end of the conventional war in Iraq
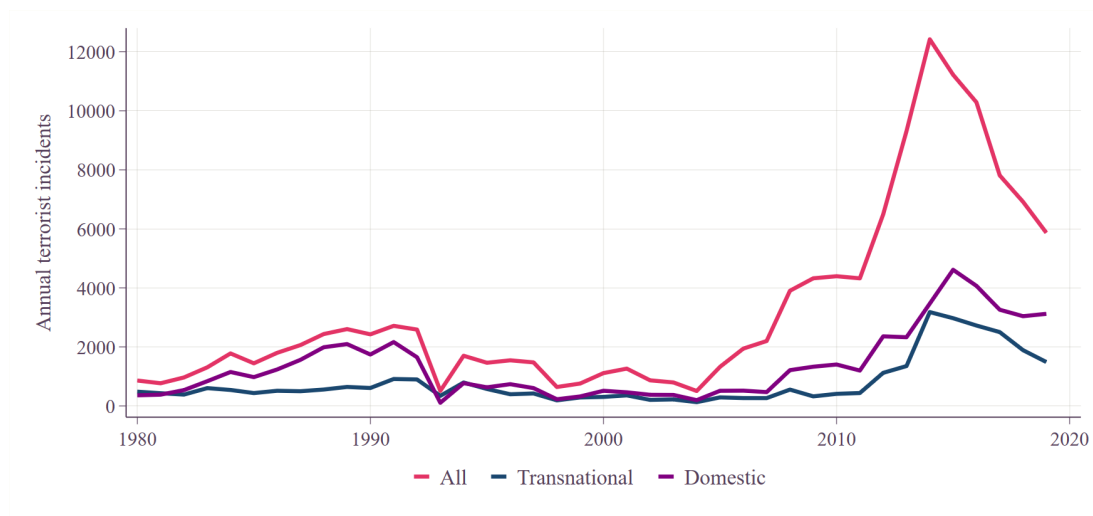
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[3]Appendix 1 Figure 7

Figure 2: *Annual number of terrorist incidents by type,* 1980–2019

and the beginning of insurgency against American troop surges in Afghanistan and Iraq.

The 2011 Arab Spring caused the Syrian and Libyan civil wars, allowing ISIL's emergence, which carried out attacks across the Islamic world. Terrorism peaked in 2014 with a year-on-year reduction since, attributed to the collapse of ISIL, the calming of the Syrian Civil War, and better international counterterrorism (IEP, 2020). Despite world trends, terrorist attacks in Afghanistan increased due to Taliban resistance.

Within GTD, domestic terrorism accounts for most Cold War incidents, falling with its end. Afterwards, transnational and domestic incidents are similar in number. There are few unknown incidents 2004, when the proportion increases to 50% of all incidents until 2015 when accuracy improves.

5.2.2 Casualties and property damage

Casualties per attack remains roughly constant across the entire time period (Figure 3). The notable exception is 2001 where transnational terror attacks see a large spike, due to 9/11 and other attacks. Casualties in OECD nations are lower than for non-OECD nations throughout the time period, bar 2001 and 2004 for OECD transnational attacks[4]. The variable used is annual casualties per country in terms of thousands. I have trimmed the 99th percentile of the variable, so extreme events such as 9/11 do not dominate the mean and standard deviations – after doing so, the standard deviation of transnational casualties dropped tenfold and its mean dropped threefold.
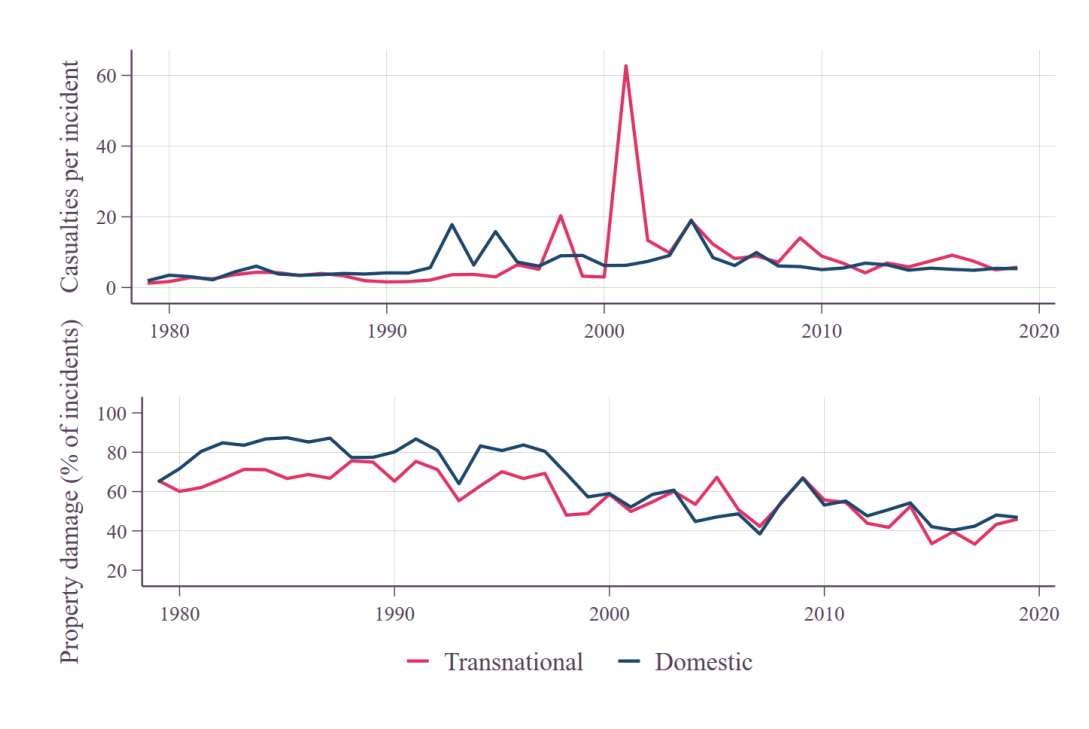
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[4] Appendix 1 Figure 8

Figure 3: *Casualties per attack and percentage of attacks with property damage,* 1980–2019

Domestic attacks are more likely to cause property damage than transnational ones. During the 1980s, two-thirds to 80% of attacks caused property damage, but by the 2010s this had fallen below half. From 2004 to 2007, the reverse is true, and transnational attacks are more likely to damage property, caused by an increase in the number, but decrease in the 'efficiency', of domestic terrorist attacks.

When differentiating between OECD and non-OECD (Figure 4), we observe that both types of non-OECD attacks are significantly more likely to cause property damage. From 2005, less than 10% of OECD attacks cause damage, while for the non-OECD this remains around a half to 40%. Additionally, for OECD nations, transnational attacks cause more property damage, a reversal of the overall picture.

Note that the property damage variable does not account for the *amount* of damage done, merely that it *was* done. Here, 9/11 is worth the same as an attack which does $1000 of damage.

5.3   Controls

To limit omitted variable bias, eight control variables and two dummies are included that account for economic, political, and systematic determinants of FDI outflows:
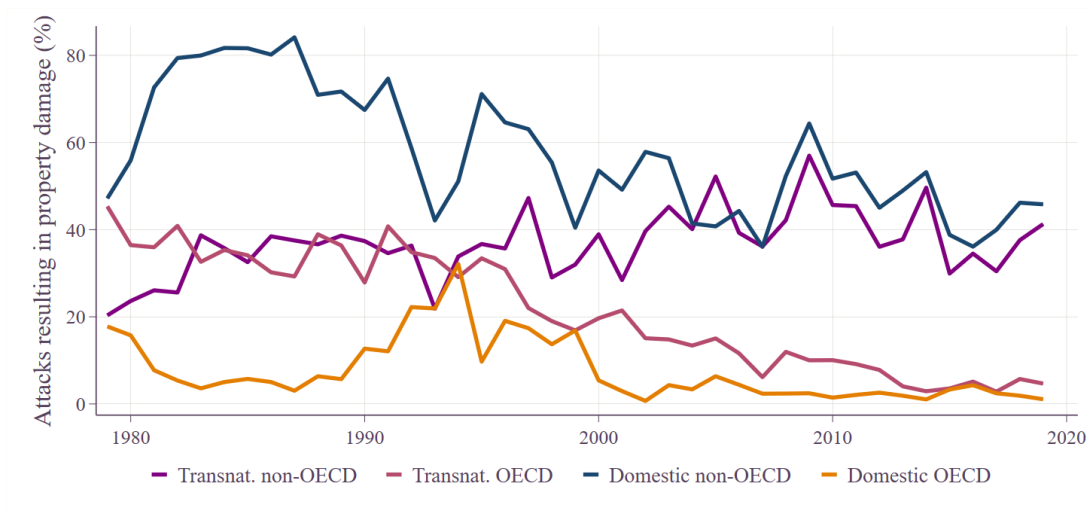
Figure 4: *Percentage of attacks with property damage by OECD membership,* 1980–2019

wealth, growth, gravity, economic growth, business opportunity, lagged FDI, openness, and democracy, together with dummies for the Cold War and OECD-membership.

The first control is the nation's wealth: richer nations have firms which have the incentive and means for foreign investment, and an increased likelihood that domestic markets are saturated. It is measured by GDP per capita, log transformed to limit the effect of larger nations. It should be positively correlated with FDI.

Powers and Choi (2012) cites research which shows that firms are more likely to invest countries with a higher growth rate. Thus, higher domestic growth rates means firms substitute investment towards the domestic economy and away from FDI, so this variable is expected to lower FDI.

Domestic inflation will incentivise firms to substitute investment away from domestic markets, increasing FDI. Inflation causes difficulty in forward-planning and investment decisions, so firms choose economies with less uncertainty. Additionally, if inflation is higher than wage increases, consumers' real income decreases and so demand for products is less, hurting firms.

Exports, measured as a proportion of GDP, should boost FDI since they are complementary (Wang, 2017). By investing abroad, MNEs optimise their production chains through vertical integration, while also having a local base abroad to help the market penetration of their domestic exports, generating greater profits.

More trade openness allows capital mobility and so the relocation of production abroad, meaning it should be positively correlated with FDI. However, the reverse may

be true as a low level of trade openness means firms choose to operate overseas to circumvent export restrictions, while having no need to do so when trade openness is high. It is measured as the volume of trade – the sum of exports and imports – as a percentage of GDP.

Higher government expenditure as a percentage of GDP may indicate a domestic crowding-out effect leading firms to operate abroad. High domestic taxes will incentivise them to relocate to a foreign low-tax environment. Therefore, government expenditure should be positively correlated with FDI.

All data mentioned so far has been obtained from the World Development Indicators published by The World Bank (2022).

Trade and FDI volumes are affected negatively by distance from a foreign economy and positively by that foreign economy's size. Larger foreign markets give firms more investment opportunity and higher potential profits, while distance decreases likelihood to invest for reasons including the level of institutional and language differences, and shipping costs. I have generated a gravity variable using the CEPII Gravity dataset (CEPII, 2021) which measures the mean of the distance from the home nation to each foreign nation times the reciprocal of the foreign nation's GDP. The variable increases in distance but decreases in the foreign market size, so measures the distance to the global economic centre, meaning it will be negatively correlated with FDI.

The final economic control variable is the lagged log of FDI, since it should control for the autocorrelation that FDI stock is prone to (Powers and Choi, 2012). Furthermore, this should control for omitted structural variables. It should be positive.

Democracies generally respect property rights, so firms in authoritarian countries seek to invest abroad in order to avoid state appropriation. Additionally, China pursues a lot of outward FDI in order to project power over East Asia and Africa through the Belt and Road Initiative, decreasing the polity score. However, democracies are more likely to allow economic freedom to their firms and so may have a positive effect upon FDI. The direction of this variable is uncertain, depending on which effect dominates. The data is from the Polity V dataset (Centre for Systematic Peace, 2021), ranking nations from –10 to +10, increasing in democracy.

6 Results and discussion

Table 1 shows the results of three fixed-effect PPML regressions, for each type of terrorism: all, transnational, and domestic. Model 1a suggests that Cold War-era terrorism has a negative effect on outward FDI. where an additional terrorist attack causes a 0.0038 percentage point reduction in OFDI as a percentage of GDP, while terrorism's impact is not affected by OECD-membership. Models 2a and 3a build on this by considering transnational and domestic terrorism independently. Model 2a shows that Cold War-era transnational terrorism also reduces OFDI, but only for non-OECD nations. Model 3a indicates that domestic terrorism increases OFDI, but this relationship is reversed during the Cold War.

Table 1: The effects of terrorist incidents on FDI outwards FDI stocks, 1980–2019

Variable	Model 1a: All		Model 2a: Transnat.		Model 3a: Domestic	
All terrorism	0.000262	(0.000185)				
Transnational			0.000105	(0.000418)		
Domestic					0.00123***	(0.000373)
$x \times$ OECD	0.000972	(0.000752)	0.000235	(0.000953)	0.000968	(0.00136)
$x \times$ Cold War	-0.00381**	(0.00132)	-0.242**	(0.0814)	-0.00433**	(0.00154)
$x \times$ OECD $\times$ Cold War	0.00308	(0.00163)	0.242**	(0.0814)	-0.00269	(0.00380)
OECD	0.214***	(0.0584)	0.204***	(0.0541)	0.233***	(0.0563)
Cold War	-2.235***	(0.313)	-2.137***	(0.315)	-2.247***	(0.311)
OECD $\times$ Cold War	-0.0145	(0.183)	-0.294	(0.174)	0.0156	(0.183)
Log GDP per capita	0.886***	(0.147)	0.828***	(0.145)	0.878***	(0.147)
GDP growth	-0.00774	(0.00595)	-0.00731	(0.00594)	-0.00764	(0.00608)
Inflation	0.00397***	(0.000976)	0.00390***	(0.000939)	0.00397***	(0.000977)
Exports	0.0106	(0.00887)	0.0104	(0.00860)	0.0103	(0.00885)
Trade openness	-0.00467	(0.00454)	-0.00474	(0.00440)	-0.00452	(0.00453)
Gravity	-0.449***	(0.116)	-0.496***	(0.121)	-0.452***	(0.115)
Gov. expenditurer	0.0613***	(0.00987)	0.0564***	(0.00982)	0.0603***	(0.00987)
Democracy	-0.0447***	(0.0110)	-0.0384***	(0.0109)	-0.0439***	(0.0112)
Lagged FDI stock	0.00113***	(0.000119)	0.00109***	(0.000121)	0.00113***	(0.000119)
Constant	-4.839**	(1.570)	-4.155**	(1.568)	-4.765**	(1.551)
N	3414		3414		3414	
Pseudo R^2	0.9194		0.9202		0.9194	
Country fixed effects	Yes		Yes		Yes	
Time fixed effects	Yes		Yes		Yes	

Robust standard errors in parentheses

x takes the form of "All terrorism", "Transnational", or "Domestic" for Models 1, 2, and 3, respectively

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Models 1a and 2a do not strictly agree with my hypothesis of terrorism increasing OFDI, though this may be due to transnational terrorism's influence in both models. As seen in Appendix 1, businesses are the second-least frequent targets of transnational terrorist attacks, and, of the targets that are businesses, it is likely that most of them are foreign MNCs rather than domestic firms. Foreign MNCs represent the ideological enemies of many terrorist groups – Western consumerism – but domestic firms provide employment opportunities, goods, and services.

Thus, the negative effect in both models may be a reflection of a wider trend in the economy: a loss of consumer confidence, stricter red-tape for counterterrorism

purposes, and economic contraction. That the effect is predominantly in the Cold War may indicate a higher effectiveness of Cold War-era terrorist groups, which makes sense considering they were often government funding and therefore subject to greater oversight than modern terrorist groups. To secure future funding, they required results. This can also explain the higher proportion of property damage as seen in Section 5.2.2.

In Model 2, during the Cold War, OECD nations are not affected – merely non-OECD nations. This could be for a multitude of reasons. Firstly, it could be my hypothesis that OECD firms do increase likelihood to move production abroad in the face of terrorism. This could be reinforced by the fact that in both other models, the Cold War-era reduction is across *all* nations. Alternatively, and more likely, OECD nations are diversified enough to not be affected by attacks.

For Model 3, the increased OFDI from terrorism outside of the Cold War potentially supports my theory that terrorism at home increases OFDI by changing relative costs and making OFDI a profit-maximising strategy whereas otherwise it would not be. It is logical that domestic terrorists target domestic businesses in a higher proportion to transnational terrorists: they respond to domestic, not international, factors such as government quality, local power struggles, and the state of the domestic economy – the latter of which would lead to attacks on business.

For all models, the control variables perform well. For all which reach significance (OECD, Cold War, log GDP per capita, inflation, gravity, government expenditure, democracy, and lagged FDI stocks), all moved in their predicted direction – democracy I decided was uncertain, so its negative result indicates that the capital flight and Chinese influence effects dominate.

7   Robustness and limitations

I use alternative measures of terrorism which account for severity: terrorist casualties and the number of property damage-inducing incidents. These measure different things, each of which gives a different measure of the severity of the attacks.

Table 2: The effects of terrorist casualties on outwards FDI stocks, 1980–2019

Variable	Model 1b: All		Model 2b: Transnat.		Model 3b: Domestic	
All casualties	-0.0882	(0.118)				
Transnat. casualties			-0.0963	(0.335)		
Domestic casualties					0.446**	(0.139)
$x \times$ OECD	0.254	(0.192)	0.951	(0.580)	-0.239	(0.279)
$x \times$ Cold War	-0.177	(0.379)	-27.57	(28.13)	-0.522	(0.407)
$x \times$ OECD $\times$ Cold War	0.0974	(0.549)	27.00	(28.10)	-2.629	(1.388)
OECD	0.225***	(0.0592)	0.205***	(0.0598)	0.242***	(0.0578)
Cold War	-2.255***	(0.315)	-2.245***	(0.314)	-2.234***	(0.313)
OECD $\times$ Cold War	0.0307	(0.184)	-0.0198	(0.181)	0.0345	(0.184)
Log GDP per capita	0.902***	(0.147)	0.882***	(0.148)	0.899***	(0.146)
Growth	-0.00722	(0.00606)	-0.00702	(0.00602)	-0.00760	(0.00609)
Inflation	0.00400***	(0.000985)	0.00396***	(0.000974)	0.00396***	(0.000973)
Exports	0.00964	(0.00888)	0.00967	(0.00882)	0.00960	(0.00885)
Trade openness	-0.00417	(0.00454)	-0.00422	(0.00451)	-0.00418	(0.00453)
Gravity	-0.443***	(0.116)	-0.451***	(0.119)	-0.441***	(0.115)
Gov. expenditure	0.0620***	(0.00990)	0.0618***	(0.00992)	0.0610***	(0.00988)
Democracy	-0.0411***	(0.0113)	-0.0394***	(0.0116)	-0.0409***	(0.0114)
Lagged FDI stock	0.00113***	(0.000119)	0.00112***	(0.000119)	0.00112***	(0.000119)
Constant	-5.051**	(1.556)	-4.860**	(1.581)	-5.016**	(1.544)
N	3358		3375		3370	
pseudo R^2	0.919		0.920		0.919	

Robust standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

7.1 Casualties

This indicator provides terrorism's severity and also acts as a damage proxy. More casualties likely indicates damage to other factors of production, therefore more economic disruption. This measure is imperfect: it will likely underweight the effect of economic disruption as not all mass-casualty incidents will cause mass infrastructure damage – likewise, incidents causing infrastructure damage may be targeted so as to *only* affect infrastructure. Nevertheless, terrorist incidents are no longer treated identically.

The results of Table 2 follows the same pattern as that of Table 1, but weaker. Neither total terrorist casualties nor the casualties of transnational incidents affect OFDI, though the effect of domestic casualties upon terrorism remains positive. The coefficient

on Model 3b can then be interpreted as an increase in OFDI of 0.45 percentage points for every 1000 additional domestic casualties. This supports the results from Table 1 as well as my hypothesis.

Table 3: The effects of property damage caused by terrorist attacks on outwards FDI stocks, 1980–2019

Variable	Model 1c: All		Model 2c: Transnat.		Model 3c: Domestic	
Property damage	-0.0000285	(0.000390)				
Transnat. prop. dam.			-0.000800	(0.00111)		
Domestic prop. dam.					0.00122	(0.000861)
$x \times$ OECD	0.00181	(0.00119)	0.00204	(0.00164)	0.00409*	(0.00208)
$x \times$ Cold War	-0.00420*	(0.00167)	-0.259**	(0.0928)	-0.00498*	(0.00201)
$x \times$ OECD $\times$ Cold War	0.00225	(0.00223)	0.259**	(0.0927)	-0.00450	(0.00439)
OECD	0.213***	(0.0573)	0.201***	(0.0543)	0.221***	(0.0562)
Cold War	-2.246***	(0.312)	-2.153***	(0.315)	-2.264***	(0.311)
OECD $\times$ Cold War	0.00377	(0.183)	-0.232	(0.172)	0.0171	(0.183)
Log GDP per capita	0.889***	(0.147)	0.836***	(0.145)	0.881***	(0.146)
GDP growth	-0.00744	(0.00602)	-0.00741	(0.00595)	-0.00743	(0.00604)
Inflation	0.00398***	(0.000975)	0.00391***	(0.000950)	0.00398***	(0.000975)
Exports	0.0105	(0.00886)	0.0107	(0.00863)	0.0100	(0.00883)
Trade openness	-0.00462	(0.00453)	-0.00485	(0.00441)	-0.00435	(0.00452)
Gravity	-0.454***	(0.116)	-0.489***	(0.119)	-0.456***	(0.115)
Gov. expenditure	0.0613***	(0.00986)	0.0574***	(0.00983)	0.0604***	(0.00986)
Democracy	-0.0454***	(0.0109)	-0.0395***	(0.0109)	-0.0443***	(0.0110)
Lagged FDI stock	0.00113***	(0.000119)	0.00110***	(0.000120)	0.00113***	(0.000119)
Constant	-4.839**	(1.563)	-4.252**	(1.561)	-4.769**	(1.550)
N	3414		3414		3414	
Pseudo R^2	0.919		0.920		0.919	
Country fixed effects	Yes		Yes		Yes	
Time fixed effects	Yes		Yes		Yes	

Robust standard errors in parentheses

x takes the form of "All terrorism", "transnational", or "domestic" for Models 1, 2, and 3, respectively

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

7.2 Property damage

The property damage variable can be seen as a modification of the incident variable. Instead of counting the total damage caused annually in dollars, it is the number of

incidents *with* damage. This is because the data on the value of damage is limited, and so this is the best alternative. It is likely to be more relevant to businesses, since property damage includes direct damage for the business as well as indirect costs for firms such as damage to roads and transport networks.

The results of Table 3 mirror those of Table 1: during the Cold War, terrorist property damage reduces OFDI, while it has no significant effect during other times. Model 2c also mirrors that of 2a, where transnational property damage-inducing terrorism reduces terrorism during the Cold War, but only for non-OECD nations. Model 3c suggests that for the OECD, there is a positive effect of domestic property damage (for every additional attack with property damage, OFDI increases by 0.004 percentage points), though this is nullified if the year is during the Cold War.

7.3   Contemporaneous controls

Finally, I have included a specification of Table 1 using contemporaneous controls, the results for which are found in Appendix 5. Over the whole time period, any terrorist incident results in increased OFDI. Terrorism during the Cold War reverses this relationship, except for OECD members, for whom there is no effect of terrorism during the Cold War. For transnational terrorism, only non-OECD members are negatively affected by terrorism during the Cold War, with no effect outside of it. Outside of the Cold War, domestic terrorism increases OFDI, whilst during it, terrorism reduces OFDI. Model 1d differs marginally from 1a, though the Cold War result is constant over both, while Models 2a and 2d, and 3a and 3d are identical in qualitative results and quantitatively close. This suggests results are not changed by the lagged control variables, while helping to control for potential endogeneity.

7.4   Limitations and further work

There is likely to be a bias in terrorism's effect: poorer nations which are heavily affected by terrorism do not have the ability, or want, to collect FDI data. Somalia, Afghanistan, Syria, all do not have any FDI data, yet it seems unlikely that at no point in history did they have outwards FDI. These nations are heavily affected by terrorism yet do not appear in the study. Due to UNCTAD's limitation, it is impossible to get data for them, so looking at other reported statistics may be wise.

Each way of defining terrorism has limitations. With incidents, there is attack extremity. Terrorist cells and individual attacks differ in damage dealt. With casualties, the effect of property damage is probably understated due to a non-perfect correlation.

Extremes also must be trimmed as natural log transformations are impossible due to the presence of zero values. Thus, years with major events absent – namely, the U.S. in 2001. Winsorization may be a solution. Finally, property damage does not account for extremity of damage. GTD offers a variable describing levels of damage, though one category encompasses all damage below $1 million – this is all but a few attacks. Further, within this extremity variable, there are many unknowns, which are likely mostly in poorer countries. Finding a more complete version of these variables is scope for further work, to better improve regressions.

All terrorist cells are wholly different, with different motivations, objectives, and means of securing objectives. For example, the Tamil Tigers of Sri Lanka are known for suicide bombings (Choi, 2015) but not all are so extreme. This is especially true for domestic terrorist attacks. Additional studies should look at specific types of attacks, specific regions, or specific terrorist groups.

According to Enders et al. (2011), GTD also overcounts attacks during the 1990s. Depending on which regions are overcounted, this could lead to an upward or a downward bias. In the paper, Enders et al. create a calibration method to correct for this, which could be used for further work.

Finally, the reason that OECD nations are less susceptible to terrorism should be clarified, especially when limited with data on the severity of attacks. Non-OECD nations may be more susceptible to terrorism, or terrorist attacks in non-OECD nations may be more effective per attack. Figure 4 suggest that the latter is true - terrorists in non-OECD nations are far more likely to attack property than those in OECD nations, and non-OECD attacks cause more casualties, but this is not certain.

8 Conclusion

My original hypothesis was based on intuition that domestic terrorism would lead to higher relative domestic costs leading to firms substituting domestic operations for foreign operations, increasing OFDI. A panel data study on domestic and transnational terrorism suggested that my hypothesis is upheld by domestic terrorism, though with no significant positive effect of transnational terrorism. During the Cold War, terrorism is effective in reducing FDI, likely due to increased terrorist efficiency due to government oversight. I found that alternative specifications of terrorism also support these conclusions.

Finally, I suggested that further study would benefit on region-specific terrorism, rather than a global overview, due to the differences in terrorism globally, especially domestic terrorism.

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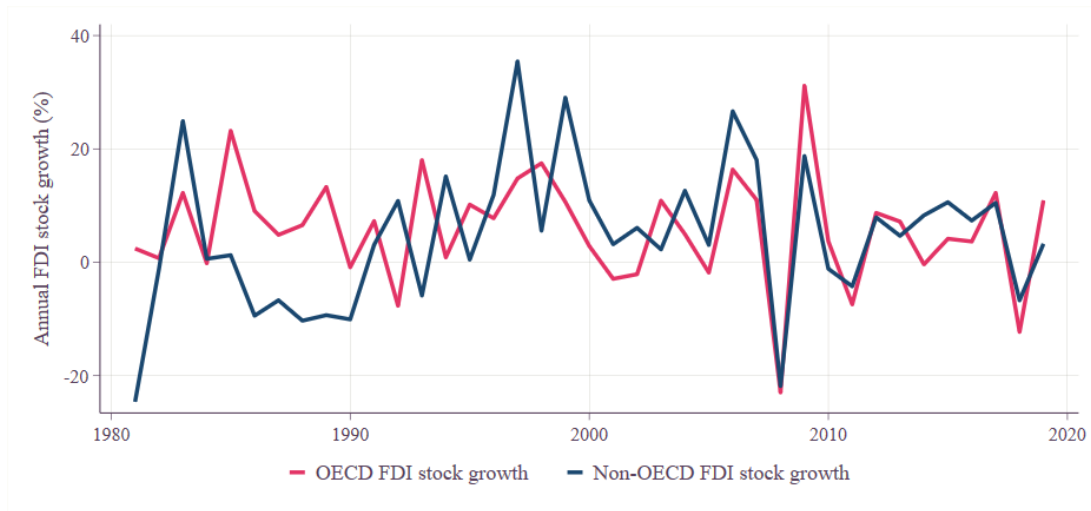
Appendix

Appendix 1: Section 5 graphs

Figure 5: *Percentage real FDI stock growth by OECD membership,* 1970–2019.
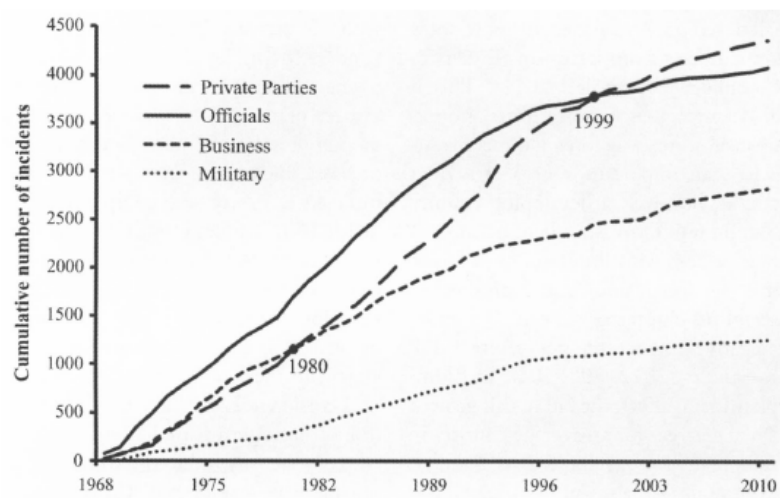

Figure 3. Cumulative number of transnational terrorist incidents by target type, 1968–2010

Figure 6: *Cumulative number of transnational terrorist incidents by target type*, 1968–2010.
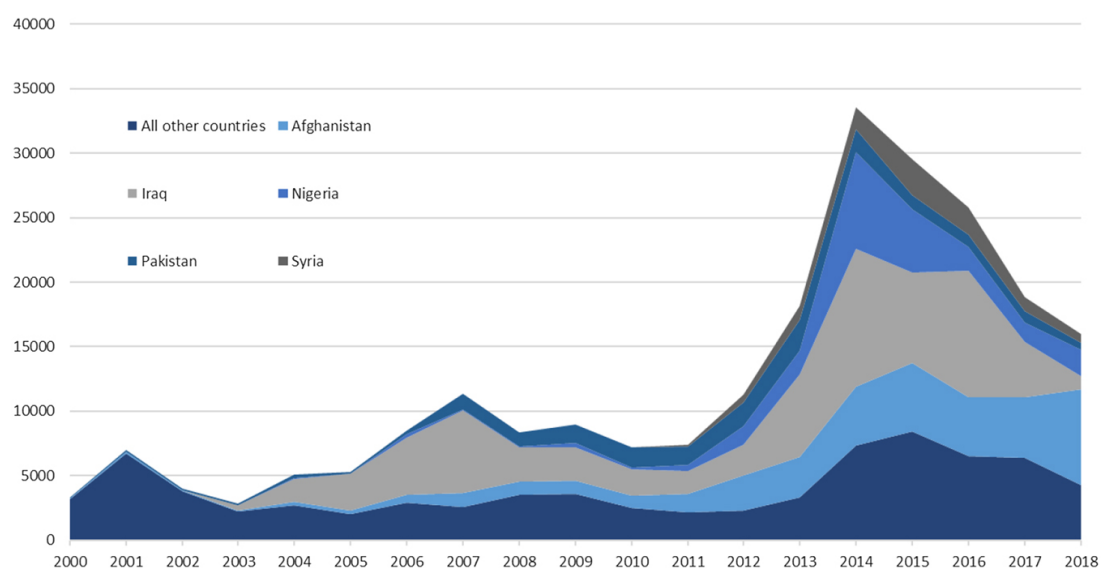Source Sandler (2014)

Figure 7: *Terrorist casualties by OECD-membership and attack type,* 1980–2019. Source Bardwell and Iqbal (2021).
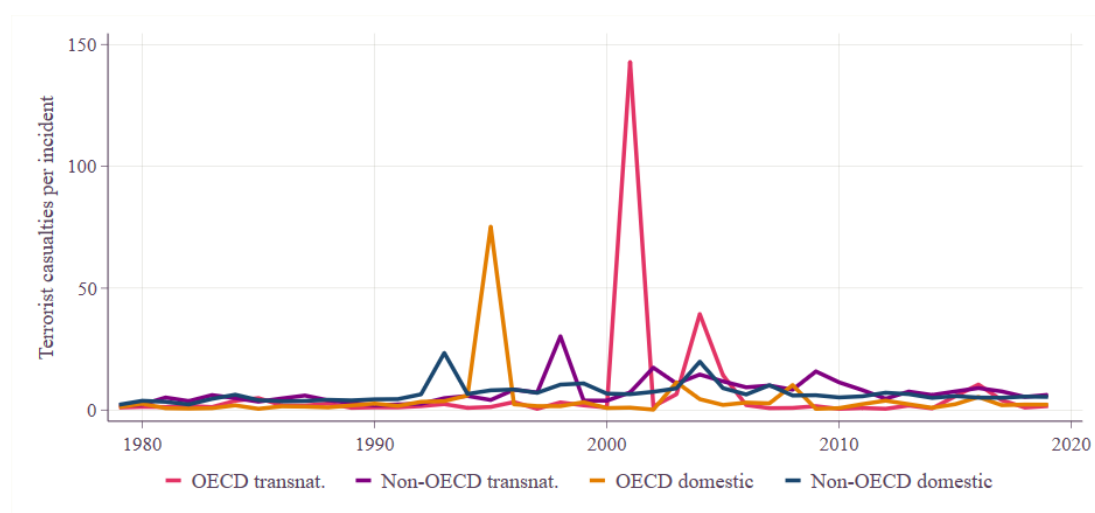

Figure 8: *Terrorist casualties by OECD-membership and attack type,* 1980–2019

Appendix 3: Variable description

Variable	Description and form	Source
fdistk	Outward FDI stock, % of GDP	UNCTAD
terr	Terrorist incidents	GTD
trans	Transnational incidents	GTD
dom	Domestic incidents	GTD
terr_cas	Terrorist casualties	GTD
trans_cas	Transnational casualties	GTD
dom_cas	Domestic casualties	GTD
propdam_total	Incidents with property damage	GTD
propdam_trans_total	Transnational incidents with property damage	GTD
propdam_dom_total	Domestic incidents with property damage	GTD
lngdppc	Log GDP per capita	WDI
growth	GDP growth, %	WDI
infl	Inflation, %, trimmed	WDI
exports	Exports, % of GDP	WDI
trade	Imports + imports, % of GDP	WDI
gravity	Gravity variable	CEPII
gov	Gov. expenditure, % of GDP	WDI
polity	Democracy, -10 to +10 increasing in democracy	Polity V
oecd	Equals 1 if nation is OECD member	
coldwar	Equals 1 if Cold War is ongoing	

Appendix 4: Summary statistics

Table 4: Summary statistics

	fdistk	terr	trans	dom	terr_cas	trans_cas	dom_cas
mean	22.22311	26.76778	6.554384	11.39289	.1367892	.043818	.0625244
sd	98.20012	139.429	41.94886	61.1597	.9952407	.5128115	.4258785
min	0	0	0	0	0	0	0
max	2066.115	3371	1231	1295	24.908	24.877	12.042

	propdam_total	propdam_trans_total	propdam_dom_total	lngdppc	growth
mean	59.12765	55.96004	61.71762	8.613383	3.510451
sd	13.7168	11.76345	15.86965	1.451465	4.983555
min	36.52445	33.2798	38.43793	5.318238	-62.07592
max	82.75782	75.57756	87.38677	11.76569	123.1396

	infl	exports	trade	gravity	gov	polity
mean	9.064055	39.84004	82.51587	3.634707	16.05864	3.803356
sd	21.14463	28.99882	54.04956	.7541258	5.506022	6.590099
min	-2.673797	3.342552	9.135846	1.835219	0	-10
max	293.6787	228.9938	442.62	6.053048	76.22212	10

Appendix 5: Regression results with contemporaneous controls

Table 5: The effects of terrorist incidents on FDI outflows, 1980–2019

Variable	Model 1d: All		Model 2d: Transnat.		Model 3d: Domestic	
All terrorism	0.000391*	(0.000190)				
Transnational			0.000485	(0.000493)		
Domestic					0.00130***	(0.000380)
$x \times$ OECD	0.000503	(0.000704)	-0.000418	(0.00101)	0.000700	(0.00121)
$x \times$ Cold War	-0.00408**	(0.00140)	-0.231**	(0.0850)	-0.00467**	(0.00166)
$x \times$ OECD $\times$ Cold War	0.00394*	(0.00170)	0.232**	(0.0850)	-0.000870	(0.00370)
OECD	0.279***	(0.0612)	0.263***	(0.0577)	0.289***	(0.0600)
Cold War	-1.498***	(0.267)	-1.415***	(0.265)	-1.535***	(0.265)
OECD $\times$ Cold War	-0.0877	(0.189)	-0.333	(0.172)	-0.0532	(0.188)
Log GDP per capita	0.732***	(0.153)	0.684***	(0.150)	0.725***	(0.153)
GDP growth	-0.0139	(0.00765)	-0.0131	(0.00761)	-0.0138	(0.00777)
Inflation	0.00351**	(0.00112)	0.00347**	(0.00109)	0.00351**	(0.00112)
Exports	0.0211*	(0.00829)	0.0207*	(0.00807)	0.0209*	(0.00827)
Trade openness	-0.0101*	(0.00439)	-0.0101*	(0.00427)	-0.00998*	(0.00438)
Gravity	-0.478***	(0.121)	-0.513***	(0.125)	-0.481***	(0.120)
Gov. expenditure	0.0588***	(0.0104)	0.0545***	(0.0104)	0.0580***	(0.0104)
Democracy	-0.0448***	(0.0112)	-0.0393***	(0.0111)	-0.0435***	(0.0114)
Lagged FDI stock	0.00115***	(0.000127)	0.00112***	(0.000129)	0.00115***	(0.000127)
Constant	-3.982*	(1.593)	-3.426*	(1.573)	-3.898*	(1.578)
Pseudo R-squared	0.9149		0.9156		0.9149	
N	3333		3333		3333	
Country fixed effects	Yes		Yes		Yes	
Time fixed effects	Yes		Yes		Yes	

Robust standard errors in parentheses

x takes the form of "All terrorism", "Transnational", or "Domestic" for Models 1, 2, and 3, respectively

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$