Are Lives a Substitute to Livelihoods? Terrorism, Security and US Bilateral Imports *

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Very Preliminary - Please do not Quote

Abstract

What is the impact of terrorism on trade through higher security at the borders? We set up a theory which shows that the impact goes not only from terrorism to trade. Higher trade with a partner might, in return, increase the probability of terrorism acts by making security measures more costly for total welfare. In order to identify the true impact of terrorism, our theory allows then for a strategy to condition out the latter mechanism. We show in particular, how past incidents perpetrated in third countries (anywhere in the world except the origin or targeted country), constitute good exogenous factors for current security measures at the borders. Our tests suggest that past terrorist acts perpetrated by groups from a given country and located anywhere in the world, affect significantly American imports from the latter. The level of the impact is up to three times higher when the acts result in a relatively high number of victims, the products are sensitive to shipping time and the size of the partner is small. The paper further shows how third countries' incidents affect the number of Business visas delivered by the US, thereby impacting significantly US imports in differentiated products. All these results suggest that security to prevent from terrorism does matter for trade.

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1 Introduction

In his 2003 Remarks at the Heritage Foundation, Robert C. Bonner, Commissioner of the Bureau of Customs and Border Protection at the Department of Homeland Security in the US, stated:

> "We must protect American lives, but we must also protect American livelihoods–our economy. That's why we have twin goals: (1) increasing security and (2) facilitating legitimate trade and travel."

After the events of September 11, the US decided to strengthen the security at its borders against transnational terrorism. In April 2004, it signed with the EU a customs cooperation agreement to extend the Container Security Initiative throughout the EU. In this agreement, US customs officers could operate in some ports of the European Union to screen and control all cargos to the US that depart from or transit through the European countries (Archick (2005)). To date, several countries have already implemented these measures and other important ports are expected to comply, in particular after the recent London attacks of July 7, 2005. Although more controversial, the two partner authorities also reached other agreements in air transport by which they increase identity controls over the borders. Hence, airlines have to provide the US authorities with the identities of the passengers from or via the EU before departure while the latter have now to prove their identity via biometric identifiers on their passports.

Are these security measures to prevent from terrorism impacting international trade flows and by how much? Are American livelihoods really affected by securing their borders from terrorism? Or, is it the livelihoods of exporters to the US and other rich countries that are more threatened by these measures?

This paper provides a first step towards responding to these questions. First, it sets up a simple theoretical framework linking trade, security and the probability of terrorism acts. Second, following the theory, we propose a test that captures more accurately the impact of terrorism incidents on bilateral trade.

The theory that is developed enlightens two forces, of different nature, linking negatively trade to security. First there is the "traditional view" that an increase in security measures could affect transaction costs and thus trade. However, our model also captures the fact that in return, a country that is a big importer from a given economy for any given reason (proximity, big size of exporter, differences in specialization, etc...) tends to reduce its security at its borders towards the latter. The argument is that the related total cost of security can end up being higher than the associated gain in the probability of preventing terrorism attacks.

Trade and terrorism incidents become then endogenous to each other. On one hand, the relationship is negative: terrorism via an increase in security reduces trade. But on the other, it can be positive: higher trade volumes are more likely to limit security measures which in return increases terrorism activities. This may explain the stylized facts shown below by which countries experiencing terrorism acts (either by being at the origin or the target of those acts) are also countries that trade significantly with each other. We thus propose a way to condition out this effect that would otherwise bias downward (in absolute value) the estimated negative impact of terrorism incidents on bilateral trade. In particular, we show how past incidents directed towards US interests (US embassies, US tourists and journalists abroad) but located in a third country, can constitute good exoegnous measures of current security measures at the US borders.

We combine two datasets on trade and terrorism incidents from 1968 to 2003. The first reports bilateral imports of the United States at the product level (SITC4/5 digits) from the NBER World Trade Data complied by Feenstra and Lipsey (2005).

As it provides only values which exceed 100,000$ per year, we have completed it with the OECD-FLUBIL bilateral trade dataset. Disaggregated data is needed here in order to control for relative specialization of countries that are expected to be correlated with both measures, bilateral trade and terrorism activities. For terrorism acts, we have chosen to work with the ITERATE dataset set-up by Mickolus, Sandler, Murdock and Flemming (2003). ITERATE is an event-based dataset that provides information on the date, country of localization of the attack, its origin and the targeted country. It lists all of the incidents in the world that have been reported in the medias since 1968 onwards. We are mainly interested in those attacks where the US has been the main target, via its representative authorities, its army or its civilians anywhere in the world.

Our results suggest that past terrorist acts against the US, perpetrated by groups from a given country, affect American imports from the latter. The effect is relatively small however on average: a 1% increase in past terrorism activities from a country reduce by around 0.01% US imports. The effect is nonlinear however. The elasticity is higher the riskier is the country of origin in terms of its related frequency of incidents and the number of victims. In particular, a 1% increase of past incidents from countries such as Columbia and Cuba over the period result in a more than 1% decrease in their exports to the US. Also, and perfectly consistent with our theory, the past terrorism impact on US imports is higher when the partner country is small in terms of its GDP size. Besides, the level of the impact more than doubles (and hence reaches more than 2% in the case of Columbia and Cuba) when the acts result in a relatively high number of victims and the products are sensitive to the time-length of shipping and network-lengths. Further, using an additional dataset from the department on state on visa issuance from 1997 to 2002, the paper shows how terrorism incidents affect the number of Business visas delivered by the US, thereby impacting significantly bilateral US imports in differentiated products.

The literature on the economic consequences of terrorism attacks has been nicely surveyed by Frey, Luechinger and Stutzer (2004). In particular, the authors mention some studies that look at the impact of terrorism on different channels of globalization (tourism, air transport and foreign direct investment in particular). Abadie and Gardeazabal (2005) look also at the impact on the world economy through foreign direct investment. They argue that the risk of terrorism in a country reduces the expected return to investment while increasing its variance. They show that a one standard deviation increase in the risk of terrorism in a country reduces its net FDI position by 5%.

Our work however is more closely related to papers investigating the links between international trade in goods and transnational terrorism. In the aftermath of September 11, the OECD was particularly concerned by the extent to which the world economy would be hit by the observed increase in security surcharges emanating from Airlines, maritime transport companies or insurers due to the increase in terrorism threat (OECD (2002a),OECD (2002b)), although without giving a particular estimate of the impact on trade. Walkenhorst and Dihel (2002) use a CGE modelling to assess more analytically that impact on trade and welfare. The authors model the costs from a terrorist attack in the same way as an increase in tariffs with the only exception that the former is not accompanied by an additional revenue for the importing government. Where the transaction costs born by terrorism are uniform across regions, the results show that highly opened regions and industries with high import price-elasticities would bear a non negligible adjustment in trade and welfare losses. Another study by Nitsh and Schumacher (2004) uses a gravity model to assess the impact on trade between two countries which have experienced terrorism attacks. They find that a doubling of terrorism attacks in those countries affect their trade by around 4%.

All these papers however, do not deal with the impact on bilateral trade of a targeted country which main interests and citizens have been hit in a foreign country. As it will be shown below, a significant proportion of the incidents targeting rich countries is actually perpetrated either locally (in the country of origin) or in a third location. Besides, although all these studies emphasize on the transaction cost impact, they do not discuss the possible endogeneity that exists between trade, terrorism and security measures neither in theory nor in the data.

As well, though not directly related to terrorism, Anderson and Marcouiller ((1997), (2002)) focus on the impact of insecurity on trade. In the first paper, insecurity arises endogenously from the choice of agents to allocate their labor between production and predatory activities, the latter hindering international trade at the borders. In the second paper, the authors model alternatively insecurity as a hidden tax on trade. They find that poor institutions in terms of government transparency and commercial legal systems hinder trade at least as much as tariffs. Instead, our paper model together, the probability of terrorism occurrence (i.e. insecurity), the governments' choice of (counter)-security measures and trade. Less trade in such a framework does not directly come from insecurity but from counter-terrorism security measures at the borders.

The paper is structured in the following way. In section 2 we begin with a discussion of the ITERATE dataset and presents some stylized facts on terrorism and its links to trade flows. Section 3 sets then a simple theoretical model of endogenous transnational terrorism and security, embedded into a standard trade model. Section 4 explains the induced empirical strategy to test the impact of terrorism and counter-terrorism measures. Section 5 and 6 take the model to the test and provide some robustness checks. Finally section 7 concludes.

2 Stylized Facts

2.1 The ITERATE database

ITERATE defines terrorism acts as "the use, or threat of use, of anxiety-inducing, extra-normal violence for political purposes by any individual or group, whether acting for or in opposition to established governmental authority, when such action is intended to influence the attitudes and behavior of a target group wider than the immediate victims and when, through the nationality or foreign ties of its perpetrators, its location, the nature of its institutional or human victims, or the mechanics of its resolution, its ramifications transcend national boundaries".

We amend that definition by two additional conditions to qualify an incident as "transnational terrorism". Focusing first on the term *terrorism*, we follow Omar Malik (2000) from the Royal Institute of International Affairs who claims that only those incidents that are perpetrated against or within *liberal* states should be qualified as terrorist attacks. A country is said to be liberal when it safeguards human rights in its laws and practices. Qualifying terrorism acts as incidents against non-liberal countries is usually more controversial. To some observers, these actions might be viewed as terrorism but to others, they might rather be qualified as acts of resistance against a totalitarian country. To avoid getting into the controversy, we decided to withdraw the corresponding observations from the dataset. We had access to the Freedom House dataset that rates civil liberties and political rights on a scale varying between 1 and 7 for each country from the 1970s onwards, in order to distinguish between 'liberal' and 'non liberal' countries. As in Helliwell (1994) and Rodrik (1999), we combine the two ratings into an index varying between 0 and 1. The higher it is in a given year and the more 'liberal' the observed country shall be considered. For the purpose of this paper, we retained only those observations where incidents took place within or against a country associated with an index equal or higher than 0.5.

Second, Mickolus *et al* treat some incidents perpetrated by separatist groups like ETA in the basque country, IRA in Northern Ireland or FLNC in Corsica as *transnationals*, leaving the choice for the users of the dataset to decide whether or not to include them in the data. We define instead a terrorism incident as "transnational" when it is directed by a group that emanates from an internationally recognized nation against or within an internationally recognized other nation and thus withdraw above observations from our study.[1]. For instance, when the ETA group from Spain perpetrates an incident in Spain, it shall not be considered as 'transnational' and thus shall be withdrawn from the data at hand. However, when the same ETA group attacks a spanish authority, one of its representations or spanish civilians within another country, say France, then the observation is kept in the dataset. That is because that type of act has some implications for security measures on the Franco-Spanish borders.

At the end, from nearly 12,500 observations in the ITERATE dataset from 1968 to 2003, we end up with around 10,700. We first look at the origin of the incidents and their place of location. Before going into details, one has to be aware that the country of origin might or might not be the country of location of the incidents: we identify each origin by the country of first nationality of the terrorist group while the country of location is the country where the act has been observed in the ITERATE dataset. In order to save space, table 1 ranks the first 60 countries of origin by their number of incidents over the period, although one should be aware that most if not all of the countries in the world have been at the origin of at least one terrorist incident from 1968. The table indicates that these countries have been related to at least 20 incidents each during the period. Besides, it is worth mentioning that

[1] It is worthwhile mentioning that we have kept incidents emanating from Palestine as the latter is already recognized as a state by 94 nations around the world. Further, 11 more nations, generally from the OECD, grant Palestine some specific form of diplomatic status.

one third of total incidents have been perpetrated by unknown groups, to which no origin have been associated.

However, as it has been already documented in Sandler and Enders (2004), the number of incidents has decreased dramatically after the nineties compared to the first decade. Although experienced by most of the origin countries, this drop had not been uniform. For instance, although groups from Palestine and Colombia had been very active during the whole period, Lebanese and Iranien group activities had been extremely high only during the eightees and the nineties. In recent years, it has even risen dramatically in some countries like Pakistan, Afghanistan and Saudi Arabia.[2]

Now, the country of origin as it is defined here might not be that of the operations of the group. In general, when the group does not operate in his own country it might be operating in the country of location of the incidents (hereafter, host country)[3]. Therefore, it is interesting to see what is the proportion of incidents originating from one country but that takes place in another. ITERATE is a place-based dataset. We know exactly where and when each incident has started and ended. In more than 95%, the location of start is the same than that of its end which makes it relatively straightforward to locate the incidents. Where the start location is different from its end however (i.e. Aerial Hijacking), we code the host country as the country where

[2] It is noteworthy observing the relatively small number 36 of transnational terrorists incidents of Palestine in the period 1998-2003. This is due to the fact that in the database ITERATE, all terrorists incidents with no foreigner's casuality (and only israeli casualties) is not reported as a act of transnational terrorism.

[3] The case of Al-Qaeda is an exception where the country of nationality of the group (presumably Saudi-Arabia) is different from its presumed country of residence ('Headquarters' in Afghanistan or Pakistan) and further different from many countries where its 'affiliates' operate. See Clarke, 2004. That said however, following our definition of country of origin, we have classified Al-Qaeda operations as originating from Saudi-Arabia as in Krueger and Laitin (2003). Now, because of its affiliates, Al-Qaeda could have many countries of origin and this could be problematic to our study that relates the economic impact of terrorism to the pre-identified country of origin of the groups. Now, one can still assume that the authorities threatened by Al-Qaeda consider the islamic world as one country of origin as a whole, against which they must secure the borders. In that case, our study can still predict of how much Al-Qaeda incidents are affecting trade between the targeted country and the muslim countries taken as a whole.

the incident has started.

Figure 1 sketches the distribution of the incidents over time across 3 possible locations (Origin, Target country and Third country). The country is coded as target when it is that of the main nationality of the victims. It is important to note here that victims, in ITERATE, are defined as "those who are directly affected by the terrorist incident by the loss of property, lives, or liberty". Thus, when a French embassy is hit without casualties in say, an African country, France is then coded as the target country. Besides, the third country represents the country where the action begins *albeit* different from the origin and target states. From figure 1, we can see that only a small and relatively stable proportion over time (10 to 20%) takes place in the target countries. Hence, attacks like those of New York (2001), Madrid (2003) and more recently London (2005) are not representative of most of the incidents. In the earlier period, around 70% of the incidents took place in Third countries but that share declined steadily over the period to equal the rising share of incidents located in origin countries (i.e. where they have been planned and prepared). Hence, at the end of the period, 40 to 50% of the incidents became local. These findings are qualitatively similar to those of Krueger and Laitin (2003) who use the Department of State dataset to assert that, in recent years, perpetrators preferred setting-up actions against "targets from foreign countries [that are] close to home". The reasons are beyond the goal of this paper. However, it is very interesting to see that there is still a big proportion of incidents that are held in third countries which could matter as much as incidents in origin and target countries for security and trade between them.

Table 2 ranks the main 50 targeted countries over the period. The US is by far the country that is most hit by terrorism attacks over the period, before France, Israel and Great Britain. Besides, the distribution of incidents across targeted countries does not change much over time. A simple calculation of the coefficient of correlation between the distribution at the beginning (1968-1978) and that at the end of the period (1997-2003) gives it around 0.96. It is quite simple to guess that some countries like Israel are systematically targeted by a small number of groups related to one particular state (here Palestine). Can we say the same for the other most targeted countries?

Table 3 presents the top 65 ranking of 'bilateral' incidents (i.e. ranking by origin and target countries) wherever those incidents take place. One can easily see that over one third of the bilateral incidents involve the US as a target country: that is, the distribution of incidents against the US is spread over a big sample of source countries. This is obviously not the case for Israel, France or Great Britain which are associated with at most 3 countries in the top 65. However, because of the bigger variability of incidents against the US, this makes cross-country studies related to the US as a target country easily implementable.

The second important remark is that over the period, and in particular before the nineties, the terrorist groups tend to hit targets that were relatively close to home and/or had big influence on internal policies of origin countries: that is in particular the case of some Latin American countries (Colombia, Puerto Rico, Peru, Cuba, Argentina) vis-à-vis the US but also that of Algeria and Spain vis-à-vis France. As proximity and colony (or neo-colony) ties are also known to be factors of trade this could give a rapid idea on why one could find some positive relationship between terrorism activities and bilateral trade if those factors are not correctly accounted for. In recent years however, the groups that were the most active and that have concentrated their attacks on the US in particular, emanated from Pakistan (100 times more between beginning and end of period), Saudi Arabia (50 times more) and Colombia (30 times more). These extremely high figures have to be attenuated though for Saudi Arabia and Pakistan by the fact that the activities of their groups were quasi-null in the beginning of the period (only one attack each in the 1968-1978 period). Thus, only terrorism groups from Colombia seem to have maintained a high intensity of their activities against the US in Latin America while a new set of groups from countries located relatively far from the US have now significantly intensified theirs. As table 1 have already suggested, note however that these groups have been mostly operating at home.

Thirdly, it is interesting to see that most of the economies at the origin of the bilateral incidents are developing countries that are mainly specialized in agriculture, natural resources and manufacturing employing intensively those resources. Whereas countries like Saudi Arabia, Iran or even Colombia are specialized in Oil production and Oil related products like Plastic (especially Saudi Arabia), Latin American countries in general (including Colombia) exploit intensively some natural resources from Agriculture and Fishing (Argentina, Cuba, Colombia, Chile, Puerto Rico) to Mineral resources (Peru) and Mining (Chile). As differences in specialization between developing and developed countries represent another important factor to trade, this is then another reason why one could retrieve a positive relationship between terrorism and bilateral trade if the degree of specialization of countries is not accounted for.

Now, we want to see also whether the type of incidents legitimates the control of merchandizes at national borders. For simplicity, we have grouped the 25 types of incidents listed in ITERATE into 9: Aerial Hijacking, Kidnapping, Hostage, Assassination and Murder, Arm Attack, Bombing, Suicide Bombing, Threat and Other Non Elsewhere Classified incidents.[4] Table 4 shows that incidents where it is a necessary condition to use high calibre arms and explosive material (Arm Attack, Bombing and Suicide Bombing) that are not readily available to the public in general in many countries, correspond to more than half of the acts perpetrated in the world during the period. This share varies very slightly across countries of origin and across years[5]. This means that at least one out of two attacks are backed

[4]Events which involved more than one type (i.e. hijacking, then hostage seizure) have been categorized by ITERATE as the type of incident which occurred first.

[5]not reported here to save space

in general by some arm and explosive providers either from inside or from outside the host country on the black market. Besides, the threat incidents that are listed can push further the defense authorities to secure their borders. Similar proportions apply to the case where the US is the targeted country.

2.2 Trade potential and terrorism activities

How are trade figures related to terrorism activities? One way to see whether terrorism constitutes an impediment to trade, most likely through an increase in transaction costs, is to compare observed trade between two countries to their trade potential and see if the gap between the two can be related to terrorism activities. Countries that are at the origin of high terrorism activities against a typical economy would experience higher gaps to reach trade potential with the latter. One straightforward way to represent the potential of trade (without going into testable equations for the time being) is to set its log as a proportion of the log of a market access index. Thus, by assuming an exporter j and an importer i and considering market access to be measured by the ratio of the product of their GDPs over distance, a simple relation of the potential of trade would be:

$$Log(Potential_{ij}) = \lambda Log\left(\frac{GDP_i\, GDP_j}{Dist_{ij}}\right) + Cst$$

Then, observed trade in log terms is the sum of its potential and the gap (g_{ij} hereafter). It can be expressed by:

$$Log(m_{ij}) = \lambda Log\left(\frac{GDP_i\, GDP_j}{Dist_{ij}}\right) + Cst + g_{ij}$$

Figure 2 plots that relationship for the US as the sole importer with all of its partners pooled over all SITC products and years (around 700,000 points). For each given year, product and partner, the coordinates are represented by bubbles which size varies with the total number of incidents emanating from each partner against the US over the last 5 years of observation[6]. We consider a stock rather than a flow measure of incidents here in order to wipe out some possible cyclical behavior of terrorism incidents. Besides, this helps removing partly the possible endogeneity over time that exists between terrorism activity and trade (more on this in next sections). Finally, the gap between observed and potential trade is to be measured by the deviation of each of the bubbles to the slope[7]. The figure does not provide any directly observable pattern consistent with our expectations. That is, the big bubbles are not systematically under the slope. Looking further to these figures one can only distinguish that most of the partners at the origin of high number of incidents are also trading significantly with the US, precisely because of their high trade potential. Thus, the market access for imports seems also to be a market access for terrorism incidents.

Alternatively, and in order to find a way to weep out some of the endogeneity, we first compute and plot a slope of trade potential for those countries related to groups that have never hit the United States over the last 5 years. This would give the potential of trade with the US for what we shall call 'safe' countries. In a second stage, we plug into the picture all of the remaining observations corresponding to the 'risky' partners. Here, we want to know what would have been the volume of exports of those countries had they not been at the origin of the incidents. Figure 3 provides a very clear pattern: trade with those countries from where emanates the incidents is most systematically lower than their potential if they were to be safe countries. Now, there are many other alternative explanations for this finding: risky countries in terms of their activity of terrorism are likely to be also risky in absolute terms (i.e. bad governance, possible civil war, other political and army conflicts with

[6] We have also considered 3 years and 10 years stock of incidents where the figures remain very similar

[7] Along with the slope, we also represent confidence intervals curves

the US, etc...). In the empirical part of the paper, we condition out for many of these effects that could alter the relationship between trade and terrorism activities.

3 A simple model of Trade, Terrorism and Security

Here are the basic elements of a model of Trade, Terrorism and Security. There is one country (the US) labelled 0 and N other countries with whom country 0 is trading.

3.1 Trade

Each country produces differentiated goods under increasing returns. The utility of a representative agent in country 0 has a standard Dixit Stiglitz form:

$$U_0 = \left[\sum_{j=0}^{j=N} n_j x_{0j}^{(1-1/\sigma)} \right]^{1/(1-1/\sigma)}$$

where n_j is the number of varieties produced in country j, x_{0j} is country 0 demand for a variety of country j (all goods produced in j are demanded in the same quantity by symmetry) and $\sigma > 1$ is the elasticity of substitution. In country 0, this helps define an usual consumer price index:

$$P_0 = \left(\sum_{j=0}^{j=N} n_j p_j^{1-\sigma} T_{0j}^{1-\sigma} \right)^{1/(1-\sigma)}$$

where p_j is the mill price of products made in j and T_{0j} are the usual iceberg trade costs between country 0 and country j. If one unit of good is exported from country j to country 0 only $1/T_{0j}$ units are consumed. Trade costs depend on geographical distance, trade restrictions and will also be assumed to depend on security measures (more on this below). As is well known the value of demand by country 0 from country j is given by

$$m_{0j} = n_j E_0 \left[\frac{p_j T_{0j}}{P_0}\right]^{1-\sigma} \tag{1}$$

where E_0 is total expenditure of country 0.

In each country, the different varieties are produced under monopolistic competition and the entry cost to produce in a monopolistic sector is supposed to be 1 unit of a freely tradable good which is chosen as world numeraire. This good is produced in perfect competition. This in turn fixes the wage rate in country 0 to its labor productivity a which is assumed to be the same across countries and across sectors under perfect and imperfect competition (for simplicity). Given this, standard mark -up conditions from profit maximization by firms give that mill prices in the monopolistic competitive sector are identical and equal to the mark up $\sigma/(\sigma-1)$ times marginal costs (also equal to 1). As labor is the only factor of production, and agents are each endowed with one unit of labor, total expenditure in country 0 is given by $E_0 = aL_0$ where L_0 is the number of workers in country 0. On the supply side, free entry implies that $n_j = aL_j/(\sigma)$. In equilibrium, the indirect utility of the representative consumer in country 0 is

$$U_0 = U_0(\mathbf{T}_0) = \frac{a}{\frac{\sigma}{\sigma-1}\left(\sigma\right)^{\frac{1}{\sigma-1}}} \left(\sum_{j=0}^{j=N}(aL_j)T_{0j}^{1-\sigma}\right)^{1/(\sigma-1)}$$

with $\mathbf{T}_0$ the vector $\{T_{0j}\}_{j=0,\ldots N}$ of iceberg costs between country 0 and the rest of the world.

As is well known from this simple model, one gets bilateral imports of country 0 from country j as proportional to :

$$m_{0j} = a.L_j E_0 T_{0j}^{1-\sigma} P_0^{\sigma-1} \tag{2}$$

3.2 Terrorism and Security

We assume that there are $K \leq N$ terrorist organizations, each of them being associated to one particular country or having headquarters located in one country. The objective of each of these organizations is to get visibility (which help them capture or enjoy particular political or economic rents) In order to do this, each organization is going to spend resources to commit a terrorist event on country 0. More precisely, we assume that a typical terrorist organization from country j maximizes

$$Max_{R_j}\ \Pi\left(R_j, S_j\right) V_j - \theta R_j \tag{3}$$

where $\Pi\left(R_j, S_j\right)$ is the probability of success of a terrorist act in country 0. It depends positively on the amount of resources R_j invested by the terrorist organization and negatively on the security measures S_j implemented by the government of country 0 against country j θ is marginal resource cost of the terrorist organization and V_j is the perceived visibility gain enjoyed by the terrorist organization when terrorism is successful. We assume a specific parametric form for the probability of success $\Pi\left(R_j, S_j\right)$. More precisely, as in Anderson and Marcouiller (1999) we take a simple asymmetric contest success function :

$$\Pi\left(R_j, S_j\right) = \frac{R_j}{R_j + \varphi S_j}$$

with the technological parameter $\varphi > 0$ reflecting the relative efficiency of security measures to reduce the occurrence of terrorism.

The solution of (3) gives immediately: the reaction curve of terrorist group j

$$\begin{aligned} R_j &= R(S_j, \theta) = \sqrt{\frac{\varphi S_j V_j}{\theta}} - \varphi S_j \qquad \text{for } S_j \leq \frac{V_j}{\varphi\theta} \\ &= 0 \qquad\qquad\qquad\qquad\qquad\qquad \text{otherwise} \end{aligned}$$

The government of country 0 is concerned both by the economic welfare of the representative consumer $U_0(\mathbf{T}_0)$ and about the level of security Φ_0 of his citizens against terrorism. To fix ideas, consider that he maximizes

$$W_0 = LogU_0(\mathbf{T}_0) + \mu Log\Phi_0$$

where the level of security Φ_0 is a positive function of the probability of non occurence of terrorist acts in country 0:

$$\Phi_0 = \Phi_0(\mathbf{R}, \mathbf{S}) = \prod_{j=1}^{j=K} \left[1 - \Pi\left(R_j, S_j\right)\right]$$

with $\mathbf{R} = \{R_j\}_{j=1,..K}$ and $\mathbf{S} = \{S_j\}_{j=1,..K}$ are respectively the vector of resources spent by terrorists organizations and security measures taken by the government of country 0. Security measures S_j against terrorists residing in country j are likely to increase transactions costs on trade flows (security checks, time delays, restrictions on passports of business people, various immigration controls) and we simply pose that

$$T_{0j} = T_j(S_j) \text{ with } T_j'(.) > 0$$

We assume that the government of country 0 forms some beliefs on the level of resources undertaken by terrorists from country j to commit a terrorist act in country 0 and given these beliefs (more on this in the appendix), his problem is simply

$$Max_{\{S_j\}}\ LogU_0(\mathbf{T}_0) + \mu\ E_{\mathbf{R}}\ Log\Phi_0(\mathbf{R}, \mathbf{S})$$

where $E_{\mathbf{R}}(.)$ reflects the expectation operator of government of country 0 on the vector of terrorist resources $\mathbf{R}$. Neglecting constant terms, this problem can be rewritten as :

$$Max_{\{S_j\}}\ \frac{1}{\sigma-1}Log\left(\sum_{j=0}^{j=N} L_j T_{0j}^{1-\sigma}\right)+\mu\ E_{\mathbf{R}}\ \sum_{j=1}^{j=K} Log[1-\Pi\left(R_j,S_j\right)]$$

or

$$Max_{\{S_j\}}\ \frac{1}{\sigma-1}Log\left(\sum_{j=0}^{j=N} L_j [T_{0j}(S_j)]^{1-\sigma}\right)+\mu\ E_{\mathbf{R}}\ \sum_{j=1}^{j=K} Log\frac{\varphi S_j}{R_j+\varphi S_j}$$

with the obvious notation that for a country j which has no terrorist organization residing there $S_j = 0.$and $T_{0j} = T_{0j}(0)$

It is easy to see that the first order conditions of this problem can be written as:

$$m_{0j}\frac{\partial T_{0j}}{\partial S_j}\frac{1}{T_{0j}} = \mu\left[\frac{1}{S_j}-\frac{d}{dS_j}[E_{R_j}(Log(R_j+\varphi S_j))]\right] \tag{4}$$

with

$$m_{0j} = \frac{L_j T_{0j}^{1-\sigma}}{\sum_{h=0}^{h=N} L_h T_{0h}^{1-\sigma}} \tag{5}$$

The left hand side is simply the marginal distortionary cost of imposing security controls and measures. It affects trade flows and, for a given country j is proportional to the level of imports m_{0j} of country 0 from country j. The right hand side is the marginal gain of security measures on the probability that there is no occurence of a successfull terrorist act in country 0. It is going to depend on the structure of beliefs that the government of country 0 has on the amount of terrorist resources **R** spent by terrorist organizations against country 0.

To fix ideas, take for each terrorist organization j, that ther resource cost θ can take two values θ^L and θ^H with $\theta^L < \theta^H$. Denote then ν_j^L and $\nu_j^H = 1-\nu_j^L$ respectively the beliefs government of country 0 has on terrorist organization j having a resource cost $\theta_j = \theta^L$ and $\theta_j = \theta^H$. Then (4) can be rewritten as:

$$m_{0j}\frac{\partial T_{0j}}{\partial S_j}\frac{1}{T_{0j}} = \mu\left[\nu_j^L \frac{R_j^L}{S_j\left[R_j^L+\varphi S_j\right]} + (1-\nu_j^L)\frac{R_j^H}{S_j\left[R_j^H+\varphi S_j\right]}\right] \tag{6}$$

with[8]

$$R_j^L = R(S_j,\theta^L) = \sqrt{\frac{\varphi S_j V_j}{\theta^L}} - \varphi S_j \text{ and } R_j^H = R(S_j,\theta^H) = \sqrt{\frac{\varphi S_j V_j}{\theta^H}} - \varphi S_j \tag{7}$$

The solution of (6), (5) and (7) defines then a bayesian Nash equilibrium vector in terrorism and security $\{\mathbf{S}^*, \mathbf{R}^{L*}, \mathbf{R}^{H*}\} = \{\mathbf{S}^*(\boldsymbol{\nu}^L), \mathbf{R}^{L*}(\boldsymbol{\nu}^L), \mathbf{R}^{H*}(\boldsymbol{\nu}^L)\}$ which depends on the vector of beliefs $\boldsymbol{\nu}^L = \{\nu_j^L\}_{j=1,..K}$ that government 0 has on terrorist organizations. In theory, once such an equilibrium is computed, one may have the values of trade flows of country 0 with the rest of the world.

To be a bit more precise, let us consider the case where transactions costs between countries 0 and j take an exponential form:

$$T_{0j}(S) = T_j\ e^{\beta S_j} \text{ with } \beta > 0$$

and that there is a unique terrorist group in one country j. Then (6) and (7) are rewritten as :

$$\frac{m_{0j}\beta}{\mu} = \frac{1}{S_j} - \sqrt{\frac{\varphi}{V_j}}E(\sqrt{\theta})\frac{1}{\sqrt{S_j}} \tag{8}$$

with $E(\sqrt{\theta}) = \nu_j^L\ \sqrt{\theta^L} + (1-\nu_j^L)\ \sqrt{\theta^H}$ [9]). In the appendix we solve for the general case with K terrorist organizations and give some sufficient assumption for

[8]The derivation of (6) comes from

$$m_{0j}\frac{\partial T_{0j}}{\partial S_j}\frac{1}{T_{0j}} = \mu\left[\frac{1}{S_j} - \frac{d}{dS_j}[E_{R_j}(Log(R_j+\varphi S_j)]\right]$$

with

$$E_{R_j}(Log(R_j+\varphi S_j)] = \nu_j^L Log(R_j^L+\varphi S_j) + (1-\nu_j^L)Log(R_j^H+\varphi S_j)$$

[9]We assume a configuration of parameters such that $S_j < 4V_j/(E(\sqrt{\theta})\varphi$ to ensure that the SOC are satisfied.

the existence of a unique Bayesian Nash Equilibrium of the terrorist-security game.

Here to simplify the exposition, we restrict the discussion to the situation with only one terrorist group located in a particular country j The structure of the equilibrium is then easily represented in figure 4. The first quadrant plots the two relationships (8) and (2). Curve (SS) representing (8) is downward sloping and shows that the level of security measures undertaken by country 0 is reduced when the level of trade flows between country 0 and country j m_{0j} gets larger. Conversely, curve (TT) representing (2), depicts the fact that the actual level of trade flows depends also negatively on security measures. These two relationships therefore describe a two way interaction between trade flows and security measures. Assuming, as shown in the picture that a stable equilibrium exists, it is given by point E at the intersection between (SS) and (TT).

One may also compute the average probability of non occurrence of a terrorist act.that is equal to:

$$E(\Phi_0) = 1 - \left[\nu_j^L \frac{R(S_j, \theta^L)}{[R(S_j, \theta^L) + \varphi S_j]} + (1 - \nu_j^L) \frac{R(S_j, \theta^H)}{[R(S_j, \theta^H) + \varphi S_j]} \right] = \sqrt{\frac{\varphi}{V_j}} E(\sqrt{\theta}) \sqrt{S_j} \tag{9}$$

The second quadrant plots the curve (PR) describing this average probability $E(\Phi_0)$ of no terrorism in country 0 against the level of security implemented in the country (equation (9)). The equilibrium average probability of no success of terrorism is then given by point P.

We can use the model to undertake some simple comparative statics. It is easy to show that an increase in V_j or in ν_j^L will increase the equilibrium level of security measures S_j^* and reduce equilibrium trade flows m_{0j}^*. It is shown on figure 1 by an upward shift of (SS). The effect on the equilibrium average probability $E(\Phi_0)$ is a priori ambiguous as from (9) it is easily seen that there is a direct negative effect (holding S_j constant, the curve (PR) is shifted upward) and a positive indirect effect as S_j^* is increased. However as (8) can be rewritten as :

$$\frac{m_{0j}\beta}{\mu} = \frac{1 - E(\Phi_0)}{S_j}$$

we obtain that

$$1 - E(\Phi_0) = S_j m(S_j)\ \frac{\beta}{\mu}$$

and the effect depends on the elasticity of trade flows to security measures. When the (absolute) elasticity is larger (smaller) than 1, then an increase in V_j, or ν_j^L tends to increase (decrease) $E(\Phi_0)$.

An increase in L_j tends to increase m_{0j} and shift (TT) upward and (SS) downward. The effect is a reduction of security measures S_j^* and a reduction of $E(\Phi_0)$.

An increase in β shifts both (SS) and (TT) downward . Again the whole effect on equilibrium security measures depends on the elasticity of trade flows to transaction costs. When the (absolute) elasticity is larger (smaller) than 1, then an increase in β tends to increase (decrease) S_j^* and $E(\Phi_0)$

4 Estimation strategy and the data

What are the empirical implications of such a model? Clearly, equations (8) and (2) suggest some endogeneity between bilateral trade flows, security and bilateral terrorism. Second, in order to capture only the relationship going from security to trade, exogenous factors that affect only the security curve (SS) are needed, while holding constant all variables that affect both curves (i.e. distance, common colony, GDPs, etc...). Equation 8 is a second degree polynomial equation. Solving for security (S_j), one can show that it directly depends on the interaction between expected marginal costs of the terrorist organization and the effectiveness of security measures, that is $E(\sqrt{\theta}).\varphi_0$.

To this end, we proxy effectiveness of security measures, φ_0, by the frequency of incidents against the US observed in the past: All things held equal, the higher is the number of incidents against the US compared to the total number of world incidents in the last years, the lower is its efficiency to implement security measures that safeguards its citizens and interests over the world. We also proxy the beliefs of the authorities about the efficiency of terrorist organizations, $E(\sqrt{\theta})_j$ by the world share of incidents that originate from country j in the last few years. To be more precise, let n express the total number of incidents, n_j those originating from any country j, n^{US} those that hit the US in whichever location in the world. Assuming T is the time horizon of the authorities and n_T is the total number of incidents over that horizon, a proxy of φ_0 would be: $F_t^{US} = \left[\frac{\sum_{t'\in[t...t-T]} n_{t'}^{US}}{n_T}\right]$. Besides, the proxy of $E(\sqrt{\theta})_j$ would be: $F_{j,t} = \left[\frac{\sum_{t'\in[t...t-T]} n_{j,t'}}{n_T}\right]$.

Thus, in the empirical study, these would constitute our first 2 variables of interest. Alternatively, and following the theory, a third variable of interest can be approached by the interaction of these two variables:

$$\pi_{jt}^{US} = \left[\frac{\sum_{t'\in[t...t-T]} n_{j,t'}}{n_T}\right] . \left[\frac{\sum_{t'\in[t...t-T]} n_{t'}^{US}}{n_T}\right] = F_{jt}.F_t^{US}$$

This third variable is an indicator of exogenous security against the occurrence of terrorism incidents.

All 3 variables are based on past incidents computed from the ITERATE dataset from 1968 until 2002. Past incident-frequencies are defined over 5 years (i.e. the time horizon over which authorities formulate their beliefs is assumed to be 5 years ($T = 5$))[10]. We thus basically ask what is the effect of the past 5 years of incidents, on US imports.

Further, ITERATE delivers information on the country of location of each inci-

[10]We have also considered time horizons of 3, 7 and 10 years. The results qualitatively very similar to a 5 years horizon. They are available upon request

dent. This enable us to split terrorism incidents n_{jt} between those perpetrated in the country of origin ($Orig_{jt}$ hereafter), those located in the targeted country (i.e. in our case, the US) and those located in third countries ($Third_{jt}$). In particular, we expect observations on past incidents in third countries to be the most exogenous to US security at the borders. The reason is that terrorism in third countries should be much less affected in return by trade between the US and the origin country. In contrast, terrorism located in either the US or the origin country could be related directly or indirectly to trade between them. For instance, higher flows from an origin country to the US could reduce security measures at US borders for reasons discussed earlier, thus increasing the probability of incidents to take place inside the US. Besides, an escalation to war between a given state and the US can reduce bilateral trade but might also independently increase terrorism activities inside the former. In either of these cases, the parameter on frequency of past incidents would be biased.

This leaves third country incidents much better candidates of exogenous security than all other incidents. Thus we define an alternative indicator of exogenous security based solely on third incidents. Let $F_{jt}(Third) = \left[\frac{\sum_{t' \in [t \ldots t-T]} Third_{j.,t'}}{n_T}\right]$, be the frequency of past incidents perpetrated in third countries, we thus define

$$\pi_{jt}^{US}(Third) = F_{jt}(Third).F_t^{US}$$

to be an alternative proxy of exogenous security at the US borders. Because they are the most closely linked to our theory, this variable, together with π_{jt}^{US} will be our main two variables of interest in the next sections.

The dependant variable we study is bilateral US imports. We have chosen to work with data at the product level in order to control for the relative specialization of countries which we already suspect (see section 2) to be correlated with both measures, bilateral trade and terrorism activities. We extract 1968-2000 bilateral imports of the United States at the product level (SITC4/5 digits) from the NBER World Trade Data complied by Feenstra and Lipsey. The data however, provides only values of flows that exceed 100,000$ per year which constitutes a potential problem as most origin countries of terrorism are LDCs that export little of many products and too much of a very few set of others where they are really specialized. Thus, neglecting small amounts could result in an over-representation of products of specialization in the dataset, possibly less sensitive to terrorism attacks, which could end up underestimating the impact of terrorism activities on trade. That is why we have completed it with the FLUBIL trade dataset from the French National Institute (INSEE) where flows over 1,000$ are usually reported. FLUBIL is basically an updated version of the OECD dataset on bilateral trade flows where some aggregation check-ups and minor corrections have been undertaken. It also completes the NBER dataset as it runs until 2002.

The sources of the rest of the variables that are used (i.e. traditional gravity and control variables), are listed in the appendix of the paper.

5 Econometric results

We want to study a bilateral US imports relation based on the trade equation (1) or its developed version equation (2), where exogenous security measures directly affect transaction costs. Let transaction costs be expressed as: $T_j = Dist_j.\ S^{\beta_j}.e^{(\sum_v \eta_v.dv_j)}$. Thus, trade costs depend on geographical distance between j exporter and the US border, a set of dummy variables (dv) designating common language and contiguity with the US, and finally security measures at the US borders. Let further $\widehat{S} = S(Z_k)$, represent a variable of exogenous security depending on a set of K alternative variables Z_k, each representing a measure of past incidents frequency.

By approaching labor by the GDP of the importer, the productivity term a by GDP per capita and the number of varieties by GDP of the exporter in equation (2), taking logs and indexing by time (t), the relation to estimate for each good (g) that enter the US market becomes:

$$
\begin{aligned}
log(m^g_{jt}) &= log(USGDP_t) + log(GDP_{jt}) + log(GDPcap_{jt}) + (1-\sigma)log(Dist_j) \\
&\quad +(1-\sigma)\eta_1 Contig_j + (1-\sigma)\eta_2 Com.language_j \\
&\quad +\sum_k \beta'_k Z_{k,jt} - log(P^g_t) + \alpha^g + \alpha_t + u^g_{jt} \qquad (10)
\end{aligned}
$$

where α^g and α_t are good and time fixed effects, u^g_{jt} is the residual. The β'_k are expected to be negative: an increase in past incident shares, increases current security measures (to prevent from potential future incidents), which leads to a decrease in US imports. The US GDP has been removed from the equation as its variation is fully captured by the time fixed effect. Also, as we do not observe the price index P, it is not a strong assumption to assume that it is captured by the time and product fixed effects.

We have alternatively run Within-form equations where each import value of a given product from any given country is expressed as a deviation from its mean value over the period: $\Delta(log(m^g_{jt})) = log(m^g_{jt}) - \overline{log(m^g_{j.})}$, where the overline designates the mean over the period. This alternative equation has the advantage to implicitly although fully account for country fixed effects, along with (country*product) specific effects, that capture the degree of specialization of the country in a given product. However, it has the shortcoming to wipe out all time-constant variables. As most of our gravity (distance, contiguity, common language) and other control variables(see below) do not change overtime, we prefer showing mainly the Pooled fixed effects regressions. The main Within regression results are also shown in the following tables.

All gravity and other control variables in the equation are listed and described in the appendix.

The β'_k are semi-elasticities as they are coefficients on frequencies (not in logs)[11]. At each time we find it necessary, we then convert those coefficients into elasticities at median points. It is important to detail however the computation of elasticities when we introduce our main (interaction) variables π that proxy security. As noticed the π indicator is a product of two frequencies. Its related coefficient, say β'_π, represents the semi-elasticity of US imports to the exogenous security indicator and is quite hard to interpret in simple economic terms. A further simple manipulation, however, enables a much better interpretation of the results.

Notice that π_{jt}^{US} varies with both, past incidents share against the US and past incidents share that originate from j (i.e.$\pi_{jt}^{US} = F^{US_t}.F_{j,t}$). Yet, one can observe from appendix 2 that most of the variation in the data comes from the second term. In fact, the first term, F^{US_t}, varies relatively little : one fourth to one half of the total listed incidents in the world hit the United states across the whole period. Thus, for a better interpretation of the results one can simply fix F^{US_t} to equal its average mean 0.35 and then compute the inferred elasticity of US imports to the frequency of past j-origin incidents. One obtains :

$$\eta^m_{F_j,t} = 0.35.\beta'_\pi.F_{j,t}$$

Needless then to say that because of the skewness of the $F_{j,t}$ distribution (only a small fraction of origin countries account for most of the incidents), only some few export countries to the US should be significantly affected by the incidents. As a matter of fact, the median frequency of incidents perpetrated by an origin country is 1 per thousand and only 1% of the countries are at the origin of more than 5% of world's total incidents over the period (see Appendix 2). Then, for those risky countries, $F_{j,t}$ is relatively high and thus the corresponding import elasticity η^m is

[11]Needless to note that one main reason why we use frequencies in absolute values not in logs is that because around 50% of the frequencies of incidents have 0 values, see appendix 2

expected to be significant.

Table 5 presents a first set of results. Notice first, that in all the regressions presented the usual variables in the trade literature (GDP, Distance, Contiguity, Common language) appear with the expected signs and magnitudes[12]. The GDP per capita variable appears insignificant however, partly because it might not be a good proxy for productivity at the product level[13].

Second, we begin our empirical investigation by including a terrorism variable computed at the bilateral level. That is the frequency of incidents, originating from a country j and directly targeting the US computed as $F_{US,j} = \frac{n_j^{US}}{n}$. It is somewhat the outcome of the interactive behavior of both terrorists and US authorities. This variable however, has a serious shortcoming. As it is defined at the bilateral level it is likely to be endogenous to bilateral trade for reasons detailed already in the stylized facts and theory sections. The effect of bilateral incidents appears however, to be negative on bilateral US imports and statistically significant at 10%, with a semi elasticity of 4.3. The induced elasticity computed at the median point is thus around 0.004, an extremely low figure. But because we suspect endogeneity between bilateral trade and bilateral incidents, we define an alternative variable where the bilateral frequency is computed over the past 5 years of observations. Column 2 shows then that the effect of terrorism incidents increases by more than 70% although it does not gain much in significance. In column 3, we show results where we have split those incidents into three categories with respect to their location: those perpetrated against and within the US, those targeting US interests in the origin country of the terrorists and finally, those targeting the US in third countries.

[12]The impact of distance is around 2 times smaller than in the rest of the literature but this is due to the nature of the panel where only the US is the importer. In fact, as we are accounting for contiguity in our regression, the distance variable looses most of its variability as all potential exporters are now at relatively comparable distances from the US.

[13]We have also run the same type of equations at the aggregate level where we do find a robust positive effect of GDP per capita. Regressions can be provided upon request.

It appears that incidents perpetrated within the US, together with incidents in the home country, do not seem to be affecting significantly US bilateral imports. By a sharp contrast however, incidents perpetrated in third countries appear to affect negatively and very significantly (1%) exports of origin countries to the United States. Now, if computed at median levels, the elasticity is null because the median frequency of incidents perpetrated in third countries is null. But if one believes that the obtained 180 semi-elasticity is representative of the true effect of incidents, perpetrated in whichever location, then the resulting elasticity of incidents at the median point is around 0.18 (i.e: a 1% increase in incidents against the US result in a reduction of their imports of around 0.18%).

Our theoretical set-up mentions however that one good way to capture the efficiency of terrorist organizations that are targeting not only the US but all other countries. Also, another good way to capture the efficiency of US authorities is to consider not only perpetrators from one given country j but perpetrators from all countries together.

We thus introduce together into the equation the frequency of incidents originating from a country j (against all targets) and the frequency of incidents against the US (from all countries of origin) as an alternative to the bilateral frequency of incidents variable. Columns 4 and 5 report the results for those variables computed respectively to express current and last 5 years of observations. In magnitude terms, the effects seem to be comparable to those reported earlier in columns 1 and 2. What is important to notice though is that the effects are now much more statistically significant (1%).

Finally, our theory mentions that the interaction of terrorist and US authorities efficiencies should reveal even better the impact on security and thereby trade. We thus introduce to the equation the interaction variable π, as an alternative security proxy. Namely, this is the product of the share of incidents introduced separately in the latter two regressions. Column 6 shows that the corresponding coefficient is negative and statistically very significant. The inferred elasticity η^m computed at the median point (1 per thousand of incidents originating from half of the countries) is around 0.0055: this is to say that for half of the export countries in the sample, a doubling of the frequency of incidents appears to be reducing US imports only by 0.55%. Now, although very small on average, that impact could be much more significant for origin countries at the top of the distribution of incidents. Thus, Cuba or Colombia, two countries associated with an average of more than 20% of incidents against the US in some years can then be highly affected as the corresponding elasticity of US imports to past incidents that originate from these countries is respectively around 1 and 1.25.

In column 7, we split our interaction variable between incidents perpetrated in own country and incidents perpetrated outside the country. Despite a non significant impact regarding incidents in own country, we obtain a very significant and negative effect of incidents located in a different country. Notice here that the third country estimator is around 5 times higher than all-incidents estimator shown in column 6.

Table 6 continues in employing the third country based proxy for exogenous security while introducing progressively all possible controls (column 1 is the benchmark, identical to column 7 in the prior table). As a matter of fact, in order to have a better estimate of the magnitude of the terrorism effect one has to control for many other sources that could co-vary independently with terrorism acts on one hand and trade flows on the other. We begin by introducing a set of controls directly related to *cross-border security* between the US and their partners. In column 2 of table 6 , we include a dummy revealing an occurrence of a Militarized Interstate Dispute between a given country and the US, lagged over 10 years of observations as in Glick and Taylor (2005) and Martin, Mayer et Thoenig (2005). The data comes from the

Correlates of War project. The sign of the coefficients is negative but not always statistically significant, possibly because we are working on a different panel at the product level. In the next tables we'll see that the impact of war differs across types of products. The inclusion of this measure of cross-border security however, reduces only slightly the magnitude of the coefficient on past terrorism incidents.

Second, there are also some reasons to believe that two countries which share the same types of political and economic institutions could share also lower transaction costs and thus make more trade on one hand, while might reduce the occurrence of terrorism attacks between them, on the other hand. In order to control for this third source effect, we add a dummy variable constructed from PolityIV dataset that takes on 1 when the polity variable (a grade that measures the degree of good governance) is as high as that of the US[14], and 0 otherwise. But the effect, although positive, does not appear to be significant and leaving the variable of terrorism incidents unaffected.

We next introduce a series of controls related to insecurity that originate specifically from the exporting country. The objective, here again, is to isolate all the forces that affect both bilateral trade and terrorism incidents. The progressive inclusion of a civil war dummy, a newstate exporter dummy, a proxy of good governance (ie. polity2 variable in PolityIV, varying from -10 to 10) , measures of ethnic or religion fractions (from Alesina et al (2003) dataset), reduce further by a third the magnitude of the coefficient on past frequencies of incidents, although without affecting its high significance in the pooled regression (i.e. estimators reduced from 80 to 57).[15]. Column 9 introduces almost all of the control variables together[16] and shows further that the impact of third countries incidents variable is still significant with a

[14]The US grade is 10, the maximum that could be obtained by a ranked country

[15]Notice however, that most of these variables appear to be statistically insignificant. Religion Fractions in a exporting country seems however to be good for trade with the US. This result is consistent with Alesina et al (2003) findings concerning the role of this variable on various outcomes.

[16]To avoid multicollinearity, we have removed Ethnic fractions and newtstate exporter dummy from the regression

semi-elasticity that reaches 47. Finally, as mentioned earlier, we run a within type regression that accounts for (country*product) dyadic effects in order to account for country specialization. The effect of the terrorism variable based on third countries, appear again with the a magnitude similar to that obtained from the prior regression, if one accounts for standard errors. To sum up, if the true semi-elasticity is say around 40, the inferred elasticity η^m computed at the median point (1 per thousand of incidents originating from half of the countries) is around 0.015. This is still not a high figure. However, those exporting countries which happen to be at the origin of high terrorism activities over the period like Cuba and Colombia (more than 20% share of total incidents in some years), tend to be associated with an elasticity of at least 2.8, almost three times as much as that estimated earlier.

6 Terrorism to reveal security

Although we have introduced many controls, we still need to show further that what we are picking is really a specific terrorism effect. Besides, we lack variables describing directly security measures. Thus, although consistent with our story, we could not prove so far empirically that the relationship between terrorism incidents and trade is really due to those measures. This section tries to go further into investigating the relationship between trade and terrorism through the security channel.

6.1 The impact of human victims

In order to see first whether we are really capturing a specific terrorism effect, we interact the variable of past incidents shares with the average number of human victims per incident perpetrated by the terrorists of a given country j. Only incidents in Third countries are considered here, because we know from above that they seem to be picking the most exogenous effect of terrorism on security and trade. Thus, we expect those incidents with high number of victims to affect even more current security measures and thus bilateral US imports. Table 7, column 1, shows the results for the complete specification. We define incidents as being relatively harmful in terms of casualties when they result in a number of human victims (deaths and injuries) higher than the standard deviation from the average in the sample. The average number of victims in the sample is around 3 by incident while the deviation is around 10. Then, we construct a dummy that takes on 1 when the resulting number of victims passes 13 (i.e. higher than the avreage+std) and 0 otherwise. The interaction term in column 1 (table 6) is negative but statistically insignificant. The impact of victims becomes statistically significant when their number becomes higher than 5 standard deviations (i.e. more than 50 victims). Column 2 shows indeed that the negative effect on US imports is up to three times higher when the incident is very harmful.

The number of victims variable is a specific feature of terrorism and hence is completely consistent with the view that we are really picking the terrorism's impact on trade. However, we still do not know whether that impact is truly coming from high security at the borders or whether it is due to higher insurance costs or a boycott effect from the US consumers. We develop in what follows a strategy that could infer the answer we are searching for.

6.2 Investigating more the security effect hypothesis

By taking advantage from trade observed at the bilateral and product level, we take three further routes to analyze whether or not the impact of terrorist incidents are informing on security measures taken at the border.

First, recalling our theory, we expect small partners of the US to be much more affected from terrorism than its big partners. The reason is that American citizens' welfare should be more dependent on big trading partners which then incite US authorities to limit their security measures towards the latter. In that respect, higher terrorism activities in the past might be more harmful to small partners, but less harmful to big partners. Table 7, column 3, shows indeed that when the GDP of the partner increases the effect of terrorism incidents that originate from the latter decreases on US imports [17]. This size effect does not alter however that of the high-number of victims. This suggest then that the country size effect does matter but for incidents that do not result in a high number of victims.

Second, if terrorism increases security controls at the borders then we expect terrorism acts to result in higher time spent at the borders. Thus, time-sensitive products should be much more affected by terrorism than time-insensitive ones. We take advantage from a study by Hummels (2002) where he estimates the average sensitivity of days spent in transport on trade at the SITC2 product level. We classify those products where time-sensitivity of trade is higher than -0.01 (and statistically significant) into a time-sensitive product category and the rest, usually around 0.005, into a time-insensitive categorie[18]. Table 7 again, shows that indeed time-sensitive products are more sensitive to terrorism acts than the rest. They are even more than 4 times more sensitive when the number of victims per incident is very high.

Third, we expect that terrorism against the US affects networks formation between the latter and the country of origin, if terrorism results in lower issuing visas and higher visa controls at the borders. Thus, if security at the border matters, we expect products that ask for networks and where market information is costly (i.e. needs more labor mobility) to be more sensitive to terrorism acts in the past than those products negotiated on global markets where information on prices and quantities is readily available. We thus split the sample by three sets of products classified

[17]We also find the same qualitative result when we interact the third incidents variable with a dummy that takes on 1 when the size of the country in terms of GDP is higher than the median size country.

[18]Standard error of the estimates were not provided. Hence, we could not compare statistically the level of estimators with each others. That is why we have chosen the threshold method where 0.01 seemed to be a clear cut between insensitive and sensitive-time products.

by Rauch (1996) into products in organized exchange, referenced prices products and differentiated products. Table 7 shows the result for the three subsamples: In the case of organized exchange products, the impact of incidents is insignificant even when they result in a high number of victims. In the case of referenced price products, the impact is as high as for differentiated products (semi elasticity around 52). In the latter case however, when those acts result in a high number of victims, the interaction term shows that the sensitivity to terrorism acts is 5 times higher.

6.3 Terrorism, Visas and US imports

Finally, we pursue our investigations by running a series of regressions where we could employ a true variable of bilateral security at the borders but on a much smaller period. We thus assemble data on the number of non-immigrant visa issuances by partner country from 1997 to 2002 (last year of our US imports dataset). These data are provided online by the US department of state[19]. We have chosen to work on the number of visas issued for Business (B1) and Business and Leisure (B1-2), assuming that those who come for both Business and Leisure decide to do so primarily for business activities[20].

Now, the rate of visas issued (i.e. ratio of number of visas to total visas demand) would have been even a better proxy for security, as it informs on the number of visa denied as well by the United States. However, and probably for political reasons, we could not find this information on the department of state website.

We want to investigate whether the impact of terrorism incidents on trade in differentiated (network-related) products is truly transiting through the number of issued visas for Business. Hence, on one side we study the relationship between

[19] http://travel.state.gov/visa/frvi/statistics/statistics 1476.html

[20] Only citizens of countries that are not part of the Visa Waiver Program are included in our analysis. Hence, most of the OECD countries, part of this program, are not included in the panel because their nationals do not need visas in general to enter the US for Business or Leisure for a short stay (under 3 months).

terrorism incidents and the number of visas issued (this is to be called our empirical model 1, hereafter) and on the other side, we study the link between the visas and trade in differentiated products (model 2, hereafter). Model 1 will also serve as a first stage regression when we run an instrumental variable regression of US imports later on.

Table 8 presents the results. The first two columns present two alternative econometric methods (Product/year fixed effects and Within) to explain the business visas issued, using mainly gravity type determinants. We add further both types of terrorism incidents based on origin and third countries. As for US imports, third countries incidents variable appear to affect significantly business visa issuance. However, no evidence is provided for incidents perpetrated on the origin country soil.

In return, Columns 3 to 5 investigate the impact of business visas on US imports. We expect the effect to be positive and statistically significant for differentiated products, and no effect for organized exchange products. Column 5 confirms the first intuition: namely a 10% increase in visa issuing increases by almost 5% trade with US in differentiated products. However, the effect of business visas appears to be negatively affecting trade in organized exchange but this effect is not robust across specifications[21].

Finally, we have also run an instrumental variable regression in model 2 where the number of business visas is instrumented by all variables described in model 1. The chi-squared Anderson statistic presented rejects the exogeneity hypothesis of the number of visas and the instruments pass the over-identification test. The effect appears now to be higher (more positive) whichever the class of products. In particular, and as expected, the impact of the number of visas on US imports of network related products is now 25% higher than in the fixed effects regression presented earlier, the impact on imports of referenced prices goods becomes now

[21]Results upon request

slightly positive and statistically significant and the effect on organized exchange goods appears to be insignificant.

We have also considered other alternative types of instruments such a series of frequency of incidents in third countries lagged over several years (generally up till 6 years) and bilateral type incidents in third countries (incidents targeting directly the US, but perpetrated in third countries) lagged also over several years. The results remain unchanged. They are not presented here to save space[22].

From the IV regression above one can then easily compute the impact of incidents on us imports *via* the number of delivered visas. The elasticity at the median point would be the product of the elasticity of trade to visas and that of visas to incidents shares: $\eta = (0.69) * (80 * 0.001 * 0.35) \approx 0.019$. This is comparable to the early figures in the prior sections where the number of visas was not yet introduced into the study.

7 Conclusion

In this paper, we have asked what is the impact of security, to prevent from terrorism, on bilateral trade. To this end we have set up a theory which shows that the impact goes not only from terrorism to trade. Trade might, in return, increase the probability of terrorism acts.

Our theory however, allows for a strategy to condition out the latter, in order to identify the true impact of terrorism. We have shown in particular, how past incidents located in third countries (anywhere in the world except the origin or the target country), can constitute good instruments of current security measures at the borders of the latter.

We have run our tests on US imports. We have shown that past terrorist acts, perpetrated by groups from a given country against the US, affect its exports to

[22]They can be asked for upon request

the latter. The level of the impact is multiplied by three when the acts result in a relatively 'high' number of victims (ie. higher than a standard deviation from the mean number of victims over the period). To fix ideas, a 1% increase in the frequency of terrorism acts originating from a high-terrorism origin country, say Colombia, against the US, reduces imports from Colombia by 3%. This effect reaches a striking 10% decrease in US imports when terrorism attacks have important victim consequences. But this high figure is rather an exception. Only one percent of the countries (i.e. the most risky ones) are associated with significant effects on their exports to the US. For an extreme majority of cases, the elasticity of US imports is very much lower.

Further, we expect that security measures at the borders are time costly and thus should affect more time-sensitive products (foreign newspapers, live animals, fresh fruits, etc...). We also know that they could affect international networks and business through limiting the movements of businessmen and visas issuing. Thus, products that are sensitive to these features could be also more affected by higher security to prevent from terrorism. Our results appear to be perfectly consistent with these two views. We have found that the negative impact of terrorism is two to three times higher for products that have these characteristics. Further, using an additional dataset from the department on state on visa issuance from 1997 to 2002, we have shown how terrorism affects the number of Business visas delivered by the US, thereby impacting significantly bilateral exports in differentiated products. All these results suggest that security to prevent from terrorism does matter for US imports.

What can we conclude from these results? As long as US imports come mainly from countries that do not represent a high risk in terms of terrorism acts, the US consumers should not be too much affected by security measures at the borders. However, those few countries at the origin of most of the attacks towards the US could be highly affected, especially that the US often constitute a significant market for their export products. Hence, the protection of US lives might be undertaken at the expense of some foreign less developed countries' economies.

Our results are consistent with the role played by security measures at the borders. But we do not, however, directly observe those measures. Also, not only security measures are affecting trade. Changes in the behaviors of insurers (higher rates of insurance prices), consumers (discrimination) could also affect trade consequently to terrorist attacks. All these issues that arise naturally from our work, deserve each to be investigated and thus ask for some future work.

Besides, we assign in this paper each terrorist attack to one particular origin. We know however that this is only partly true in today's changing forms of terrorism around the world where some terrorist organizations are becoming more multinationals. Put differently, this paper does not study the indirect impact of terrorism from one country of origin on security measures over other suspected countries, which host groups from the same 'multinational' organization. One might argue that the indirect impact can be substantial as well. This is left, however, for future research.

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Appendix on Existence of a Bayesian Nash equilibrium security vector $\mathbf{s} = (\mathbf{s}_1^*,....\mathbf{s}_N^*)$ in the multi-country terrorist case:

Transactions costs between countries 0 and j take the exponential form:

$$T_{0j}(S) = T_j \; e^{\beta S_j} \text{ with } \beta > 0$$

Let us denote the following Assumption :

$$\textbf{Assumption } A : \sigma < 1 + \frac{\varphi \left[E(\sqrt{\theta}) \right]^2}{\beta V_j} \quad \text{for all } j \in [1, K]$$

Then we have the following result :

- *Under assumption A, there is a unique Bayesian Nash equilibrium of the security-terrorism game between country* 0 *and the* K *terrorist organizations. It is characterized by an equilibrium security vector* $S = (S_1^*, \ldots S_N^*)$*, and an equilibrium terrorist vector* $\left(R_j^{L*}\right)_{i \in [1,K]}$ *,(resp.* $\left(R_j^{H*}\right)_{i \in [1,K]}$*) associated to the realization* $\theta = \theta^L$ *(resp.* $\theta = \theta^H$*) of the terrorist resource cost.*

Equation (6) rewrites

$$\frac{m_{0j}\beta}{\mu} = \frac{1}{S_j} - \sqrt{\frac{\varphi}{V_j}} E(\sqrt{\theta}) \frac{1}{\sqrt{S_j}}$$

with

$$m_{0j} = \frac{L_j T_{0j}^{1-\sigma}}{\sum\limits_{h=0}^{h=N} L_h T_{0h}^{1-\sigma}} = \frac{L_j e^{\beta(1-\sigma)S_j}}{\sum\limits_{h=0}^{h=N} L_h e^{\beta(1-\sigma)S_h}}$$

Hence

$$\begin{aligned} \frac{L_j e^{\beta(1-\sigma)S_j}}{\sum\limits_{h=0}^{h=N} L_h e^{\beta(1-\sigma)S_h}} &= \frac{\mu}{\beta} \left[\frac{1}{S_j} - \sqrt{\frac{\varphi}{V_j}} E(\sqrt{\theta}) \frac{1}{\sqrt{S_j}} \right] \text{ for all } j \in [1, K] \\ &\text{and} \\ S_j &= 0 \text{ for } j \in [K, N] \end{aligned}$$

Denote

$$A = \sum_{h=0}^{h=N} L_h e^{\beta(1-\sigma)S_h}$$

and consider the equation

$$L_j e^{\beta(1-\sigma)S_j} = \frac{A\mu}{\beta}\left[\frac{1}{S_j} - \sqrt{\frac{\varphi}{V_j}}E(\sqrt{\theta})\frac{1}{\sqrt{S_j}}\right] \quad \text{for } S_j \leq \frac{V_j}{\varphi\left(E(\sqrt{\theta})\right)^2}$$

It is easy to see that for $\sigma < 1 + \frac{\varphi\left[E(\sqrt{\theta})\right]^2}{\beta V_j}$ it generates a unique solution $S_j(A)$. As a matter of fact, the function

$$\Psi(S) = L_j e^{\beta(1-\sigma)S} - \frac{A\mu}{\beta}\left[\frac{1}{S} - \sqrt{\frac{\varphi}{V_j}}E(\sqrt{\theta})\frac{1}{\sqrt{S}}\right]$$

is continuous and such that $\Psi(0) = -\infty$ and $\Psi(\frac{V_j}{\varphi\left(E(\sqrt{\theta})\right)^2}) = L_j e^{\beta(1-\sigma)\frac{V_j}{\varphi\left(E(\sqrt{\theta})\right)^2}} > 0$. By the theorem of intermediate values there is at least one value $S_j(A)$ which is such that $\Psi(S_j(A)) = 0$. The value is unique because for any S such that $\Psi(S) = 0$ and $S \leq \frac{V_j}{\varphi\left(E(\sqrt{\theta})\right)^2}$, one has $\Psi'(S) > 0$. As a matter of fact

$$\begin{aligned}
\Psi'(S) &= L_j\beta(1-\sigma)e^{\beta(1-\sigma)S} + \frac{A\mu}{S\beta}\left[\frac{1}{S} - \sqrt{\frac{\varphi}{V_j}}\frac{E(\sqrt{\theta})}{2}\frac{1}{\sqrt{S}}\right] \\
&= -\beta(\sigma-1)\frac{A\mu}{\beta}\left[\frac{1}{S} - \sqrt{\frac{\varphi}{V_j}}E(\sqrt{\theta})\frac{1}{\sqrt{S}}\right] + \frac{A\mu}{S\beta}\left[\frac{1}{S} - \sqrt{\frac{\varphi}{V_j}}\frac{E(\sqrt{\theta})}{2}\frac{1}{\sqrt{S}}\right] \\
&> \frac{A\mu}{\beta}\left[\frac{1}{S} - \sqrt{\frac{\varphi}{V_j}}\frac{E(\sqrt{\theta})}{2}\frac{1}{\sqrt{S}}\right]\left(\frac{1}{S} - \beta(\sigma-1)\right) \\
&> \frac{A\mu}{\beta}\left[\frac{1}{S} - \sqrt{\frac{\varphi}{V_j}}\frac{E(\sqrt{\theta})}{2}\frac{1}{\sqrt{S}}\right]\left[\frac{\varphi\left[E(\sqrt{\theta})\right]^2}{V_j} - \beta(\sigma-1)\right] > 0
\end{aligned}$$

Hence there can only a unique solution of $\Psi(S_j(A)) = 0$. The situation is depicted by a picture indentical to figure 4 in the main text. It is easy to see as well that

$$\frac{dS_j}{dA} = -\frac{\mu}{\beta}\left[\frac{1}{S} - \sqrt{\frac{\varphi}{V_j}}E(\sqrt{\theta})\frac{1}{\sqrt{S}}\right]\frac{1}{-\Psi'(S)} > 0$$

and that $\lim_{A\to 0} S_j(A) = 0$ and $\lim_{A\to\infty} S_j(A) = \frac{V_j}{\varphi\left(E(\sqrt{\theta})\right)^2}$

Now we get the equilibrium value of A from the following equation:

$$A = \Phi(A) = \sum_{h=0}^{h=N} L_h e^{\beta(1-\sigma)S_h(A)}$$

$\Phi(A)$ is decreasing in A (recall that $S_h(A)$ is increasing in A and $\sigma > 1$). In $A = 0$, it has a positive value and it remains bounded when A goes to infinity, From this $\Phi(A) - A$ is strictly decreasing with value $\Phi(0) > 0$ at 0 and value $-\infty$ for A tending to ∞. Hence there is a unique A^* satisfying $A = \Phi(A)$.

Once we know A^*, we can recover the equlibrium security vector $S^* = [S_j(A^*)]_{j\in[1,K]}$, the corresponding equilibrium efforts of terrorism of each group $R_j^{L*} = R(S_j(A^*, \theta^L))$ and $R_j^{H*} = R(S_j(A^*, \theta^H))$ and the probability of non occurence of a terrorist act in country as

$$E(\Phi_0) = 1 - \Pi_{i=1}^{i=K}\left[\nu_j^L \frac{R_j{}^{L*}}{\left[R_j^{L*} + \varphi S_j^*\right]} + (1-\nu_j^L)\frac{R_j{}^{H*}}{\left[R_j{}^{H*} + \varphi S_j^*\right]}\right]$$

Trade flows are immediately obtained from

$$m_{0j} = \frac{L_j T_{0j}^{1-\sigma}}{\sum_{h=0}^{h=N} L_h T_{0h}^{1-\sigma}} = \frac{L_j e^{\beta(1-\sigma)S_j^*}}{\sum_{h=0}^{h=N} L_h e^{\beta(1-\sigma)S_h^*}}$$

QED.

Appendix: Bayesian revision of beliefs after past terrorism in a third country.

We provide here a simple justification of why beliefs of the government can be correlated to past terrorist actions in third countries. Consider the following timing. At the beginning of the period, a terrorist organization k tries to hit citizen or economic interests of country 0 in the rest of the world but not in country 0 itself. The technology is the same as before, namely in country $j \neq 0$, a terrorist organization k maximizes

$$Max_{R_k^j}\ \Pi\left(R_k^j, S_k^j\right) V_k^j - \theta_k R_k^j$$

where $\Pi\left(R_k^j, S^j\right)$ is the probability of success of a terrorist act in country j committed by organization k against country 0. with

$$\Pi\left(R_k^j, S^j\right) = \frac{R_k^j}{R_k^j + \varphi S_k^j}$$

which depends positively on the amount of resources R_k^j invested by the terrorist organization and negatively on some specific factor S_k^j to country j (security measures, environment, political stability links between countries k and j, etc...). θ_k is the marginal resource cost of the terrorist organization and V_k^j is the perceived visibility gain that is enjoyed by the terrorist organization when the terrorist act is successful in country j against country 0.

The solution of (3) gives immediately: the reaction curve of terrorist group k in country j

$$R_k^j = R(S^j, \theta_k) = \sqrt{\frac{\varphi S_k^j V_k^j}{\theta_k}} - \varphi S^j$$

and the frequency of terrorist acts by organization k in country j against country

0 is

$$\pi_k^j = 1 - \sqrt{\frac{\varphi \theta_k S_k^j}{V_k^j}}$$

as θ_k can only take two values θ^L and θ^H with $\theta^L < \theta^H$, let us denote ν_{0k}^L and $\nu_{0k}^H = 1 - \nu_{0k}^L$ respectively the initial beliefs that the government of country 0 has on the value of θ_k. Assume also that S_k^j / V_k^j is iid distributed across countries and follows a density law $f(.)$

Then applying Bayes' law gives us the revised belief of the government of country 0 after having observed π_k^j in country j

$$\nu_{1k}^L = \frac{\nu_{0k}^L f(\frac{\left[1-\pi_k^j\right]^2}{\varphi\theta_L})}{\nu_{0k}^L f(\frac{\left[1-\pi_k^j\right]^2}{\varphi\theta_L}) + (1-\nu_{0k}^L) f(\frac{\left[1-\pi_k^j\right]^2}{\varphi\theta_H})}$$

or the odd ratio can be written as :

$$\frac{1-\nu_{1k}^L}{\nu_{1k}^L} = \frac{1-\nu_{0k}^L}{\nu_{0k}^L} \frac{f(\frac{\left[1-\pi_k^j\right]^2}{\varphi\theta_H})}{f(\frac{\left[1-\pi_k^j\right]^2}{\varphi\theta_L})}$$

and after the observation of all countries but 0 , one gets in the end:

$$\frac{1-\nu_{1k}^L}{\nu_{1k}^L} = \frac{1-\nu_{0k}^L}{\nu_{0k}^L} \prod_{j=1}^{j=N} \left[\frac{f(\frac{\left[1-\pi_k^j\right]^2}{\varphi\theta_H})}{f(\frac{\left[1-\pi_k^j\right]^2}{\varphi\theta_L})} \right]$$

To fix ideas, consider the case where S_k^j / V_k^j is exponentially distributed $f(x) = \lambda e^{-\lambda x}$. Then we get

$$\frac{1-\nu_{1k}^L}{\nu_{1k}^L} = \frac{1-\nu_{0k}^L}{\nu_{0k}^L} e^{-\frac{\lambda}{\varphi}\left[\frac{1}{\theta_H} - \frac{1}{\theta_L}\right]\left[\sum_{j=1}^{j=N}\left[1-\pi_k^j\right]^2\right]}$$

It is easy to see immediately that ν_{1k}^L is an increasing function of π_k^j (the probability of success of a terrorist action by organization k in country j)

Appendix 1: sources of data

Variables	Dataset	Dimensions	period selected	Documentation
Terrorism incidents	ITERATE dataset	Origin, Target and Location Countries* and time	1968-2003	1968-1977: Inter-university Consortium for Political and Social Research (1982) and 1978-2003: Mickolus, Sandler, Murdock and Flemming (2003)
US bilateral imports	1/ NBER World trade dataset (Feenstra and Lipsey) and 2/ Flubil-INSEE dataset	Country Pairs, SITC4/5 product level and Time	1968-2002	www.nber.org and francoise.le-gallo@insee.org
GDP, GDP per capita	World Development Indicators (Worldbank)	Countries and time	1968- 2002	www.worldbank.org/data
Distance, Contiguity, English Common Language	CEPII (Paris)	Country pairs	no time series	www.cepii.fr/francgraph/bdd/distances.htm
Military Interstate Dispute (MID)	MID Data v3.02 from Correlates of War Project (COW)	yearly and bilateral	1968-2002	http://www.correlatesofwar.org/
State Governance (Polity2)	Polity IV project	Country and time	1968-2002	www.cidcm.umd.edu/inscr/polity/
Civil War	Civil War Resolution dataset	country and year	1968-2002	Barbara Walter (www-irps.ucsd.edu/academics/f-walter-data.php)
Ethnic, Religious Fractions	Fractionalization data By Alesina, Devleeschauwer, Easterly and Kurlat (2003)	Country data (only one observed year by country, generally between 1980 and 2001)	no time series	http://www.stanford.edu/ wacziarg/papersum.html

* 'Origin' (resp. 'Target') is the country of first nationality of terrorist group (resp. Human and Physical victims).

Appendix 2: Descriptive Statistics on Victims and Frequency of incidents (in the last 5 years)

Variable	Label	Mean	Median	Std. dev	5th Ptcl	95th Pctl	99th Pctl	Maximum	Origin of Max. frequencies
F_t^{US}	Freq. of total incidents against the US	0.352	0.319	0.104	0.228	0.564	0.672	0.672	
NV_j	Number of victims per incident originating from j	3.122	0.2	10.293	0	18.15	61.209	173.76	Saudi Arabia
F_{jt}	Freq. of incidents originating from j	0.006	0.001	0.013	0	0.026	0.049	0.261	Cuba
$F(Orig)_{jt}$	Freq. of incidents originating from and located in j	0.004	0.001	0.012	0	0.021	0.037	0.208	Colombia
$F(Third)_{jt}$	Freq. of incidents originating from j but located in third country	0.002	0	0.005	0	0.009	0.022	0.261	Cuba
π_{jt}^{US}	$F_{jt}.F_t^{US}$ proxy of $\varphi_0^{US}.E(\sqrt{\theta})_i^2$	0.002	0	0.005	0	0.009	0.017	0.125	
$\pi(Orig)_{jt}^{US}$	$F(Orig)_{jt}.F_t^{US}$	0.001	0	0.005	0	0.007	0.014	0.1	
$\pi(Third)_{jt}^{US}$	$F(Third)_{jt}.F_t^{US}$	0.001	0	0.002	0	0.003	0.007	0.125	

Table 1: Rankings of Origin Countries across periods

Origin Country	All period (1968-2003) Total ranking	Total incidents	1968-1978 incidents	rank	1978-1988 incidents	rank	1988-1998 incidents	rank	1998-2003 incidents	rank	1968-2003 Growth of incidents share**
*UNO**	***1***	4002	1357	*1*	1352	*1*	1051	*1*	242	*1*	*-38,18%*
PAL	***2***	823	409	*2*	240	*2*	138	*3*	36	*4*	*-69,49%*
COL	***3***	457	36	*12*	120	*7*	146	*2*	155	*2*	***1392,53%***
TUR	***4***	292	46	*10*	169	*4*	63	*10*	14	*15*	*5,50%*
IRN	***5***	275	16	*27*	162	*5*	90	*5*	7	*22*	*51,66%*
LBN	***6***	236	21	*20*	178	*3*	34	*17*	3	*40*	*-50,48%*
CUB	***7***	220	161	*3*	45	*19*	10	*42*	4	*30*	*-91,39%*
ESP	***8***	207	31	*15*	122	*6*	49	*13*	5	*26*	*-44,09%*
GRC	***9***	207	36	*12*	85	*10*	71	*9*	15	*13*	*44,44%*
PHL	***10***	206	20	*23*	89	*9*	80	*7*	17	*12*	*194,65%*
GBR	***11***	169	63	*7*	64	*14*	34	*17*	8	*19*	*-55,98%*
PER	***12***	164	7	*38*	78	*12*	75	*8*	4	*30*	*98,09%*
USA	***13***	162	77	*6*	72	*13*	11	*38*	2	*45*	*-91,00%*
ARG	***14***	160	137	*4*	13	*36*	9	*46*	1	*55*	*-97,47%*
PRI	***15***	153	91	*5*	62	*15*	0		0		*-100,00%*
KUR	***16***	131			27	*27*	104	*4*	0		*0,00%*
FRA	***17***	130	53	*8*	60	*16*	10	*42*	7	*22*	*-54,22%*
RFA	***18***	126	33	*14*	91	*8*	2	*76*			*-100,00%*
SLV	***19***	119	14	*29*	79	*11*	26	*20*			*-100,00%*
ITA	***20***	110	52	*9*	40	*20*	8	*51*	10	*17*	*-33,34%*
SOM	***21***	95	1	*65*	1	*81*	85	*6*	8	*19*	***2673,21%***
IRQ	***22***	86	8	*35*	36	*23*	23	*21*	19	*9*	*723,30%*
DZA	***23***	83	8	*35*	3	*68*	57	*11*	15	*13*	*549,97%*
KOR	***24***	83			46	*18*	37	*16*			*0,00%*
GTM	***25***	80	21	*20*	40	*20*	19	*25*			*-100,00%*
YUG	***26***	77	37	*11*	23	*28*	12	*34*	5	*26*	*-53,16%*
PAK	***27***	75	5	*42*	12	*40*	18	*26*	40	*3*	***2673,21%***
JPN	***28***	69	22	*19*	32	*24*	14	*30*	1	*55*	*-84,24%*
IND	***29***	66	17	*25*	22	*29*	21	*23*	6	*24*	*22,35%*
LBY	***30***	65	1	*65*	56	*17*	8	*51*			*-100,00%*
EGY	***31***	63	2	*57*	13	*36*	42	*14*	6	*24*	*939,96%*
CHL	***32***	59	4	*47*	16	*34*	38	*15*	1	*55*	*-13,34%*
IDN	***33***	57	15	*28*	4	*62*	4	*64*	34	*5*	*685,74%*
KHM	***34***	54	1	*65*	2	*71*	51	*12*			*-100,00%*
YEM	***35***	52			1	*81*	27	*19*	24	*6*	
AGO	***36***	45	3	*51*	10	*41*	9	*46*	23	*8*	***2557,66%***
PRT	***37***	45	5	*42*	38	*22*	1	*89*	1	*55*	*-30,67%*
HND	***38***	44			30	*25*	14	*30*			*0,00%*
NIC	***39***	41	13	*31*	18	*31*	9	*46*	1	*55*	*-73,33%*
ISR	***40***	40	18	*24*	13	*36*	8	*51*	1	*55*	*-80,74%*
JOR	***41***	40	5	*42*	22	*29*	9	*46*	4	*30*	*177,32%*
MEX	***42***	40	28	*16*	8	*45*	2	*76*	2	*45*	*-75,24%*
BOL	***43***	38	21	*20*	7	*48*	10	*42*			*-100,00%*
MOZ	***44***	36			28	*26*	8	*51*			
RUS	***45***	34			17	*33*	16	*28*	1	*55*	
SLE	***46***	34					10	*42*	24	*6*	
ETH	***47***	33	11	*33*	10	*41*	11	*38*	1	*55*	*-68,49%*
SAU	***48***	33	1	*65*	1	*81*	12	*34*	19	*9*	***6486,38%***
LKA	***49***	32	1	*65*	6	*50*	21	*23*	4	*30*	*1286,61%*
ZWE	***50***	32	12	*32*	18	*31*	1	*89*	1	*55*	*-71,11%*
AFG	***51***	31	1		5	*56*	13	*32*	13	*16*	***801,29%***
ERI	***52***	27	26	*17*	1	*81*					*-100,00%*
URY	***53***	27	26	*17*					1	*55*	*-86,67%*
SDN	***54***	26			10	*41*	13	*32*	3	*40*	
VEN	***55***	26	14	*29*	5	*56*	3	*70*	4	*30*	*-0,96%*
BIH	***56***	25					23	*21*	2	*45*	
SYR	***57***	23	1	*65*	13	*36*	8	*51*	1	*55*	*246,65%*
NGA	***58***	22	1	*65*	1	*81*	2	*76*	18	*11*	***6139,73%***
DEU	***59***	20					17	*27*	3	*40*	
PAN	***60***	20	3	*51*	6	*50*	11	*38*			
Total		**10772**	**3106**		**3887**		**2884**		**896**		

**UNO=Unknown Origin*

** calculations are based on the relative growth between the share of incidents in the first decade (1968-1978) and that of the last period considered (1998-2003). When the country has not been associated with incidents in first decade, the second decade is taken to compute the related growth rate of incidents.

Table 2: Rankings of Targeted Countries across periods

	All Period (1968-2003)		*1968-1978*		*1978-1988*		*1988-1998*		*1998-2003*		1968-2003
Targeted Country	***Rank***	**Total_incidents (1968-2003)**	**incidents**	***rank***	**incidents**	***rank***	**incidents**	***rank***	**incidents**	***rank***	Growth share of incidents**
USA	*1*	3822	1385	*1*	1125	*1*	854	*1*	458	*1*	14,60%
FRA	*2*	649	75	*6*	368	*2*	180	*2*	26	*4*	20,13%
ISR	*3*	647	385	*2*	140	*5*	98	*7*	24	*5*	-78,40%
GBR	*4*	581	120	*3*	216	*3*	170	*3*	75	*2*	116,59%
TUR	*5*	310	32	*15*	126	*6*	146	*4*	6	*20*	-35,02%
RUS	*6*	276	65	*7*	86	*9*	115	*6*	10	*12*	-46,69%
UNO*	*7*	269	30	*16*	191	*4*	44	*11*	4	*24*	-53,79%
ITA	*8*	266	39	*11*	114	*7*	93	*8*	20	*6*	77,71%
INT*	*9*	253	19	*20*	51	*15*	133	*5*	50	*3*	811,95%
RFA	*10*	212	117	*4*	95	*8*					-100,00%
ESP	*11*	218	82	*5*	62	*10*	62	*9*	12	*10*	-49,29%
PAL	*12*	130	51	*9*	59	*12*	20	*23*			-100,00%
JPN	*13*	123	18	*24*	46	*16*	56	*10*	3	*29*	-42,24%
IND	*14*	119	34	*14*	37	*19*	34	*13*	14	*9*	42,69%
CHE	*15*	107	20	*19*	56	*14*	22	*20*	9	*14*	55,94%
IRN	*16*	106	17	*26*	60	*11*	29	*14*			-100,00%
NLD	*17*	98	35	*13*	32	*23*	20	*23*	11	*11*	8,91%
YUG	*18*	97	48	*10*	37	*19*	10	*45*	2	*34*	-85,56%
CUB	*19*	96	56	*8*	24	*29*	11	*41*	5	*22*	-69,06%
UFN	*20*	91	29	*17*	19	*36*	27	*15*	16	*7*	91,19%
VEN	*21*	91	14	*28*	31	*25*	40	*12*	6	*20*	48,52%
BEL	*22*	79	10	*34*	32	*23*	22	*20*	15	*8*	419,81%
EGY	*23*	72	23	*18*	31	*25*	18	*26*			-100,00%
CAN	*24*	71	13	*31*	21	*34*	27	*15*	10	*12*	166,57%
IRQ	*25*	70	14	*28*	43	*17*	12	*38*	1	*49*	-75,25%
IRL	*26*	68	36	*12*	18	*38*	11	*41*	3	*29*	-71,12%
LBY	*27*	63			59	*12*	4	*75*			
PRT	*28*	58	8	*40*	36	*21*	10	*45*	4	*24*	73,27%
NIC	*29*	57	11	*32*	33	*22*	13	*37*			-100,00%
CHL	*30*	55	19	*20*	26	*28*	10	*45*			-100,00%
SWE	*31*	55	11	*32*	23	*31*	18	*26*	3	*29*	-5,49%
AUT	*32*	50	10	*34*	21	*34*	18	*26*	1	*49*	-65,35%
COL	*33*	50	14	*28*	16	*42*	12	*38*	8	*16*	98,02%
MEX	*34*	50	18	*24*	16	*42*	14	*34*	2	*34*	-61,50%
SAU	*35*	50	2	*60*	24	*29*	23	*19*	1	*49*	73,27%
KWT	*36*	49	4	*53*	38	*18*	7	*56*			-100,00%
ZAF	*37*	49	9	*38*	22	*33*	14	*34*	4	*24*	54,02%
GRC	*38*	43	7	*43*	16	*42*	18	*26*	2	*34*	-0,99%
AUS	*39*	42	2	*60*	15	*45*	17	*30*	8	*16*	1286,16%
SYR	*40*	41	10	*34*	27	*27*	4	*75*			-100,00%
CHN	*41*	40			12	*50*	26	*17*	2	*34*	
JOR	*42*	39	8	*40*	17	*40*	10	*45*	4	*24*	73,27%
ARG	*43*	36	15	*27*	14	*47*	5	*67*	2	*34*	-53,79%
BRA	*44*	34	6	*45*	9	*54*	19	*25*			-100,00%
LBN	*45*	34	19	*20*	11	*53*	4	*75*			-100,00%
NAT	*46*	33			23	*31*	8	*52*	2	*34*	
PHL	*47*	32	1	*78*	9	*54*	14	*34*	8	*16*	2672,32%
POL	*48*	32	5	*48*	8	*58*	15	*33*	4	*24*	177,23%
CYP	*49*	31	2	*60*	19	*36*	10	*45*			-100,00%
KOR	*50*	30	2	*60*	9	*54*	17	*30*	2	*34*	246,54%
Total		***10772***	***3105***		***3887***		***2884***		***896***		

** INT=International Organizations; UNO=Unknown Targeted country*

**Calculations are based on the relative growth between the share of incidents in the first decade (1968-1978) and that of the last period considered (1998-2003). When the country has not been associated with incidents in first decade, the second decade is taken to compute the related growth rate of incidents.

Table 3: Ranking of incidents by Origin and Target Countries across periods

		All Period (1968-2003)		*1968-1978*		*1978-1988*		*1988-1998*		*1998-2003*		1968-2003
Origin	**Target**	***Rank***	**Total incidents**	**incidents**	***rank***	**incidents**	***rank***	**incidents**	***rank***	**incidents**	***rank***	Groth share of incidents**
UNO	USA	***1***	1591	774	***1***	392	***1***	298	***1***	127	***1***	-43,14%
PAL	ISR	***2***	317	240	***2***	46	***12***	25	***20***	6	***19***	-91,34%
COL	USA	***3***	232	13	***35***	45	***13***	54	***7***	120	***2***	3098,83%
UNO	FRA	***4***	212	19	***21***	128	***2***	60	***4***	5	***22***	-8,81%
UNO	ISR	***5***	192	103	***3***	51	***8***	36	***10***	2	***60***	-93,27%
UNO	GBR	***6***	176	32	***11***	62	***5***	58	***5***	24	***4***	159,91%
PAL	USA	***7***	175	71	***6***	38	***18***	48	***9***	18	***6***	-12,14%
PRI	USA	***8***	142	87	***5***	55	***7***					-100,00%
PHL	USA	***9***	120	13	***35***	40	***16***	57	***6***	10	***9***	166,57%
UNO	INT	***10***	119	7	***62***	23	***30***	65	***3***	24	***4***	1088,14%
TUR	TUR	***11***	105	17	***25***	71	***3***	16	***29***	1	***114***	-79,62%
UNO	RUS	***12***	103	17	***25***	32	***22***	52	***8***	2	***60***	-59,23%
ARG	USA	***13***	101	91	***4***	4	***160***	5	***97***	1	***114***	-96,19%
GRC	USA	***14***	100	31	***12***	38	***18***	22	***22***	9	***10***	0,61%
ESP	FRA	***15***	97	8	***56***	66	***4***	21	***23***	2	***60***	-13,36%
UNO	ESP	***16***	90	50	***7***	26	***26***	10	***45***	4	***28***	-72,28%
KUR	TUR	***17***	87			10	***76***	77	***2***			
GBR	GBR	***18***	86	23	***18***	38	***18***	21	***23***	4	***28***	-39,73%
UNO	TUR	***19***	78	14	***32***	31	***23***	31	***12***	2	***60***	-50,49%
PER	USA	***20***	76	6	***73***	41	***14***	28	***18***	1	***114***	-42,24%
UNO	UNO	***21***	76	4	***96***	56	***6***	16	***29***			-100,00%
KOR	USA	***22***	74			41	***14***	33	***11***			
TUR	USA	***23***	73	19	***21***	19	***40***	29	***15***	6	***19***	9,43%
LBN	USA	***24***	69	7	***62***	47	***11***	13	***35***	2	***60***	-0,99%
UNO	ITA	***25***	69	12	***42***	24	***28***	29	***15***	4	***28***	15,51%
CUB	USA	***26***	66	39	***9***	27	***25***					-100,00%
UNO	RFA	***27***	66	40	***8***	23	***30***	3	***148***			-100,00%
IRN	USA	***28***	64	12	***42***	38	***18***	11	***39***	3	***44***	-13,36%
RFA	USA	***29***	60	12	***42***	48	***9***					-100,00%
SLV	USA	***30***	58	2	***153***	40	***16***	16	***29***			-100,00%
CUB	CUB	***31***	56	36	***10***	9	***87***	8	***57***	3	***44***	-71,12%
LBN	FRA	***32***	56	5	***81***	48	***9***	3	***148***			-100,00%
COL	VEN	***33***	49	1	***219***	14	***50***	29	***15***	5	***22***	1632,70%
UNO	JPN	***34***	47			21	***36***	25	***20***	1	***114***	
UNO	PAL	***35***	46	16	***27***	22	***34***	8	***57***			-100,00%
UNO	YUG	***36***	46	16	***27***	22	***34***	7	***69***	1	***114***	-78,34%
GBR	IRL	***37***	45	30	***13***	10	***76***	5	***97***			-100,00%
USA	RUS	***38***	45	29	***14***	16	***46***					-100,00%
CHL	USA	***39***	44	2	***153***	11	***68***	30	***13***	1	***114***	73,27%
ITA	USA	***40***	44	29	***14***	10	***76***	1	***317***	4	***28***	-52,20%
PAK	USA	***41***	44	1	***219***	7	***100***	5	***97***	31	***3***	10642,75%
IRN	IRN	***42***	42	3	***121***	24	***28***	15	***33***			-100,00%
UNO	UFN	***43***	41	25	***17***	2	***261***	12	***37***	2	***60***	-72,28%
UNO	IRN	***44***	40	9	***52***	21	***36***	10	***45***			-100,00%
ESP	ESP	***45***	39	13	***35***	6	***115***	20	***25***			-100,00%
PAL	PAL	***46***	38	16	***27***	18	***43***	4	***118***			-100,00%
YUG	YUG	***47***	37	28	***16***	8	***93***	1	***317***			-100,00%
UNO	EGY	***48***	36	14	***32***	13	***55***	9	***52***			-100,00%
UNO	IND	***49***	36	14	***32***	10	***76***	10	***45***	2	***60***	-50,49%
PAL	GBR	***50***	35	13	***35***	13	***55***	7	***69***	2	***60***	-46,69%
UNO	CUB	***51***	35	18	***24***	13	***55***	2	***199***	2	***60***	-61,50%
UNO	SAU	***52***	35	1	***219***	14	***50***	19	***26***	1	***114***	246,54%
UNO	IRQ	***53***	34	7	***62***	20	***38***	6	***79***	1	***114***	-50,49%
SOM	USA	***54***	33					30	***13***	3	***44***	
DZA	FRA	***55***	31			1	***372***	28	***18***	2	***60***	
UNO	NLD	***56***	31	6	***73***	13	***55***	6	***79***	6	***19***	246,54%
BOL	USA	***57***	30	19	***21***	4	***160***	7	***69***			-100,00%
HND	USA	***58***	30			19	***40***	11	***39***			
GTM	USA	***59***	29	8	***56***	17	***44***	4	***118***			-100,00%
IRN	FRA	***60***	29			25	***27***	4	***118***			
IND	IND	***61***	28	13	***35***	12	***65***	3	***148***			-100,00%
LBY	LBY	***62***	28			28	***24***					
SAU	USA	***63***	29	1		0		11	***39***	17	***7***	5791,18%
UNO	BEL	***64***	28	5	***81***	10	***76***	12	***37***	1	***114***	-30,69%
FRA	USA	***65***	27	15	***30***	7	***100***	3	***148***	2	***60***	-53,79%

Note: UNO=Unknown origin; INT=International Organizations

**Calculations are based on the relative growth between the share of incidents in the first decade (1968-1978) and that of the last period considered (1998-2003). When the country has not been associated with incidents in first decade, the second decade is taken to compute the related growth rate of incidents.

Table 4: Type of incidents

	Aerial hijacking	Armed attack	Bombing	Suicide	Assassination murder	Hostage	Kidnapping	Threat	Other
All countries	0.03	0.11	0.45	0.01	0.08	0.01	0.1	0.12	0.1
USA	0.02	0.09	0.54	0.004	0.04	0.005	0.09	0.14	0.07
USA (after 1990)	0.01	0.19	0.43	0.013	0.03	0.01	0.11	0.16	0.05

Table 5: Impact of Terrorism incidents on Log of US imports

Variables	1	2	3	4	5	6	7
Constant	-1.089***	-0.233***	-0.238***	0.165	0.772***	-0.227***	-0.216***
	[0.156]	[0.077]	[0.077]	[0.179]	[0.116]	[0.076]	[0.078]
Log GDP exporter	0.797***	0.805***	0.808***	0.803***	0.815***	0.813***	0.829***
	[0.047]	[0.047]	[0.047]	[0.047]	[0.048]	[0.048]	[0.049]
Log Weighted Distance	-0.465**	-0.472**	-0.454*	-0.485**	-0.498**	-0.489**	-0.523**
	[0.230]	[0.232]	[0.230]	[0.231]	[0.233]	[0.233]	[0.234]
English Common Language	0.380**	0.381**	0.373**	0.389**	0.392**	0.390**	0.437**
	[0.160]	[0.161]	[0.162]	[0.162]	[0.164]	[0.163]	[0.174]
Contiguity	0.994**	0.999***	1.007**	0.950**	0.936**	0.952**	0.850**
	[0.384]	[0.381]	[0.386]	[0.388]	[0.388]	[0.387]	[0.385]
Log GDP per cap	0.02	0.014	0.013	0.015	0.006	0.009	0.002
	[0.063]	[0.064]	[0.064]	[0.063]	[0.064]	[0.064]	[0.064]
Frequency of Incidents originating from ***i*** against ***US:***							
_ in current year	-4.397*						
	[2.616]						
_during last 5 years		-7.316*					
		[4.235]					
Frequency of Incidents originating from ***i*** against ***US*** *(during last 5 years)* **:**							
_ and located in i			-3.764				
			[3.967]				
_ and located in US			-81.545				
			[128.673]				
_ and located in third countries			**-180.106*** **				
			[35.838]				
Frequency of Incidents originating from i				-4.470**			
				[1.863]			
Frequency of Incidents against the US				-5.495***			
				[0.732]			
(1) : Frequency of Incidents originating from ***i*** (during last 5 years)					-6.923**		
					[3.181]		
(2): Frequency of Incidents against the ***US*** (during last 5 years)					-5.938***		
					[0.679]		
(1) * (2): Security proxy						-16.327**	
						[8.211]	
(1) * (2) : Security proxy based on incidents located in ***i***							-7.139
							[7.529]
(1) * (2) Security proxy , based on incidents located in ***third*** countries							**-80.887*** **
							[29.030]
Fixed effects:							
_ product (SITC 5 digits)	yes	yes	yes	yes	yes	yes	yes
_ year	yes	yes	yes	yes	yes	yes	yes
Number of Observations	699249	673725	673725	700297	673725	673725	673725
R-squared	0.26	0.26	0.26	0.26	0.26	0.26	0.26

Robust Standard errors provided in brackets with clustering by exporter
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6: Robustness of Terrorism incidents impact on Log of US Imports

Variables	1	2	3	4	5	6	7	8	9	10
Constant	-0.216***	-0.292***	-0.232***	-0.216***	-0.228***	-0.309***	-0.315***	-0.218***	-0.236**	_
	[0.078]	[0.081]	[0.089]	[0.078]	[0.081]	[0.084]	[0.083]	[0.079]	[0.093]	
Log GDP exporter	0.829***	0.830***	0.823***	0.829***	0.865***	0.831***	0.815***	0.807***	0.803***	2.323***
	[0.049]	[0.050]	[0.049]	[0.049]	[0.065]	[0.058]	[0.048]	[0.043]	[0.051]	[0.255]
Log Weighted Distance	-0.523**	-0.536**	-0.497**	-0.521**	-0.591**	-0.464*	-0.543**	-0.527**	-0.462*	_
	[0.234]	[0.236]	[0.234]	[0.238]	[0.289]	[0.252]	[0.238]	[0.222]	[0.243]	
English Common Language	0.437**	0.446**	0.412**	0.436**	0.382**	0.375**	0.471***	0.287*	0.208	_
	[0.174]	[0.177]	[0.175]	[0.173]	[0.188]	[0.185]	[0.179]	[0.171]	[0.187]	
Contiguity	0.850**	0.907**	0.905**	0.853**	0.776*	0.963**	0.976**	0.918***	1.152***	_
	[0.385]	[0.418]	[0.369]	[0.391]	[0.436]	[0.413]	[0.392]	[0.337]	[0.384]	
Log GDP per cap	0.002	0	-0.031	0.003	0.001	-0.014	-0.023	-0.004	-0.042	-0.689**
	[0.064]	[0.067]	[0.078]	[0.065]	[0.072]	[0.079]	[0.068]	[0.057]	[0.088]	[0.312]
(1) * (2) : Security proxy based on incidents located in ***i***	-7.139	-7.369	-6.012	-7.499	-7.259	-7.662	-6.439	-5.157	-6.201	0.208
	[7.529]	[7.450]	[7.425]	[8.037]	[7.592]	[7.646]	[7.348]	[6.628]	[6.828]	[2.635]
(1) * (2) Security proxy , based on incidents located in ***third*** countries	***-80.887****	***-78.246****	***-80.294****	***-80.923****	***-83.991****	***-77.529****	***-76.314****	***-56.339****	***-47.709****	***-34.874****
	[29.030]	***[27.502]***	***[28.576]***	***[29.051]***	***[29.521]***	***[29.306]***	***[27.324]***	***[28.857]***	***[25.570]***	***[13.266]***
Bilateral Insecurity										
Military Interstate Dispute										
t		-0.173							-0.175	-0.156
		[0.110]							[0.115]	[0.115]
t-1		-0.153*							-0.169*	-0.142
		[0.092]							[0.092]	[0.090]
t-2		-0.089							-0.104*	-0.068
		[0.071]							[0.061]	[0.054]
t-3		-0.140*							-0.154**	-0.145**
		[0.071]							[0.065]	[0.057]
t-4		-0.102*							-0.125**	-0.074
		[0.056]							[0.052]	[0.056]
t-5		-0.044							-0.057	-0.102
		[0.060]							[0.057]	[0.062]
t-6		-0.035							-0.056	-0.117*
		[0.074]							[0.070]	[0.070]

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Table 6 (cont'd): Robustness of Terrorism incidents impact on Log of US Imports

Variables	1	2	3	4	5	6	7	8	9	10
		[0.061]							[0.061]	[0.062]
t-8		-0.079							-0.077	-0.133*
		[0.078]							[0.073]	[0.072]
t-9		-0.083							-0.123	-0.157***
		[0.084]							[0.086]	[0.054]
t-10		-0.025							-0.072	-0.139**
		[0.097]							[0.095]	[0.062]
Same rating of governance than US			0.163						0.095	-0.084
			[0.202]						[0.202]	[0.110]
Exporter internal Security										
Civil war in Exporter				0.025					0.061	-0.094
				[0.181]					[0.186]	[0.066]
Exporter is a newstate					0.061				_	_
					[0.134]					
rating of state Governance						0.009			0.009	0.009
						[0.016]			[0.015]	[0.008]
Log of Ethnic fractions in Exporter							-0.101		_	_
							[0.071]			
Log of Religion fractions in Exporter								0.235***	0.243***	_
								[0.074]	[0.074]	
Fixed effects:										
_ product (SITC 5 digits)	yes	yes	yes	yes	yes	yes	yes	yes	yes	
_ year	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
_exporter										
_ product*exporter										yes
Observations	673725	673196	673725	673725	656985	659671	672478	673725	659173	659173
R-squared	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.27	0.26	0.16

Robust Standard errors provided in brackets with clustering by exporter
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 7: Terrorism and Security Related Effects: Victims, Partner Size, 'Just in Time' and Networks

Variables				Role of Shipping time		Role of Networks		
	Nb. Victims (1)	Nb. Victims (2)	Exporter Size	Non time Sensitive	Time sensitive	Organized Exchange	Referenced Prices	Differentiated Products
Constant	-0.295***	-0.293***	-0.323***	-0.316	-1.041*	1.800***	0.116	-0.576
	[0.080]	[0.080]	[0.085]	[0.353]	[0.623]	[0.682]	[0.396]	[0.628]
Log GDP exporter	0.805***	0.804***	0.809***	0.736***	0.934***	0.276***	0.524***	0.868***
	[0.044]	[0.044]	[0.043]	[0.030]	[0.055]	[0.066]	[0.033]	[0.055]
Log Weighted Distance	-0.529**	-0.530**	-0.508**	-0.447***	-0.625**	-0.322	-0.680***	-0.611**
	[0.221]	[0.220]	[0.218]	[0.153]	[0.270]	[0.224]	[0.133]	[0.285]
English Common Language	0.290*	0.290*	0.265	0.323**	0.363*	0.381	0.281*	0.263
	[0.172]	[0.173]	[0.177]	[0.127]	[0.218]	[0.252]	[0.154]	[0.245]
Contiguity	1.010***	1.017***	1.059***	0.819**	0.956**	1.824**	1.304**	1.249***
	[0.367]	[0.370]	[0.375]	[0.404]	[0.411]	[0.792]	[0.512]	[0.388]
Log GDP per cap	-0.006	-0.005	-0.006	0.033	0.01	-0.202***	-0.028	-0.054
	[0.060]	[0.060]	[0.059]	[0.042]	[0.075]	[0.077]	[0.047]	[0.076]
(1) * (2) Security proxy, based on incidents located in *third* countries	**-46.543***	**-50.140***	**-84.532*****	**-48.863****	**-55.217***	**-50.858**	**-52.697****	**-51.146***
	[25.118]	**[25.573]**	**[30.175]**	**[22.930]**	**[28.940]**	**[32.766]**	**[24.634]**	**[30.659]**
Security proxy* Number of Victims higher than 1 std	-71.298							
	[55.903]							
Security proxy * Number of Victims higher than 5 std		**-166.112****	**-171.595****	**-89.614***	**-235.212****	**-36.754**	**43.36**	**-245.514****
		[77.344]	**[73.851]**	**[51.857]**	**[103.924]**	**[45.437]**	**[53.261]**	**[103.774]**
Security proxy * Partner size			**34.599****					
			[17.454]					
Military interstate dispute:								
t0	-0.161	-0.195*	-0.165	-0.039	-0.332***	0.233	-0.03	-0.340**
	[0.111]	[0.105]	[0.108]	[0.118]	[0.104]	[0.214]	[0.145]	[0.139]
t-1	-0.194**	-0.177*	-0.141	-0.067	-0.226**	0.019	0.098	-0.261**
	[0.087]	[0.091]	[0.095]	[0.102]	[0.092]	[0.169]	[0.117]	[0.112]
t-2	-0.074	-0.103	-0.083	0.018	-0.161**	0.039	0.122	-0.206***
	[0.068]	[0.064]	[0.066]	[0.086]	[0.066]	[0.138]	[0.111]	[0.063]
t-3	-0.157**	-0.151**	-0.141**	-0.027	-0.238***	0.106	0.064	-0.261***
	[0.065]	[0.063]	[0.066]	[0.080]	[0.072]	[0.149]	[0.108]	[0.075]
t-4	-0.102**	-0.121**	-0.090*	-0.035	-0.169***	0.045	0.036	-0.192***
	[0.048]	[0.050]	[0.051]	[0.069]	[0.046]	[0.116]	[0.087]	[0.044]
t-5	-0.043	-0.057	-0.047	0.063	-0.164*	0.051	0.127*	-0.160**
	[0.060]	[0.056]	[0.058]	[0.054]	[0.084]	[0.117]	[0.067]	[0.068]
t-6	-0.069	-0.054	-0.047	0.045	-0.134*	0.11	0.098	-0.138**
	[0.078]	[0.070]	[0.073]	[0.089]	[0.070]	[0.160]	[0.116]	[0.062]
t-7	-0.025	-0.04	-0.023	0.048	-0.116*	0.212	0.082	-0.116*
	[0.064]	[0.057]	[0.060]	[0.062]	[0.061]	[0.137]	[0.099]	[0.064]
t-8	-0.094	-0.103	-0.09	-0.016	-0.209**	-0.018	0.096	-0.175**
	[0.082]	[0.076]	[0.078]	[0.087]	[0.082]	[0.157]	[0.097]	[0.076]
t-9	-0.094	-0.112	-0.104	-0.035	-0.227***	0.022	0.048	-0.178**
	[0.084]	[0.081]	[0.082]	[0.098]	[0.080]	[0.214]	[0.132]	[0.084]
t-10	-0.072	-0.065	-0.065	-0.028	-0.167	0.23	0.117	-0.101
	[0.094]	[0.094]	[0.095]	[0.112]	[0.108]	[0.191]	[0.130]	[0.106]
Log of religion fractions	0.243***	0.242***	0.232***	0.196***	0.274***	0.06	0.197***	0.286***
	[0.075]	[0.075]	[0.075]	[0.065]	[0.087]	[0.095]	[0.071]	[0.092]
Fixed effects:								
_ product (SITC 5 digits)	yes	yes	yes	yes	yes	yes	yes	yes
_ year	yes	yes	yes	yes	yes	yes	yes	yes
Observations	673196	673196	673196	322151	308696	33021	103192	351045
R-squared	0.27	0.27	0.27	0.23	0.35	0.1	0.19	0.3

Robust Standard errors provided in brackets with clustering by exporter
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 8: Visas, Networks and US imports

	Model 1: Impact of incidents on business Visas allowance		**Model 2:** Impact of business visas allowance on US imports					
			Organized Exchange	Referenced Prices	Differentiated Products	Organized Exchange	Referenced Prices	Differentiated Products
	Product and year effects	***Within regression***	***Product and year effects***			***Instrumental Variables regression***		
	1	2	3	4	5	6	7	8
Constant	0.842***	0.057	-0.006	-0.18	-0.564**	-0.156	-0.05	-0.687***
	[0.119]	[0.049]	[0.150]	[0.133]	[0.215]	[0.160]	[0.135]	[0.200]
Log GDP exporter	0.807***	0.257	0.683***	0.543***	0.631***			
	[0.069]	[1.503]	[0.101]	[0.082]	[0.146]			
Log Weighted Distance	-1.471***		-0.837***	-0.319	0.515	-0.522**	-0.249	0.741***
	[0.185]		[0.284]	[0.231]	[0.378]	[0.219]	[0.183]	[0.274]
English Common Language	0.925***		0.138	0.083	-0.465	-0.046	0.041	-0.600*
	[0.149]		[0.286]	[0.220]	[0.341]	[0.298]	[0.214]	[0.355]
Log GDP per cap	0.07	1.072	-0.167*	0.019	-0.182	-0.189*	0.018	-0.181
	[0.094]	[1.463]	[0.096]	[0.084]	[0.142]	[0.110]	[0.085]	[0.138]
(1) * (2) Security proxy, based on incidents located in *third* countries	**-88.522***	**-76.182*****						
	[51.092]	**[26.398]**						
(1) * (2) Security proxy, based on incidents located in *country i*	**37.594***	**9.858**						
	[19.318]	**[9.234]**						
Log of number of B. visas			**-0.272****	**0.084**	**0.536*****	**-0.028**	**0.134***	**0.693*****
			[0.120]	**[0.087]**	**[0.130]**	**[0.077]**	**[0.069]**	**[0.155]**
Control variables	Military interstate Disputes (lagged over 10 years), Same governance than US		Military interstate Disputes (lagged over 10 years), Same governance than US, Civil war, Log of religion fractions			Military interstate Disputes (lagged over 10 years), Same governance than US, Civil war, Log of religion fractions		
Fixed effects:								
_ product (SITC 5 digits)	yes		yes	yes	yes	yes	yes	yes
_ year	yes	yes	yes	yes	yes	yes	yes	yes
_Product*Exporter		yes						
Anderson IV relevance test (Chi2)						49.66	16000	56000
Pvalue						[0.000]	[0.000]	[0.000]
Hansen overidentification test						2.95	2.83	4.08
Pvalue						[0.399]	[0.411]	[0.252]
Period	1997-2002	1997-2002	1997-2002	1997-2002	1997-2002	1997-2002	1997-2002	1997-2002
Observations	98953	98953	4184	13629	45027	4184	13629	45027
R-squared	0.76	0.13	0.07	0.11	0.29			

NB:1/ In VI regressions, Log of number of visas is instrumented by the security proxy variables based on incidents in third countries and orgin countries and the rest of variables in model 1

2/ Log GDP exporter has been moved to left hand side in Instrumental variable regressions as it was multicolinnear to Log of number of visas (VIF related to GDP=105 and VIF related to Log number of visas=99)

Robust Standard errors provided in brackets with clustering by exporter

* significant at 10%; ** significant at 5%; *** significant at 1%

Figure 1: Location of incidents across Origin, Target and Third Countries

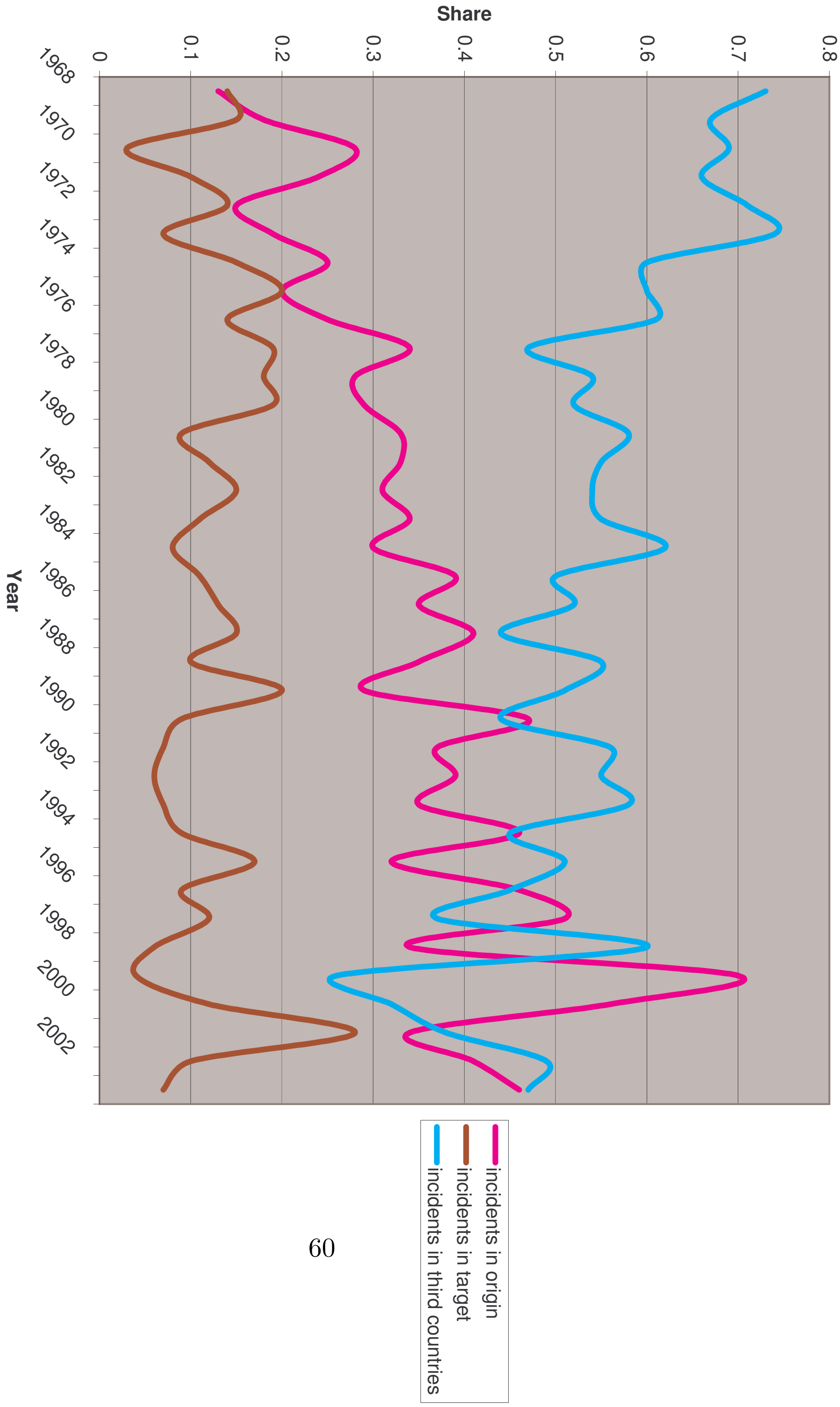


Figure 2: Terrorism incidents and the trade gap

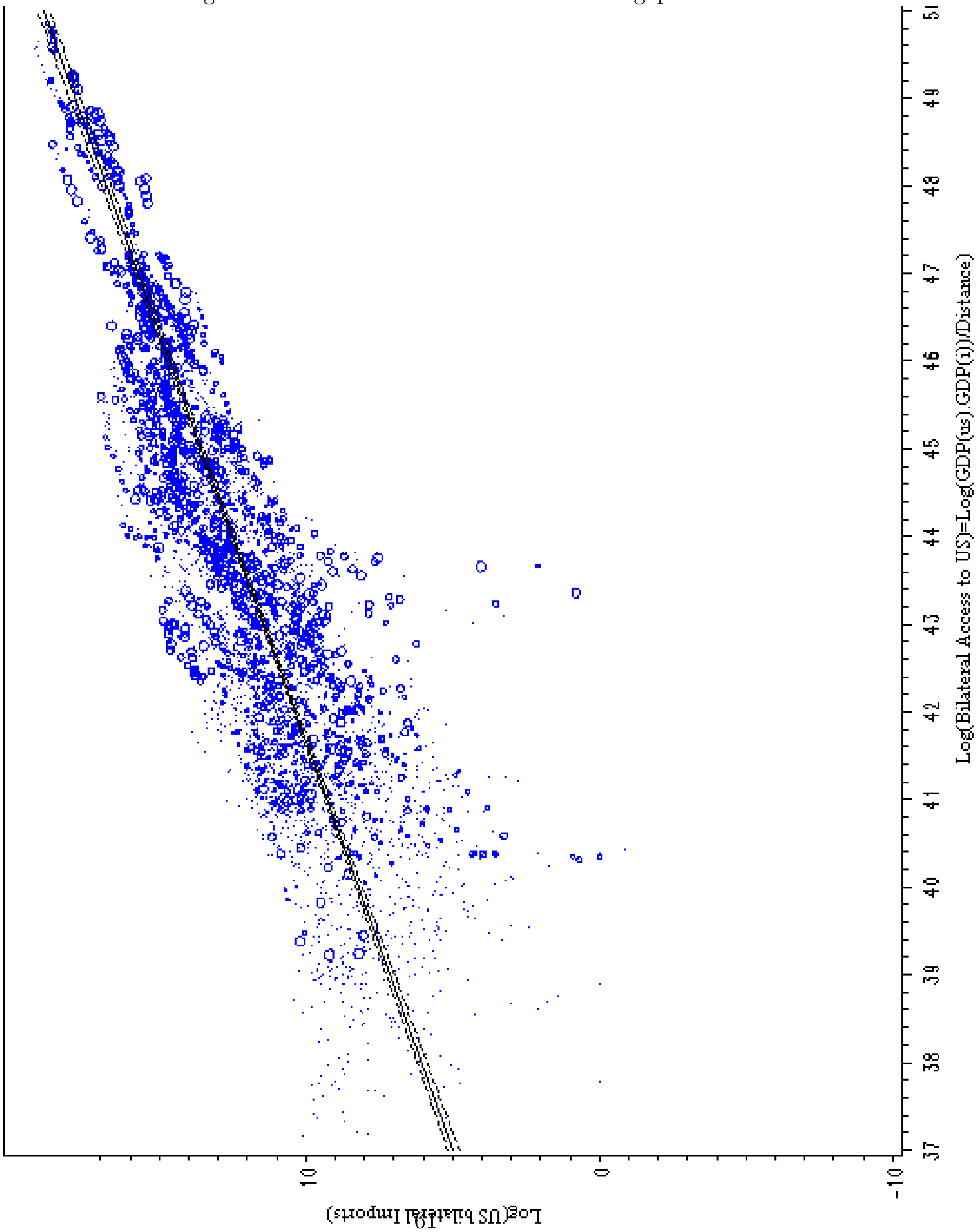
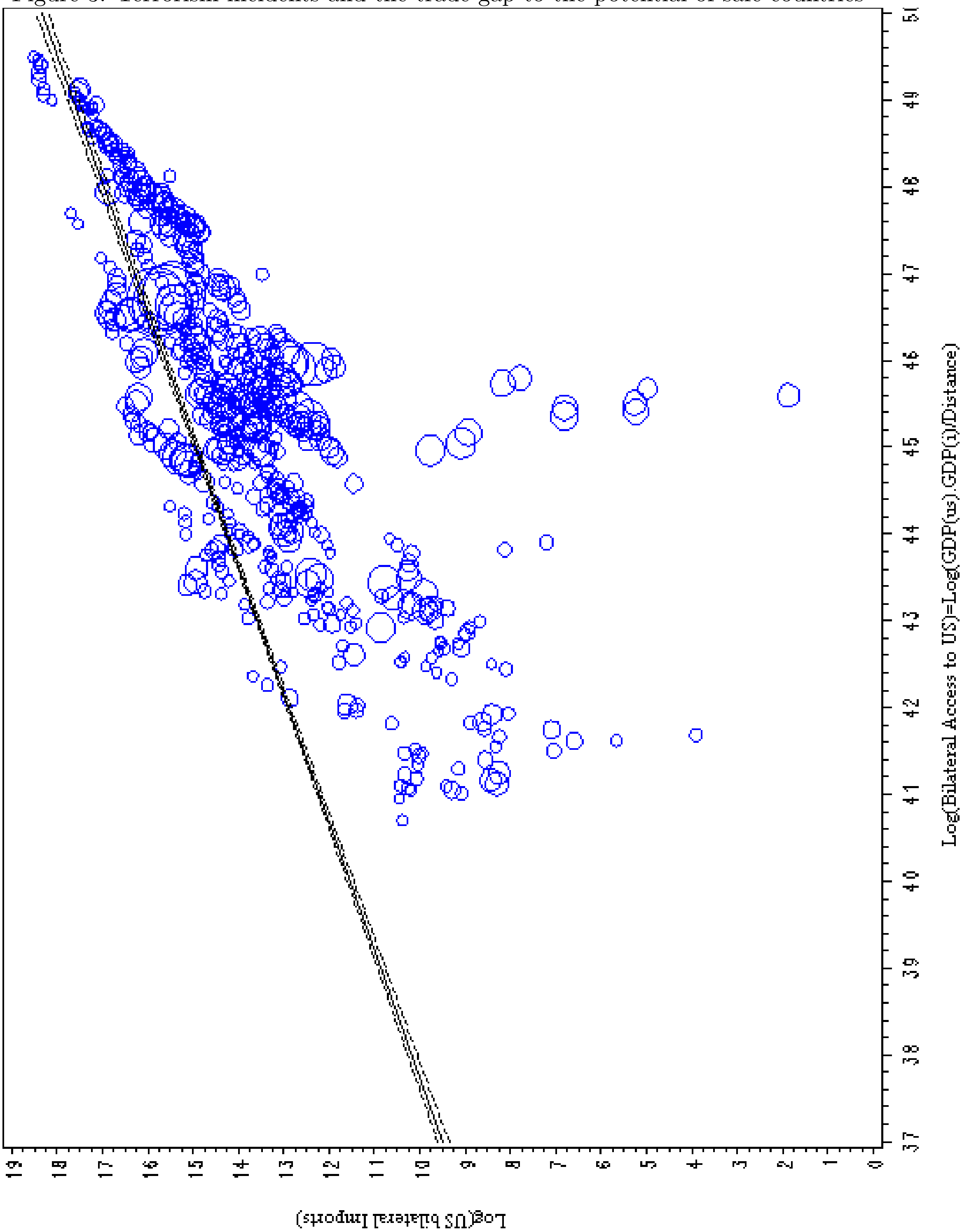


Figure 3: Terrorism incidents and the trade gap to the potential of safe countries



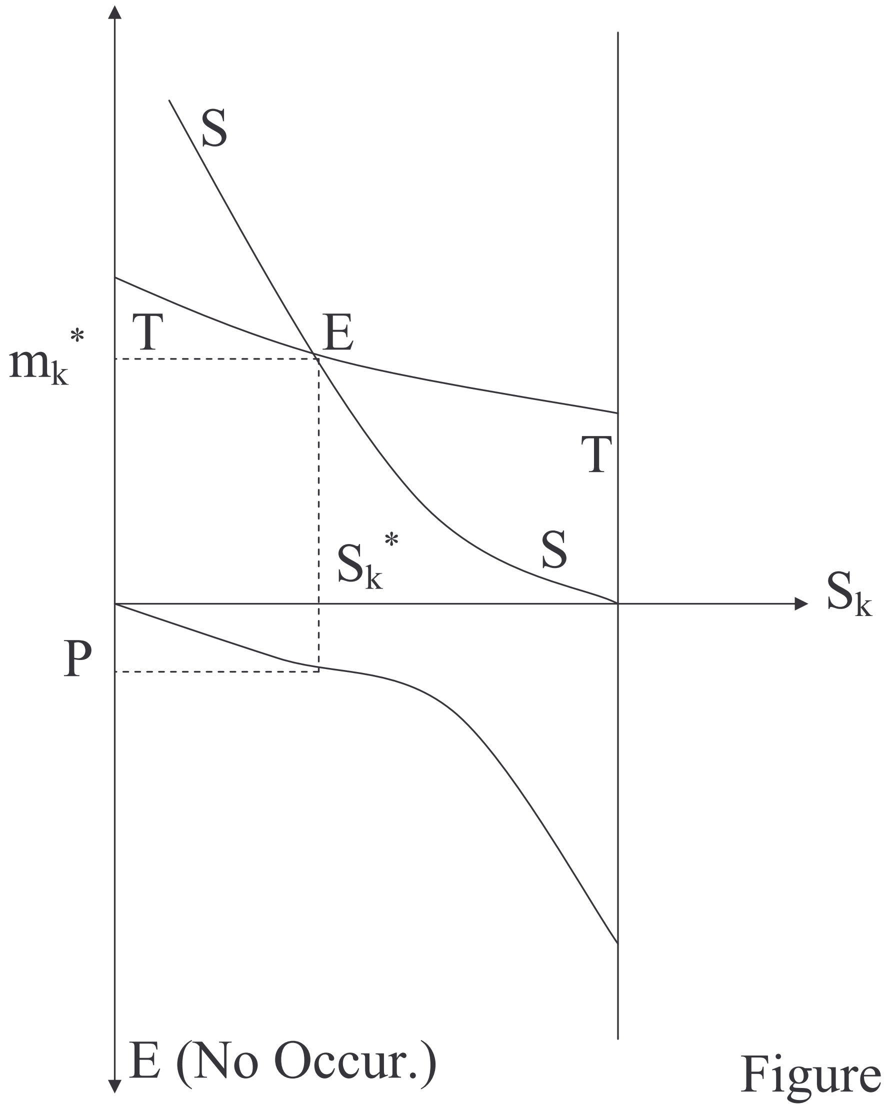


Figure 4

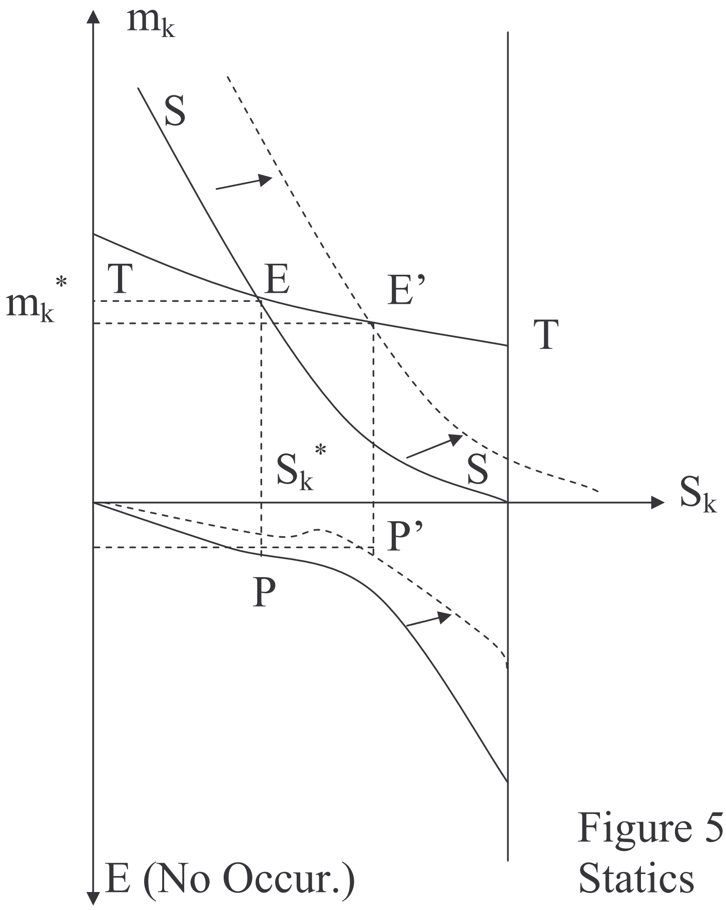


Figure 5a): comparative Statics

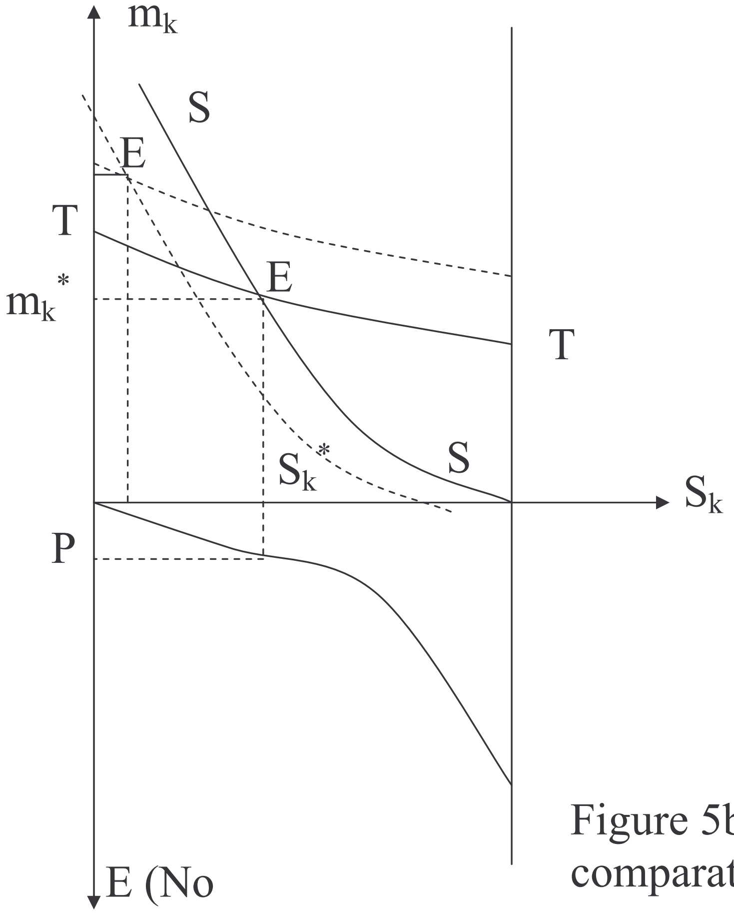


Figure 5b): comparative