HOW MUCH DOES VIOLENCE TAX TRADE?

S. BROCK BLOMBERG
GREGORY D. HESS

CESIFO WORKING PAPER NO. 1222
CATEGORY 7: TRADE POLICY
JUNE 2004

CESifo *Working Paper No. 1222*

How Much Does Violence Tax Trade?

Abstract

We investigate the empirical impact of violence as compared to other trade impediments on trade flows. Our analysis is based on a panel data set with annual observations on 177 countries from 1968 to 1999, which brings together information from the Rose [2004] dataset, the ITERATE dataset for terrorist events, and datasets of external and internal conflict. We explore these data with traditional and theoretical gravity models. We calculate that, for a given country year, the presence of terrorism, as well as internal and external conflict is equivalent to as much as a 30 percent tariff on trade. This is larger than estimated tariff-equivalent costs of border and language barriers and tariff-equivalent reduction through GSPs and WTO participation.

JEL Classification: E6, H1, H5, D74, O11.

Keywords: trade, conflict, terrosism.

S. Brock Blomberg
Department of Economics
Claremont McKenna College
500 E. 9th Street – Bauer Center
Claremont, CA 91711
USA
bblomberg@mkenna.edu

Gregory D. Hess
Department of Economics
Claremont McKenna College
500 E. 9th Street – Bauer Center
Claremont, CA 91711
USA
ghess@mkenna.edu

1 Introduction

What are the major impediments to trade and what can be done to remove them? In a recent and controversial paper, Andrew Rose (2004) asserts that "while theory, casual empiricism, and strong statements abound, there is, to my knowledge, no compelling empirical evidence showing that the GATT/WTO has actually encouraged trade." Several researchers have re-examined this finding, but the general thrust of Rose's view is well taken – what are the trade creating and trade destroying factors that affect world trade?[1]

This question is our paper's focal point but with a twist. The purpose of our paper is to calculate the economic cost of *violence* on trade and compare it to the economic cost of other trade barriers to see which is larger in magnitude. We assert that world peace is an important consideration to trade and one that may actually provide a larger impact than even bilateral trade pacts. Using data from 177 countries over more than 30 years, we find that peace has a strong statistical and economic impact on trade. We estimate the impact of peace to be greater than the impact from either multilateral or bilateral trade agreements emanating from WTO membership or from generalized set of preferences (GSPs). Moreover, the negative impact of conflict is greater than language and border effects. These results are robust across regions, time and country income groups.

Estimating the trade costs of conflict has received less attention in the economic literature relative to the vast literature on the economic benefits to tariff reduction and non-tariff barrier reduction.[2] There is, however, a growing body of literature which explores how conflict impacts economies through two channels– a domestic channel and a globalization (i.e. trade) channel.

[1]For example, Subramanian and Wei (2004) have shown that the death of WTO as a trade promotion device may be overstated, as they demonstrate that the WTO can improve trade strongly but unevenly.

[2]For examples of the benefits to lowering trade barriers see among others, Anderson (1979) who championed use of the gravity equation from different structural models, including Ricardian models, Heckscher-Ohlin (H-O) models, and increasing returns to scale (IRS) models. See also Eaton and Kortum (2002).

While the purpose of this paper is to concentrate on analyzing the globalization channel, it is first instructive to consider the domestic channel.[3] The domestic channel is a basic story of economic allocation. That is if the government spends more on the military to quell or to create conflict, consumption and/or investment may in turn be crowded out. One consequence of the decrease in investment would be a decline in future economic growth.[4]

Recently, Blomberg, Hess and Orphanides (2004), investigate the impact of various forms of conflict such as terrorism, internal wars and external wars on a country's economic growth. They find that, on average, the incidence of terrorism may have an economically significant negative effect on growth, albeit one that is considerably smaller and less persistent than that associated with either external wars or internal conflict. Terrorism is associated with a redirection of economic activity away from investment spending and towards government spending. They also find that the impacts are largest in Africa and amongst non-democratic states.

A second channel by which economic prosperity is affected by conflict is the globalization channel. The traditional view of the globalization channel is that violence harms the real economy in the same manner as any trade cost. In this case, external conflict, internal conflict, or an international terrorist attack leads to a fall in trade thereby leading to a decline in aggregate activity and a fall in output. Put differently, an increase in terrorism in country A increases the cost to doing business with country A so that country B will either purchase goods or services domestically or from another more peaceful country. Thus, violence acts as a distorting tax or tariff that limits the attainment of the benefits from free trade.

Anderson and Marcouiller (2002) have pursued this angle employing corruption and imper-

[3]There is also the issue of how economic activity affects a nation's proclivity towards violence – see Hess and Orphanides (1995, 2001a,b) and Blomberg Hess and Thacker (2004).

[4]Of course, other factors could reduce growth. The rise in uncertainty from a conflict could make households and firms reduce spending, the nations's productive capacity could be directly affected – e.g. see Blomberg (1996).

fect contract enforcement as impediments to international trade. They find that omitting indexes of institutional quality obscures the negative relationship between per capita income and the share of total expenditure devoted to traded goods. Their paper, however, does not consider direct measures of conflict.[5] In a complementary study to ours, Glick and Taylor (2004) do consider the direct effect of very large external wars on trade from a broader historical perspective. However, they do not consider the effect of terrorism and internal wars on international trade., and the cost to their analysis of a longer time period is that it reduces the number of countries for which there is available data.

Our paper investigates the globalization channel by directly analyzing the impact of *all* types of conflict on trade. We employ the workhorse trade model – the gravity model – to determine the economic benefit of peace. We estimate both a traditional and a theoretical gravity model to determine the cost of conflict. We divide conflict into several sub-categories to isolate the individual impacts from terrorism (**T**), external war (**E**), revolutions (**R**) and inter-ethnic fighting (**IF**) on trade. Furthermore, we also analyze the aggregate effect of conflict on trade by using factor analysis to create a synthetic measure of violence (**TERIF**). In summary, we find that, in total, violent conflict is a larger impediment to trade than traditional tariff barriers. This result should refocus policymakers attention to encourage peace as a trade-promoting device to improve economic welfare.

2 The Data and Basic Empirical Regularities

We combine data from five different sources for our project. First, the trade data is obtained from Rose (2004). This is a bilateral data set on trade flows from 1948 to 1999 that has approximately two hundred thousand dyadic observations.

[5]Nitsch and Schumacher (2004) also analyze some aspects of conflict's impact on trade but over a significantly shorter time horizon.

The data we use for organized violence comes from three different individual sources and is given in country year form which we then convert to dyadic form.[6] There are four main sources of organized violence that we consider: The first is Terrorism (**T**), which is adopted from the ITERATE data set – see Mickolus (1993). In order to be considered an international/transnational terrorist event, the definition in ITERATE is as follows:

> "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. " (page 2)

The ITERATE project began as an attempt to quantify characteristics, activities and impacts of transnational terrorist groups. The data set is grouped into four categories. First, there are incident characteristics which code the timing of each event. Second, the terrorist characteristics yield information about the number, makeup and groups involved in the incidents. Third, victim characteristics describe analogous information on the victims involved in the attacks. Finally, life and property losses attempt to quantify the damage of the attack. Following Blomberg, Hess and Orphanides (2004), since we cannot control for the significance of individual events, we define a dummy variable **T** which takes the value 1 if a terrorist event is recorded for either country in a given dyad country year pair. This measure also has the advantage of defining the incidence of terrorism in a manner comparable to the incidence of other forms of conflict in the data set.[7]

The second type of conflict we consider is External conflict (**E**), which is the initiation or escalation of a foreign policy crisis that results in violence. A foreign policy crisis is defined by

[6] See the Data Appendix for more details.

[7] In Blomberg, Hess and Orphanides (2004) we demonstrate that the effects of terrorism on growth are similar if we use the number of incidents-per-capita in a given year as a measure of the incidence of terrorism.

Brecher, Wilkenfeld and Moser (1988) as:

> "a specific act, event or situational change which leads decision-makers to perceive a threat to basic values, time pressure for response and heightened probability of involvement in military hostilities. A trigger may be initiated by: an adversary state; a non-state actor; or a group of states (military alliance). It may be an environmental change; or it may be internally generated." (page 3)

Based on these criteria, we code **E** to equal one if an external conflict is recorded for either country involved in the same dispute in a given dyad country year pair. Such a definition is also used in Hess and Orphanides (1995,2001a,b), Blomberg, Hess and Weerapana (2004), and Blomberg, Hess and Orphanides (2004).

Data for Revolutions (**R**) and Interethnic Fighting (**IF**) are obtained from Gurr *et al* (2003). Revolutionary conflict (**R**) is defined as conflict between the government and politically organized groups seeking to overthrow those in power. Groups include political parties, labor organizations, or parts of the regime itself. Note that for these internal conflicts to be considered, more than 1,000 individuals had to be mobilized and 100 fatalities must have occurred. An example of such a conflict would be the Chinese Tiananmen Square massacre of 1989. Again, **R** takes the value 1 if a revolution event is recorded for either county in a given dyad country year pair.

Inter-ethnic Fighting and Genocide, denoted (**IF**), is defined to include the execution, and/or consent of sustained policies by governing elites or their agents that result in the deaths of a substantial portion of a communal group (genocide) or a politicized non-communal group (politicide). The victims counted are non-combatants and the percentage of those killed in each group is given more weight than the number of dead. **IF** takes the value 1 if an inter-ethnic fighting or genocide event is recorded for either county in a given dyad country year pair.

Finally, in an attempt to capture the broad features of all the types of conflict in our data,

we construct a synthetic measure of violence from the principle components of the underlying factors of violence. Such a method has been used in other contexts in cross-country analysis such as Kaufman et al (2000). Specifically, we create a measure of **TERIF** that is obtained from the largest principal component from a principal components model that is a linear combination of **T**, **E**, **R** and **IF**. In short, the first principal component explains the largest fraction of the variation in the underlying data and hence we focus on that as our synthetic measure of the dyad's overall measure of latent conflict. Formally, let $\mathbf{TERIF}_{ijt}$ represent dyad ij's unobserved level of terror from j factors **T**, **E**, **R**, and **IF**, so that:

$$\text{TERIF}_{ijt} = \alpha_1 \cdot \text{T}_{ijt} + \alpha_2 \cdot \text{E}_{ijt} + \alpha_3 \cdot \text{R}_{ijt} + \alpha_4 \cdot \text{IF}_{ijt} + \epsilon_{ijt} \tag{1}$$

Therefore, using this principle components model, we estimate **TERIF** by employing information from our four different measures of conflict **T**, **E**, **R** and **IF**. The model optimally selects one factor with the relevant output given below. From this analysis, the factor **TERIF** is given as

$$TERIF_{ijt} = .41873 * N(T_{ijt}) + .04526 * N(E_{ijt}) + .58256 * N(R_{ijt}) + .50414 * N(IF_{ijt}) \tag{2}$$

where $N(.)$ standardizes the variable T,E,R,IF to be standard normal. Given the relative frequencies of each underlying factor, it is not surprising that there is more weight associated with T, R, IF versus E.

In summary, we have constructed various measures of violence to include terrorism (**T**), external conflict (**E**), revolutions (**R**), inter-ethnic fighting (**IF**) and an amalgam measure (**TERIF**). The basic cross-national and time properties of conflict have been well documented in Blomberg, Hess and Orphanides (2004) but are given in the appendix in Tables A1-A4. There are four main facts shown in the violence data. First, terrorism occurs more frequently than other forms of violence, with the greatest incidence occurring in the Americas and Europe.[8] But before concluding

[8]This is partly due to the fact that terrorism is measured rather crudely in ITERATE and partly due to the fact

that there is a causal relationship between rich democracies and terrorism, it is worth noting that two of the highest incidence countries, France and Germany, are located geographically, politically and economically close to Nordic countries such as Sweden, Norway and Finland with virtually no terrorism. Hence, the relationship is not straightforward.

Second, other forms of internal conflict (**R** and **IF**) have been most persistent in non-democratic regimes and in low-income countries. A possible suggested interpretation is that many non-democratic and/or low-income countries are inundated with internal strife and that conflict may explain, in large part, why certain countries fail to advance.

Third, external wars are a much less frequent event largely due to the high cost of waging a war with border state. This is possibly why others such as Blomberg, Hess and Orphanides (2004) find it has the largest negative impact on growth. *Ceteris paribus*, a shock from external war is less frequent but extremely harmful to an economy.[9]

Fourth and perhaps most interestingly for this paper, violence is falling (or at least it was) for the last part of the time sample. This is best shown in Figure 1. This figure depicts the sum of average incidence for each country of **T**, **E**, **R**, **IF** from 1968 to 1999.[10] Notice there is an increase in the trend of violence until the early 1990s when there is a large downward swing.[11] This is noteworthy because trade tends to rise precisely at the same time. There are a variety of possible explanations for this but one would be the general democratization and realignment in a post-Cold War world. As countries have moved to more peaceful postures both internally and externally, trade has improved as the cost of doing business has fallen. It is important to note that this swing

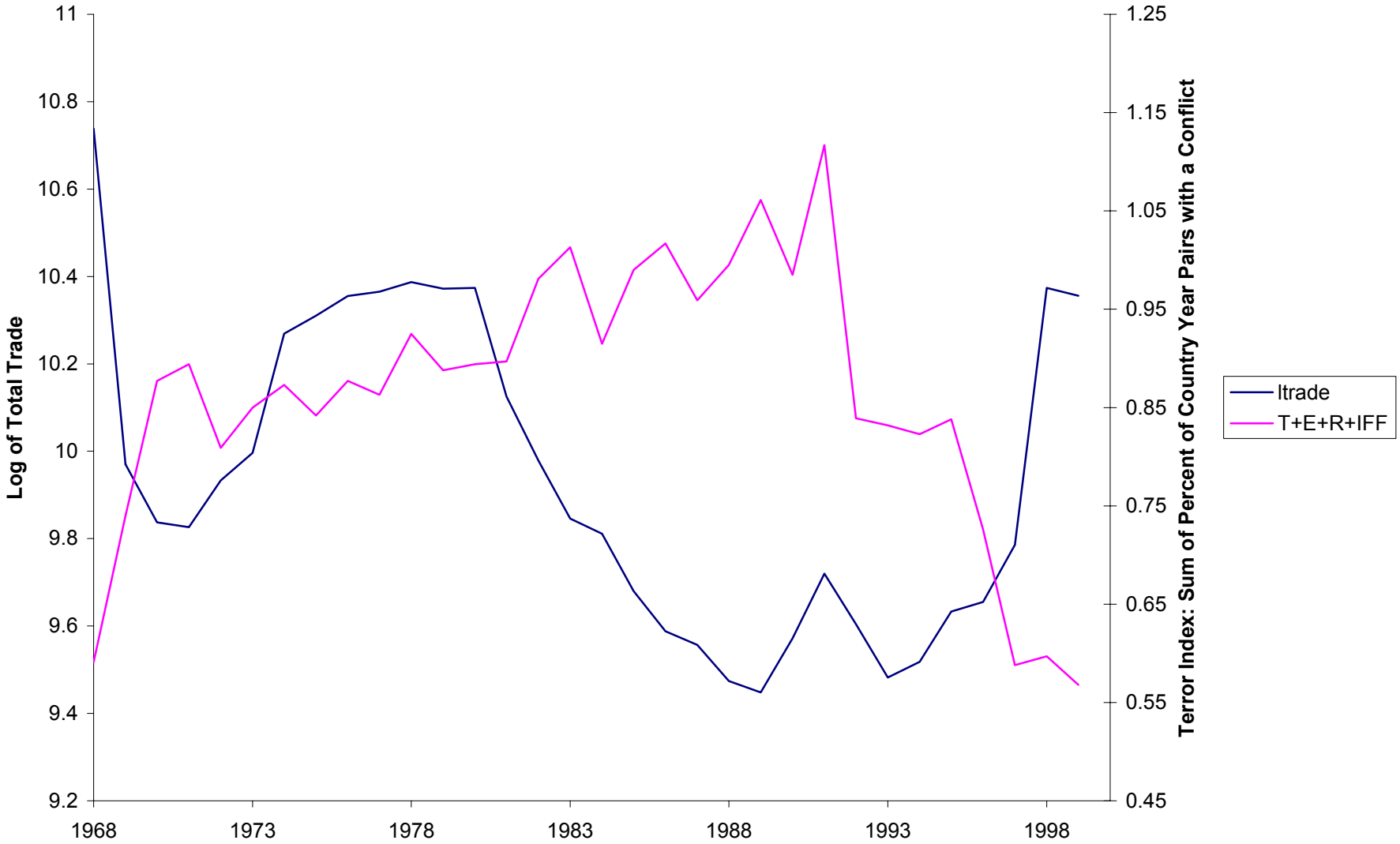
that a terrorist event is a relatively low cost proposition for most insurgents.

[9]Due to its infrequent nature, however, external conflict's impact on economic activity is not always precisely estimated.

[10]The general dynamic of the sum is practically identical to the factor **TERIF** once **TERIF** is aggregated across countries.

[11]Enders and Sandler (2004) show that there is no statistical increase in terrorism post 9-11. If anything, they show that there is a decline in hostage taking in the 1990s.

Figure 1: Time Series Averages of Terror and Trade over 177 countries



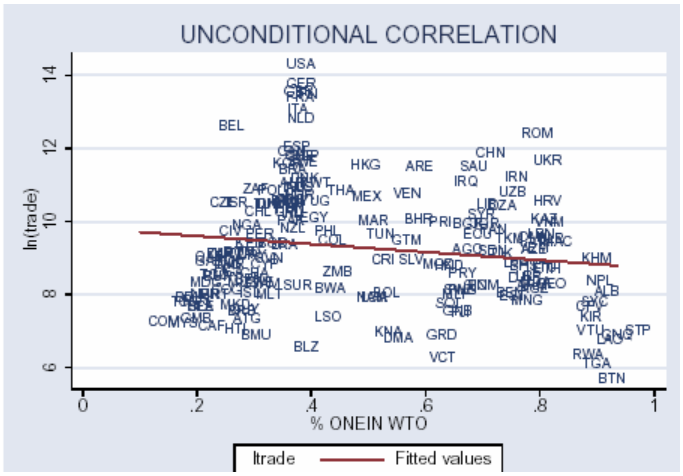
has occurred at a distinct point and time whereas other international movements to encourage trade such as WTO ascension etc. have been more gradual in nature. Hence, this suggests that peace, rather than statutory promotion, appears to play an important role in encouraging trade.

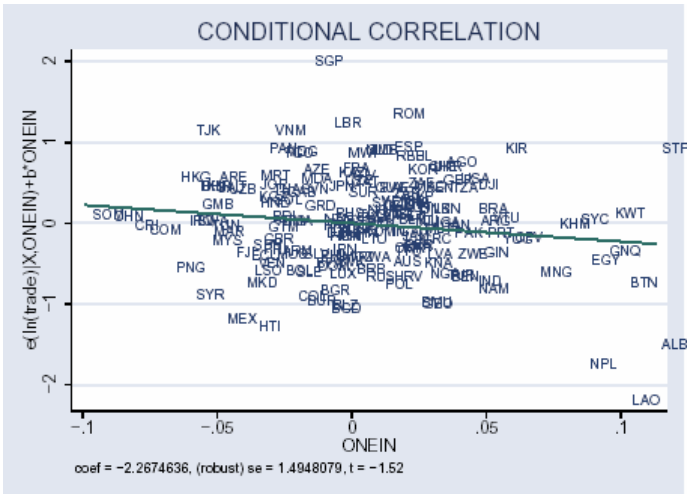
To investigate these points further, in Figures 2A and 2B we provide several unconditional and conditional cross-country scatter plots to understand better the gross features of trade, trade promotion and conflict. Figure 2a demonstrates these relationships in a cross-section by averaging trade (the vertical axis) and trade promotion (the horizontal axis) from 1968 to 1999. **ONEIN** denotes that one country is a member of the **WTO**, **BOTHIN** denotes that both are, and **GSP** denotes whether the countries have a generalized system of preferences arrangement. Each point on the figure reflects the dyadic variables time average. The unconditional correlation is a simple scatter plot whereas the conditional correlation is a partial correlation mapped directly from a traditional gravity model (as described in the next section– see equation (3). Figure 2A validates the results in Rose (2004) by showing that, WTO membership does not help trade, and if anything reduces trade. On the other hand, GSPs do tend to encourage trade in both the conditional and unconditional plots.

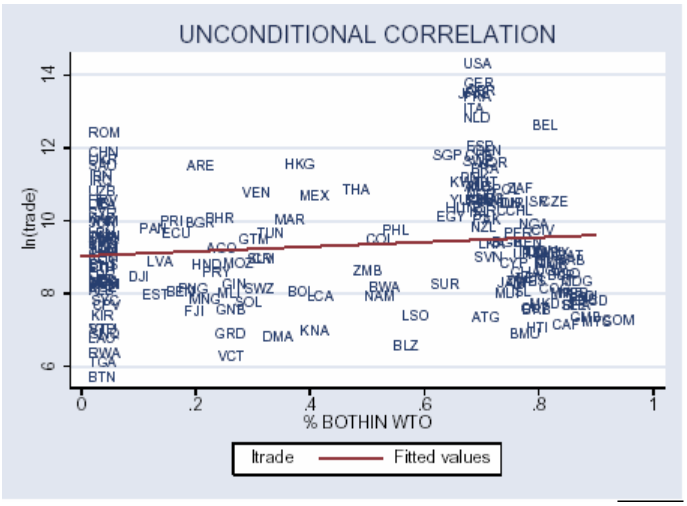
Figure 2B provides cross-country plots of trade (the vertical axis) and measures of conflict (the horizontal axis). Here we simply measure violence by a rank ordering of countries by violence (e.g. **T**, **R** and **TERIF**) as the regressor.[12] In this case, paradoxically, violence tends to be **positively** related to trade in the unconditional model. However, such analysis is impressionistic since it excludes many factors such as colonization, income, etc are not included in the unconditional distribution. Once these factors have been accounted for, we see something quite different. Importantly, the conditional plots demonstrate negative impacts of violence on trade in each case. Moreover the impact is statistically significant for **R** and **TERIF** even though these effects may

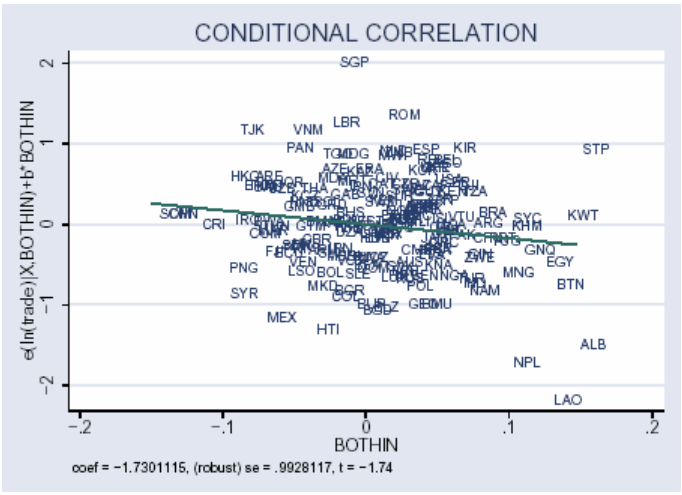
[12]Similar plots can be shown with **E** and **IF** but are not reported here to reduce clutter.

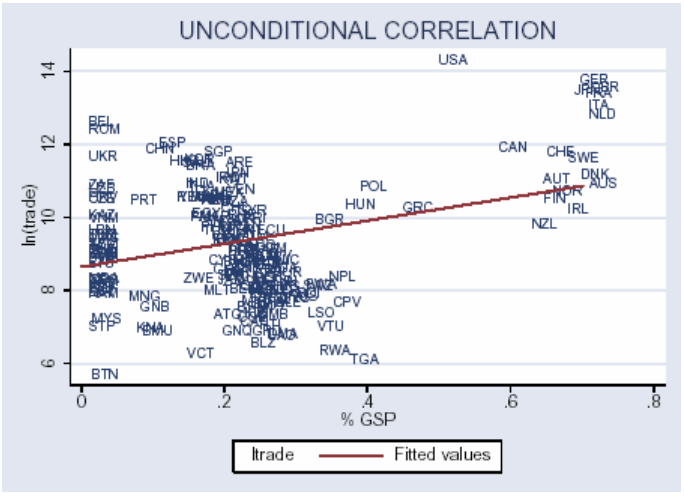
Figure 2a: The Impact of Trade Promotion on Trade











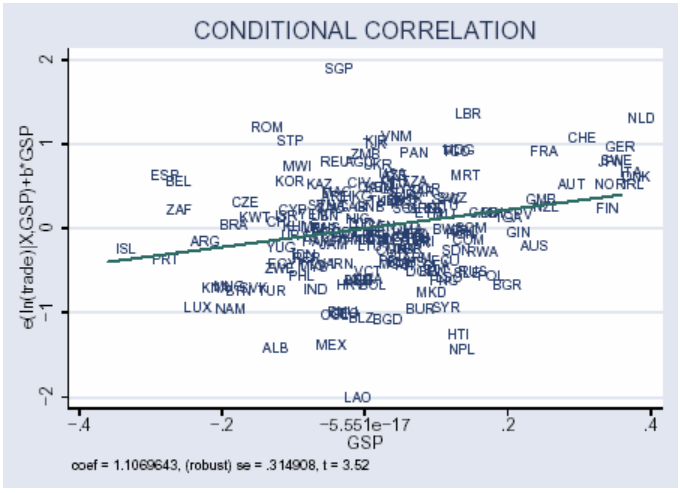
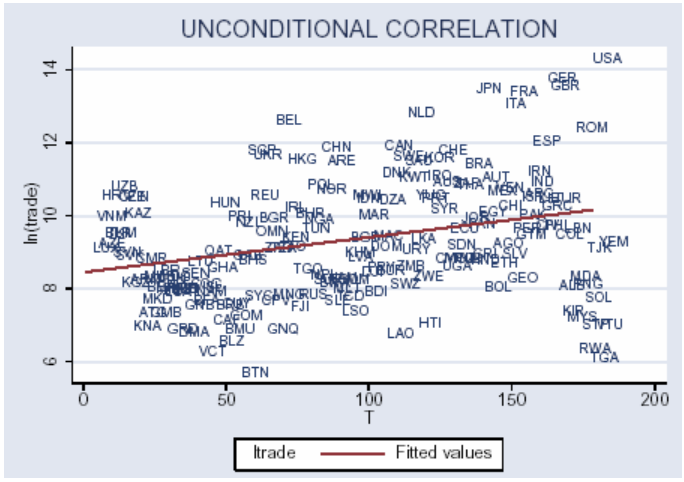
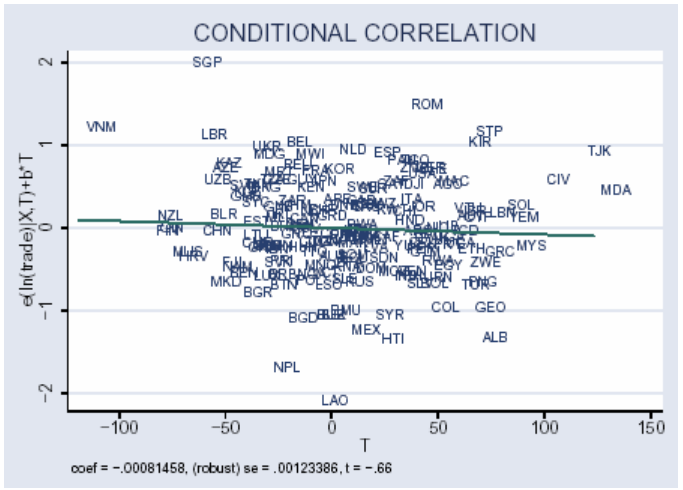
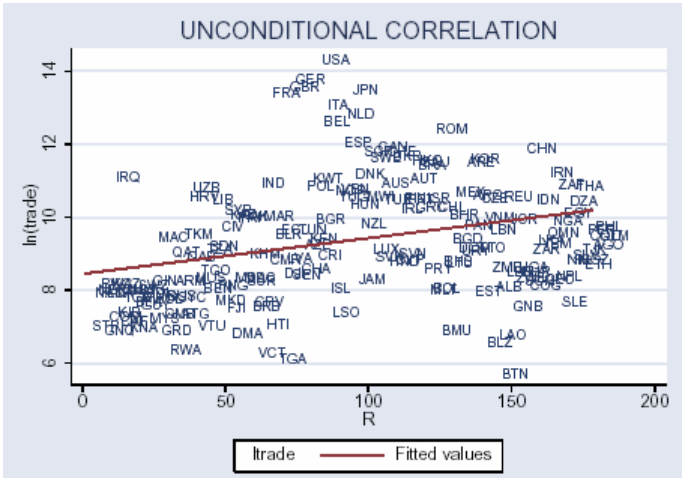
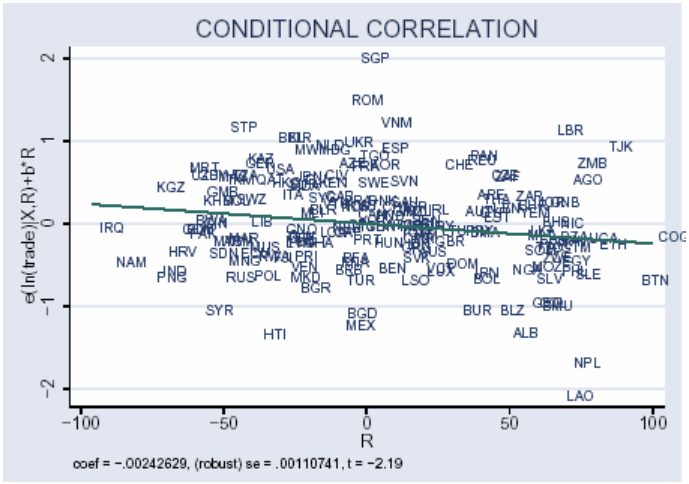


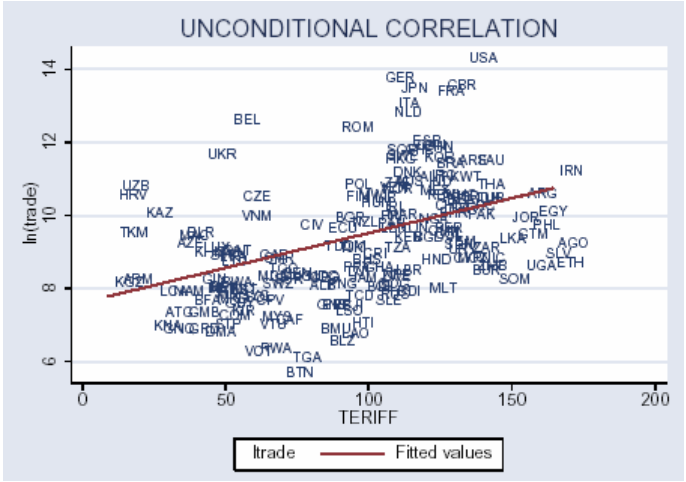
Figure 2b: The Impact of Violence on Trade

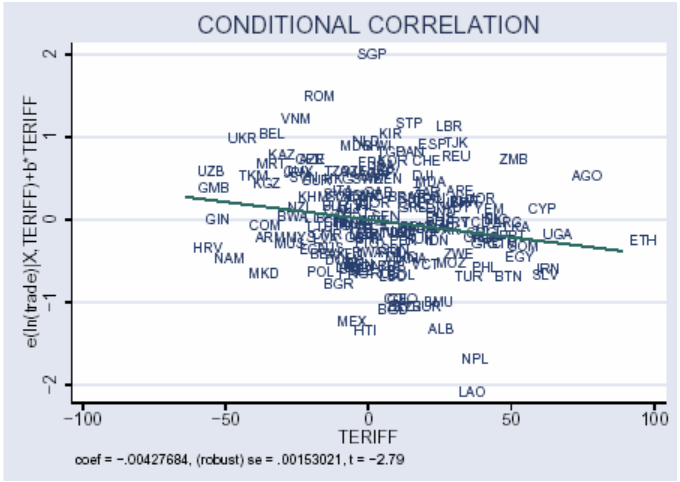












be diminished due to time averaging.

To summarize, there appears to be a negative relationship between violence and trade both in the time domain (Figure 1) and across countries (Figures 2A and 2B). In the following section, we attempt to sort out these effects of violence on trade.

3 Empirical Specification and Results

This section of the paper analyzes the empirical effect of violence on bilateral international trade. We first examine the impact of violence on trade for the traditional gravity model and then for the theoretical gravity model. We then turn to evaluating the tariff like impact of violence on trade and then to demonstrating the robustness of our findings.

We begin our investigation of the effect of violence on trade with a traditional gravity model of trade that is a conventional device used to estimate determinants of trade based on geography and history. Such a work-horse model incorporates how similar borders and histories are important in determining trade between any two countries. Formally, the empirical specification of our augmented traditional gravity model is:

$$
\begin{aligned}
ln(X_{ijt}) = \beta_0 + \beta_1 \cdot \text{LDIST}_{ij} + \beta_2 \cdot ln(\text{RGDP}_{it} \times \text{RGDP}_{jt}) + \beta_3 \cdot ln\left(\frac{\text{RGDP}_{it} \times \text{RGDP}_{jt}}{\text{POP}_{it}\text{POP}_{jt}}\right) \quad (3) \\
+ \beta_4 \cdot \text{COMLANG}_{ij} + \beta_5 \cdot \text{BORDER}_{ij} + \beta_9 \cdot \text{COMCOLONY}_{ij} + \beta_{10} \cdot \text{CURCOLONY}_{ij} \\
+ \beta_{11} \cdot \text{COLONY}_{ij} + \beta_{12} \cdot \text{COMCUR}_{ijt} + \beta_{13} \cdot \text{REGIONAL}_{ijt} + \phi \cdot \mathbf{Z} + \gamma_1 \cdot \text{BOTHIN}_{ijt} \\
+\gamma_2 \cdot \text{ONEIN}_{ijt} + \gamma_3 \cdot \text{GSP}_{ijt} + \delta \cdot VIOLENCE_{ijt} + \varepsilon_{ijt}
\end{aligned}
$$

where i, j denote trading partners i and j and t denotes time. The economic variables are defined as: X is the average value of real bilateral trade (exports+imports)/GDP, RGDP is real Gross

Domestic Product, POP is population, and LDIST is the natural log of distance between two countries[13]. The descriptive and geographic variables are defined as: COMLANG is a dummy variable which is 1 if countries have a common language and 0 otherwise, COLONY is a dummy variable which is 1 if countries were ever colonies before 1945, CURCOLONY a dummy variable which is 1 if countries were colonized by the given year, COMCUR is a dummy variable which is 1 if both countries use the same currency, BORDER is a dummy variable for whether the countries share a border, REGIONAL is a dummy variable which is 1 if both countries belong to the same regional trade agreement, and **Z** is a vector of a comprehensive set of time and dyad fixed effects [14]. The trade variables are defines as: BOTHIN is a dummy variable which is 1 if both countries are members of WTO, ONEIN is a dummy variable which is 1 if one country is a member of WTO, and GSP is a dummy variable which is 1 if both countries are a part of a GSP. VIOLENCE is a measure of organized violence that can include Terrorism (**T**), External War (**E**), Revolution and Coups (**R**), Inter-ethnic Conflict and Genocide (**IF**), while **TERIF** is the principle component from the Factor model described above.[15]

Table 1 presents a comprehensive set of regression results for the traditional gravity model. The results in the first column generally replicate those in Rose (2004). There are four noteworthy elements of this baseline specification. First, is that all the standard control variables for common language, common currency, colonial status, distance, etc ... are of the expected sign and are statistically significant. Second, the income terms are also of the expected sign (positive) and statistically significant. Third, that the presence of a regional trade agreement and a generalized system of trade preferences (GSP) raises bilateral trade and does so in an economically and statistically significant

[13] As in Rose (2004), this is measured as the average value of bilateral trade from country i to j from FOB exports and CIF imports deflated by the United States' CPI.

[14] Of course, when these dyad fixed effects are included, other variables such as BORDER and others cannot separately be estimated.

[15] These variables are coded such that the dummy variables are equal to one if either country has experienced an episode of violence of a certain type. This issue is examined further in Table 4 below.

Table 1: Panel Regression: Trade and Violence using Traditional Gravity Model

	1 Rose	2 C.E.	3 T	4 E	5 R	6 IF	7 ALL	8 TERIF	9 D.E.	10 Y.E.
BOTHIN	-0.119***	0.330***	0.319***	0.330***	0.310***	0.318***	0.293***	0.293***	0.190***	0.063***
	[0.023]	[0.033]	[0.033]	[0.033]	[0.033]	[0.033]	[0.033]	[0.033]	[0.025]	[0.023]
ONEIN	-0.084***	0.147***	0.144***	0.147***	0.138***	0.143***	0.132***	0.132***	0.090***	0.016
	[0.024]	[0.026]	[0.026]	[0.026]	[0.026]	[0.026]	[0.026]	[0.026]	[0.023]	[0.023]
GSP	0.719***	0.512***	0.515***	0.512***	0.514***	0.514***	0.518***	0.519***	0.119***	0.770***
	[0.010]	[0.012]	[0.012]	[0.012]	[0.012]	[0.012]	[0.012]	[0.012]	[0.016]	[0.010]
LDIST	-1.195***	-1.403***	-1.403***	-1.403***	-1.403***	-1.403***	-1.403***	-1.403***		-1.185***
	[0.007]	[0.008]	[0.008]	[0.008]	[0.008]	[0.008]	[0.008]	[0.008]		[0.007]
LN(RGDP)	0.847***	0.080***	0.088***	0.080***	0.100***	0.076***	0.100***	0.098***	0.402***	0.854***
	[0.002]	[0.014]	[0.014]	[0.014]	[0.015]	[0.014]	[0.015]	[0.015]	[0.011]	[0.002]
LN(RGDP/POP)	0.439***	0.388***	0.380***	0.388***	0.363***	0.391***	0.362***	0.365***	0.114***	0.448***
	[0.004]	[0.019]	[0.019]	[0.019]	[0.019]	[0.019]	[0.019]	[0.019]	[0.014]	[0.004]
REGIONAL	1.131***	1.288***	1.279***	1.289***	1.283***	1.285***	1.274***	1.273***	0.365***	1.297***
	[0.029]	[0.035]	[0.035]	[0.035]	[0.035]	[0.035]	[0.035]	[0.035]	[0.048]	[0.030]
CUSTRICT	1.134***	1.179***	1.179***	1.179***	1.182***	1.179***	1.181***	1.181***	0.498***	1.044***
	[0.043]	[0.047]	[0.047]	[0.047]	[0.047]	[0.047]	[0.047]	[0.047]	[0.073]	[0.041]
COMLANG	0.321***	0.290***	0.289***	0.290***	0.290***	0.289***	0.289***	0.289***		0.301***
	[0.013]	[0.015]	[0.015]	[0.015]	[0.015]	[0.015]	[0.015]	[0.015]		[0.013]
BORDER	0.438***	0.383***	0.382***	0.386***	0.383***	0.382***	0.385***	0.383***		0.438***
	[0.027]	[0.027]	[0.027]	[0.027]	[0.027]	[0.027]	[0.027]	[0.027]		[0.027]
COMCOL	0.615***	0.554***	0.553***	0.554***	0.553***	0.554***	0.553***	0.553***		0.686***
	[0.021]	[0.023]	[0.023]	[0.023]	[0.023]	[0.023]	[0.023]	[0.023]		[0.021]
CURCOL	1.710***	0.560***	0.567***	0.560***	0.566***	0.559***	0.570***	0.570***	0.136	1.324***
	[0.118]	[0.109]	[0.109]	[0.109]	[0.107]	[0.109]	[0.107]	[0.107]	[0.144]	[0.110]
COLONY	1.467***	1.269***	1.270***	1.269***	1.268***	1.269***	1.268***	1.269***		1.408***
	[0.025]	[0.023]	[0.023]	[0.023]	[0.023]	[0.023]	[0.023]	[0.023]		[0.024]
T			-0.076***				-0.066***			
			[0.011]				[0.011]			
E				-0.358			-0.326			
				[0.219]			[0.218]			
R					-0.208***		-0.183***			
					[0.020]		[0.020]			
IF						-0.178***	-0.148***			
						[0.023]	[0.023]			
TERIF								-0.084***	-0.089***	-0.043***
								[0.006]	[0.004]	[0.005]
Obs	199228	199228	199228	199228	199228	199228	199228	199228	199228	199228
R-squared	0.62	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.05	0.64

Notes: Robust standard errors are presented in parentheses. $***$, $**$ and $*$ represent statistical significance at the .01, .05 and .10 levels, respectively. The results in this table are estimated from equation (1) for 177 countries from 1968 to 1999. Models (2) through (8) include country fixed effects. Models (1) through (10) are the basic gravity model adding separately the different forms of terror, i.e. terror index (TERIF) terrorism (T), external wars (E), Revolutions (R) and Interethnic Fight or Genocides (IFF). Model (9) includes only dyad fixed effects and Model (10) includes only year fixed effects.

way. However, as emphasized by Rose (2004), membership in the WTO is statistically significant but with the incorrect sign: namely, membership by one country or both countries in the WTO lowers trade. As noted by Subramanian and Wei (2004), however, the results in column 2 of Table 1 demonstrate that when one includes country fixed effects, the sign of the coefficient on BOTHIN and ONEIN become positive rather than negative, and are statistically significant.

Beginning with column 3 of Table 1, we explore the direct effect of violence on bilateral trade. Columns 3 through 6 sequentially include our measures of terrorism, external conflict, revolutions and inter-ethnic fighting into the empirical specification and all four measures of conflict are included in the results in column 7. The results in these five columns, which include country fixed effects, demonstrate three key findings that will be shown to be robust throughout the remainder of our paper. First, conflict has a statistically significant and robust negative impact on bilateral trade flows. Second, different types of conflict have different negative impacts on trade. For example, a country that has a terrorist incident is associated with a 7.6 percentage point decline in bilateral trade. While this is an important effect, it is less than half as large as the negative impact on trade from external conflict and inter-ethnic conflict, which are associated with declines of -20.8 and -17.8 percentage points, respectively. Third, while external conflict is associated with a tremendous decline in trade, the estimate is not statistically significant. As noted in Blomberg, Hess and Orphanides (2004), the difficulty in estimating the impact of external conflict on economic activity is that external wars are infrequent, that many countries that have faced the greatest costs of external conflict (e.g. Afghanistan, Iraq, etc...) simply do not have reliable data, and that countries that get into external conflict with one another usually do not trade much with each other. The results in column 7, where all measures of violence are included, demonstrates remarkably similar findings to when each measure is included separately.

The results in columns 8 through 10 of Table 1 demonstrates the robustness of these findings on violence when we use our summary measure of violence from factor analysis, **TERIF**. The results in column 8 suggest that a one standard deviation shock to the **TERIF** indicator is associated with a -8.4 percentage point decline in bilateral trade. The results in column 9 demonstrate that this finding is robust to the inclusion of dyadic fixed effects.[16] Finally, the inclusion of time effects in column 10 weakens the finding on **TERIF**, though the estimate remains statistically and economically significant.

As an alternative to estimating the effects of violence on trade in a traditional gravity equation, one can estimate the theoretical counterpart of the above gravity equation, namely:

$$\begin{aligned} ln(X_{ijt}/(\text{RGDP}_{it} \times \text{RGDP}_{jt})) &= \beta_0 + \beta_1 \cdot \text{LDIST}_{ij} + \beta_4 \cdot \text{COMLANG}_{ij} \\ &+ \beta_5 \cdot \text{BORDER}_{ij} + \beta_9 \cdot \text{COMCOLONY}_{ij} + \beta_{10} \cdot \text{CURCOLONY}_{ij} + \beta_{11} \cdot \text{COLONY}_{ij} \\ &+ \beta_{12} \cdot \text{COMCUR}_{ijt} + \beta_{13} \cdot \text{REGIONAL}_{ijt} + \phi \cdot \mathbf{Z} + \gamma_1 \cdot \text{BOTHIN}_{ijt} + \gamma_2 \cdot \text{ONEIN}_{ijt} \\ &+ \gamma_3 \cdot \text{GSP}_{ijt} + \delta \cdot VIOLENCE_{ijt} + \varepsilon_{ijt} \end{aligned} \tag{4}$$

and include country dummies to control for multilateral resistance terms (see Fenstra (2002)). Notice that the restrictions on the traditional gravity equation (3) that produce the theoretical gravity equation are that $\beta_2 = 1$ and $\beta_3 = 0$.

Table 2 provides the estimation results for the impact of violence in a theoretical gravity model. The results in this table differ somewhat from those for the traditional gravity specification in Table 1. For instance, in all specifications, the measures of WTO participation, **BOTHIN** and **ONEIN**, both imply significantly lower bilateral trade. This is in keeping with Rose's (2004) findings, and it is clearly robust across all modifications to the specification in Table 2. Second,

[16] The dyadic fixed effects are not included in the calculation of the R-squared.

Table 2: Panel Regression: Trade and Violence Theoretical Model

	1 Rose	2 C.E.	3 T	4 E	5 R	6 IF	7 ALL	8 TERIF	9 D.E.	10 Y.E.
BOTHIN	-0.215***	-0.767***	-0.774***	-0.767***	-0.771***	-0.775***	-0.781***	-0.795***	-0.586***	-0.075***
	[0.024]	[0.030]	[0.030]	[0.030]	[0.030]	[0.030]	[0.030]	[0.030]	[0.024]	[0.023]
ONEIN	-0.120***	-0.400***	-0.400***	-0.400***	-0.401***	-0.404***	-0.403***	-0.409***	-0.292***	-0.044*
	[0.024]	[0.025]	[0.025]	[0.025]	[0.025]	[0.025]	[0.025]	[0.025]	[0.022]	[0.024]
GSP	1.008***	0.269***	0.275***	0.269***	0.277***	0.269***	0.282***	0.280***	-0.246***	1.049***
	[0.010]	[0.012]	[0.012]	[0.012]	[0.012]	[0.012]	[0.012]	[0.012]	[0.016]	[0.010]
LDIST	-1.239***	-1.416***	-1.416***	-1.416***	-1.415***	-1.416***	-1.416***	-1.416***	0	-1.211***
	[0.007]	[0.008]	[0.008]	[0.008]	[0.008]	[0.008]	[0.008]	[0.008]	[0.000]	[0.007]
REGIONAL	1.781***	1.131***	1.117***	1.132***	1.125***	1.130***	1.113***	1.113***	-0.039	1.952***
	[0.029]	[0.037]	[0.037]	[0.037]	[0.037]	[0.037]	[0.037]	[0.037]	[0.049]	[0.029]
CUSTRICT	0.855***	1.296***	1.295***	1.296***	1.298***	1.296***	1.297***	1.297***	0.678***	0.712***
	[0.045]	[0.048]	[0.048]	[0.048]	[0.048]	[0.048]	[0.048]	[0.048]	[0.075]	[0.043]
COMLANG	0.444***	0.297***	0.296***	0.297***	0.296***	0.297***	0.295***	0.295***	0	0.417***
	[0.013]	[0.015]	[0.015]	[0.015]	[0.015]	[0.015]	[0.015]	[0.015]	[0.000]	[0.013]
BORDER	-0.018	0.370***	0.369***	0.373***	0.370***	0.370***	0.371***	0.370***	0	0.034
	[0.027]	[0.028]	[0.028]	[0.028]	[0.028]	[0.028]	[0.028]	[0.028]	[0.000]	[0.027]
COMCOL	0.694***	0.559***	0.558***	0.559***	0.558***	0.559***	0.557***	0.558***	0	0.687***
	[0.021]	[0.024]	[0.024]	[0.024]	[0.024]	[0.024]	[0.024]	[0.024]	[0.000]	[0.021]
CURCOL	2.285***	1.016***	1.023***	1.016***	1.016***	1.016***	1.023***	1.023***	0.569***	1.888***
	[0.119]	[0.122]	[0.121]	[0.122]	[0.119]	[0.121]	[0.119]	[0.119]	[0.147]	[0.112]
COLONY	1.369***	1.277***	1.277***	1.276***	1.275***	1.277***	1.276***	1.276***	0	1.347***
	[0.027]	[0.024]	[0.025]	[0.024]	[0.024]	[0.024]	[0.025]	[0.025]	[0.000]	[0.026]
T			-0.124***				-0.108***			
			[0.011]				[0.011]			
E				-0.319			-0.28			
				[0.226]			[0.226]			
R					-0.325***		-0.304***			
					[0.020]		[0.020]			
IF						-0.090***	-0.041*			
						[0.023]	[0.024]			
TERIF								-0.106***	-0.099***	-0.199***
								[0.006]	[0.004]	[0.005]
Obs	199228	199228	199228	199228	199228	199228	199228	199228	199228	199228
R-squared	0.25	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.01	0.29

Notes: Robust standard errors are presented in parentheses. $***$, $**$ and $*$ represent statistical significance at the .01, .05 and .10 levels, respectively. The results in this table are estimated from equation (2) for 177 countries from 1968 to 1999. Column (1) is the basic theoretical gravity model. Column (2) is the basic theoretical gravity model, including country fixed effects. Columns (3) - (7) are the theoretical gravity model including country fixed effects. Columns (8) - (10) include the factor TERIFF first with country fixed effects, then with dyad fixed effects alone and finally with year fixed effects alone.

the remainder of the estimated coefficients, excluding for the moment those for the measures of violence, are largely unaffected by adopting the theoretical specification over the traditional specification. Finally, and most importantly, the impact of violence as measured by terrorism and revolutions become much larger (and negative), while that for inter-ethnic fighting actually becomes smaller. Overall, however, the measures of violence significantly reduce international trade, with the continuing exception of external conflict.

While it is important to understand the negative trade consequences of conflict, it is also important to place some perspective on how this impediment to trade compares to other impediments to trade. In other words, if we were to consider violence to be a tariff (i.e. a tax) on trade, how big of a tariff would it be?[17] Fortunately, there is a methodology to help us study this specific question. Following earlier studies, Feenstra (2002) demonstrates that $\exp\{\tau_{ij}\} = \exp\left\{\hat{\beta}/(1-\sigma)\right\}$ where σ is the elasticity of substitution between domestic and foreign goods and $\hat{\beta}$ is the estimated value of the impact of a particular variable on international trade. Maximizing a C.E.S. utility function subject to resource constraints yields the following estimating relationship between trade and tariff costs τ:

$$ln(\frac{X_{ijt}}{\text{rgdp}_{ijt}}) = \beta_0 + \rho(1-\sigma)\text{ldist}_{ij} + (1-\sigma)ln\tau_{ijt} + (1-\sigma)lnp_i + (1-\sigma)lnp_j + (1-\sigma)\varepsilon_{ijt} \quad (5)$$

where σ denotes the C.E.S. parameter and ρ denotes the impact of distance on transportation cost and p are prices. This specification has the added benefit of allowing us to calculate the tariff cost associated with **T**, **E**, **R**, **IF** versus other widely accepted costs such as border effects, language and colony effects.

Unfortunately, tariff costs are unobservable. Instead we observe multilateral resistance

[17] This tax measures the pure distortion and does not incorporate the further unfortunate consequence that it would be a tax that generated zero direct revenue.

terms such as borders, conflicts, etc... that are given as a vector of dummy variables, $D_{ij} = \text{comlang}_{ij}, \text{border}_{ij}, \text{comcol}_{ij}, \text{curcol}_{ij}, \text{colony}_{ij}, \text{custrict}_{ij}, \text{regional}_{ij}, \text{bothin}_{ij}, \text{onein}_{ij}, \text{gsp}_{ij}$, so that our empirical representation is actually

$$ln(\frac{X_{ijt}}{\text{rgdp}_{ijt}}) = \beta_1 \text{ldist}_{ij} + \beta D_{ijt} + \epsilon_{ijt} \tag{6}$$

with country dummies and intercepts suppressed in the exposition (but included in the regression) to control for price terms. Combining these two expressions we get $\beta D = (1-\sigma) ln\tau$, so that for any given resistance term, we can calculate the tariff equivalent by substituting elasticities values, i.e. $\tau = e^{\frac{\beta}{1-\sigma}}$.

Unfortunately, in order to implement this calculation, the elasticity of substitution, σ, must be separately provided. It is straightforward to see that σ scales up and down the estimated effects such that an increase in σ lowers the estimated trade effect from any impediment to trade. Based on empirical research, however, such as in Anderson and Van Wincoop (2003), it is typical for researchers to calculate these tariff equivalent factors using values of σ equal to 5 and 10.

In Table 3 we provide these estimated effects on trade from the usual suspects and our measures of violence. The first five columns report the estimates with the lower bound of CES elasticity of 5 and the last five columns report the estimates with the higher bound of CES elasticity of 10.

We begin by analyzing the impacts of the usual suspects and trade. Table 3 reports that regional trade agreements and currency unions have the most positive impacts on trade at about 12 to 28 percent each, depending on the elasticity. These effects are similar to what has been found in Rose and Van Wincoop (2001) and have the largest magnitude from the standard tariff equivalent trade cost literature. Common language tariff equivalent trade costs have a magnitude of about 4 to 9 percent, which is a few percent below what was found in the literature (see Eaton and

Table 3: Tariff Equivalent Trade Costs of:

	$\sigma = 5$					$\sigma = 10$				
BOTHIN	-21.35	-21.14	-21.26	-21.38	-21.56	-8.98	-8.90	-8.94	-8.99	-9.07
ONEIN	-10.52	-10.52	-10.54	-10.63	-10.60	-4.54	-4.54	-4.56	-4.59	-4.58
GSP	6.64	6.50	6.69	6.50	6.81	3.01	2.94	3.03	2.94	3.08
REGIONAL	24.36	24.65	24.52	24.61	24.29	11.67	11.82	11.75	11.80	11.63
CUSTRICT	27.66	27.67	27.71	27.67	27.69	13.40	13.41	13.43	13.41	13.42
COMLANG	7.13	7.16	7.13	7.16	7.11	3.24	3.25	3.24	3.25	3.22
BORDER	8.81	8.90	8.84	8.84	8.86	4.02	4.06	4.03	4.03	4.04
COMCOL	13.02	13.04	13.02	13.04	13.00	6.01	6.02	6.01	6.02	6.00
CURCOL	22.57	22.43	22.43	22.43	22.57	10.74	10.68	10.68	10.68	10.74
COLONY	27.33	27.31	27.29	27.33	27.31	13.23	13.22	13.21	13.23	13.22
T	-3.15				-2.74	-1.39				-1.21
E		-8.30			-7.25		-3.61			-3.16
R			-8.46		-7.90			-3.68		-3.44
IF				-2.28	-1.03				-1.01	-0.46
VIOLENCE	-3.15	-8.30	-8.46	-2.28	-18.91	-1.39	-3.61	-3.68	-1.01	-8.26

Notes: See Table 2. The results in this table are estimated from equation (2) for 177 countries from 1968 to 1999. The first five columns are the basic theoretical gravity model impacts by individually and then jointly including measures of conflict assuming a CES elasticity of 5. The final five columns are the basic theoretical gravity model impacts by individually and then jointly including measures of conflict assuming a CES elasticity of 10. VIOLENCE calculates the sum of the impacts of T,E,R, and IF. Each number represents a tariff equivalent percentage.

Korum (2002)). However, this is largely explained by our inclusion of the previously ignored colony dummies (comcol, curcol and colony) each costing a tariff equivalent of between 6 to 27 percent of trade.[18] Finally, adding all of these trade costs together, we find that the tariff equivalent of trade costs are between 50 to 100 percent, which is consistent with what has been found by Eaton and Korum (2002). However, the other usual cost, national border barriers, is found to have the tariff equivalent price of 4 to 9 percent.[19]

In general, our estimates of the gravity equation are reasonably consistent across the different measures of trade costs. This is important when considering the tariff equivalent trade cost of violence in Table 3. We estimate that some forms of violence such as terrorism or inter-ethnic fighting have a smaller cost (1 to 3 percent) whereas other forms such as external war and revolutions have a larger cost (4 to 8 percent). Taken together, we estimate the tariff equivalent cost of violence to be between 8 and 19 percent. This is higher than the costs from language and border and significantly higher than the benefits from GSPs and WTO/GATT membership.

In Table 4 we re-explore our earlier findings for the impact of violence on trade. In particular, we parse out the measures of terrorism, external conflict, revolutions and inter-ethnic fighting so that we account for whether just one of the two countries is experiencing this type of conflict, or if both are simultaneously engaged. For example, **ONET** is a dummy variable equal to one only if at least one of the two countries experienced an episode of terrorism in a given year, while **BOTHT** is a dummy variable for if both countries experienced an episode of terrorism in a given

[18] We also estimated the regression without colony costs (not reported here) and found similar magnitudes of the tariff equivalent cost of language to Eaton and Korum (2002). Our general results do not depend on the inclusion or exclusion of colony costs. We include them as they demonstrate a cost not previously reported in the literature and to prevent omitted variable bias.

[19] Note that these estimates are about half of what others have reported – see Feenstra (2002). There are two possible explanations: first, the data sample in the literature has typically examined inter - and intra - national trade, which our paper does not. The loss in variation in our sample could easily bias the estimates downward. Second, the country choice in our sample is much larger. The first paper in the literature only examined trade in Canada and the United States. The inclusion of many countries without a border in our sample could also explain the smaller number.

Table 4: Trade and Violence: Treating Violence Differently

	Traditional Gravity Model					Theoretical Gravity Model				
	1	2	3	4	5	6	7	8	9	10
	T	E	R	IF	ALL	T	E	R	IF	ALL
ONET	-0.074***				-0.069***	-0.118***				-0.108***
	[0.011]				[0.011]	[0.011]				[0.011]
BOTHT	-0.095***				-0.082***	-0.190***				-0.168***
	[0.015]				[0.015]	[0.015]				[0.015]
ONEE		-0.083***			-0.073***		-0.103***			-0.090***
		[0.014]			[0.014]		[0.014]			[0.014]
BOTHE		-0.299			-0.291		-0.246			-0.234
		[0.219]			[0.218]		[0.226]			[0.225]
ONER			-0.178***		-0.151***			-0.265***		-0.243***
			[0.020]		[0.021]			[0.020]		[0.021]
BOTHR			-0.485***		-0.440***			-0.644***		-0.612***
			[0.114]		[0.114]			[0.115]		[0.116]
ONEIF				-0.146***	-0.111***				-0.036	0.015
				[0.025]	[0.026]				[0.026]	[0.026]
BOTHIF				-0.113	-0.059				0.123	0.196
				[0.138]	[0.138]				[0.142]	[0.141]
Total Impact $\sigma = 5$						-7.86	-8.95	-24.32	2.12	-32.97
Obs	199228	199228	199228	199228	199228	199228	199228	199228	199228	199228
R-squared	0.72	0.72	0.72	0.72	0.72	0.45	0.45	0.45	0.45	0.45

Notes: Robust standard errors are presented in parentheses. $***$, $**$ and $*$ represent statistical significance at the .01, .05 and .10 levels, respectively. The results in this table are estimated from either equation (1) or (2) for 177 countries from 1968 to 1999. Columns (1) - (5) are the basic gravity model. Columns (6) - (10) are the theoretical gravity model including country fixed effects. The coefficient associated with ONEX measures the impact if one of the dyad pair has conflict type X. The coefficient associated with BothX measures the impact if both of the dyad pair has conflict type X. None of the control variables are reported. Total Impact measures the estimated impact on trade from all terror variables with $\sigma = 5$.

year. Similarly, **ONEE**, **BOTHE**, **ONER**, **BOTHR**, **ONEIF** and **BOTHIF** are defined for external conflict, revolutions and inter-ethnic fighting, respectively. In each of the first five columns of Table 4 we report regression results using the traditional gravity equation in expression (3) while columns six through ten report the results when the theoretical gravity equation in expression (4) is estimated.

Column one presents the estimation results for terrorism's impact on trade. Terrorism, whether felt by one country or both countries, appears to lower international trade by approximately the same amount, -8 percentage points. Second, if just one country is engaged in an external war, this appears to lower bilateral trade by a similar amount. The result, however, for if both countries are in an external conflict is not statistically different from zero, for likely the same reasons for why external conflict was not significant in Tables 1 or 2 – namely, this occurs very infrequently.[20] Thirdly, revolutions limit trade but especially so if both countries face revolutions, as it is associated with an almost 50 percentage point reduction. Finally, if one country is engaged in inter-ethnic fighting this is associated with a -14 percentage point decline in trade, though the effect on trade if both face such a type of conflict is not statistically significant, likely due to the reason that such a scenario is very rare.

The results from the theoretical gravity specification in columns 6 through 10 of Table 4 are very similar to those in the first five columns with the exception that the effect of the impact of violence on trade is larger. For example, in column six, where we estimate the theoretical gravity specification, the impact of terrorism is larger, and significantly larger still if both countries face terrorism. Indeed, on average the impact is approximately 20 percent larger. One exception, however, is that the effect of inter-ethnic fighting on trade is no longer statistically significant. Of course, the additional bonus to estimating the theoretical gravity specification is that one can

[20] **ONEE** occurs in approximately 1.5 percent of the observations whereas **BOTHE** occurs at a 0.04 percent rate.

interpret the tariff equivalent effect of violence on trade. As demonstrated in column ten, conflict is equivalent to an approximate 32 percent tariff, which for a value of $\sigma = 5$ is larger than the effect presented in Table 2 which was 19 percent. In sum, the results in Tables 1, 2 and 3 would therefore appear to be a lower bound estimate of the effect of conflict on trade.

As the results in Table 4 demonstrate, our baseline estimates of the traditional gravity specification in (3) reported Table 1 are robust across modifications considered in Tables 2 and 4. In Table 5, however, we examine further the robustness of our result of the impact of conflict on trade across different regions and time periods. Columns 1 through 7 of Table 5 report the results from a traditional gravity specification where we include the factor index **TERIF** in each specification.[21] As can be seen from the appropriate rows of the table, the estimate is statistically significant at below the .01 level in all cases, and the coefficient estimates vary between $-.035$ in high income countries to $-.125$ in South East Asia. Finally, columns 8 and 9 explore the impact of violence on trade when we split the sample in 1983. Interestingly, the estimated impact of violence is much lower, though still statistically significant at the 10 percent level, for the 1968-1983 sub-sample. The coefficient is 4 times larger for the second half of the sample.

As a final step, we consider the issue of endogeneity. If peace can improve trade, then it is possible that trade can cause peace. Indeed, some of the political science literature discusses the issue of whether trade and substantively important benefit to reducing interstate violence – among other papers in this vast literature, see Mansfield (1994) and Oneal and Russett (1999). To consider this possibility, we estimate the traditional gravity equation and use instruments for violence through the strategic components of trade. In this case, we instrument for conflict using UN voting records as in Bennett and Stamm (1999), and dummy variables for for international

[21]The regions we consider are, respectively, South East Asia, East Asia, the Middle East and North Africa, Latin America and the Caribbean, and High and Low Income countries. The latter classification is from Rose (2004) and is obtained from the World Bank Development Indicators.

Table 5: Sensitivity Analysis: Trade and Violence by Region & Time

	1 SASIA	2 EASIA	3 SSAFR	4 MIDEAF	5 LATCA	6 HIGHIN	7 LOWIN	8 1968-83	9 1984-99
BOTHIN	0.829***	0.295***	-0.072	-0.013	0.213***	0.254***	0.121**	-0.344***	0.271***
	[0.223]	[0.072]	[0.072]	[0.064]	[0.053]	[0.052]	[0.062]	[0.071]	[0.058]
ONEIN	0.453**	0.179***	-0.248***	-0.022	0.062	0.216***	-0.063	-0.159***	0.118**
	[0.208]	[0.057]	[0.055]	[0.045]	[0.043]	[0.048]	[0.044]	[0.042]	[0.047]
GSP	0.031	0.253***	0.457***	0.500***	0.222***	0.358***	0.431***	0.400***	0.607***
	[0.073]	[0.045]	[0.026]	[0.040]	[0.030]	[0.014]	[0.024]	[0.016]	[0.020]
LDIST	-1.170***	-1.418***	-1.668***	-1.663***	-1.677***	-1.376***	-1.413***	-1.281***	-1.493***
	[0.136]	[0.052]	[0.027]	[0.033]	[0.026]	[0.011]	[0.019]	[0.011]	[0.011]
LN(RGDP)	0.568***	0.745***	-0.153***	0.143***	0.180***	0.027	-0.037*	0.399***	1.063***
	[0.038]	[0.045]	[0.022]	[0.026]	[0.032]	[0.020]	[0.020]	[0.044]	[0.044]
LN(RGDP/POP)	-0.390***	-0.203***	0.447***	0.396***	0.348***	0.616***	0.337***	0.366***	-0.974***
	[0.050]	[0.061]	[0.031]	[0.038]	[0.043]	[0.027]	[0.027]	[0.065]	[0.046]
REGIONAL		1.424***			1.857***	0.394***	1.663***	1.686***	1.100***
		[0.093]			[0.060]	[0.039]	[0.096]	[0.061]	[0.044]
CUSTRICT	1.109***	1.420***	1.472***	-0.645	-0.147*	0.829***	1.574***	1.121***	1.120***
	[0.388]	[0.173]	[0.064]	[0.736]	[0.081]	[0.085]	[0.063]	[0.061]	[0.068]
COMLANG	0.111*	0.038	0.297***	0.104**	0.600***	0.327***	0.111***	0.214***	0.351***
	[0.059]	[0.048]	[0.030]	[0.044]	[0.029]	[0.017]	[0.027]	[0.020]	[0.021]
BORDER	-0.717***	-0.609***	1.135***	0.052	-0.179***	-0.446***	0.872***	0.264***	0.509***
	[0.155]	[0.129]	[0.053]	[0.066]	[0.049]	[0.038]	[0.048]	[0.038]	[0.037]
COMCOL	0.332***	0.480***	0.466***	0.826***	0.380***	0.029	0.551***	0.453***	0.611***
	[0.081]	[0.063]	[0.038]	[0.057]	[0.064]	[0.036]	[0.034]	[0.032]	[0.032]
CURCOL		1.636***	-0.486*	0.899***	1.309***	0.657***	-0.193	0.831***	-0.338*
		[0.202]	[0.272]	[0.166]	[0.102]	[0.116]	[0.388]	[0.126]	[0.194]
COLONY	0.221**	1.103***	1.693***	0.597***	0.841***	1.301***	1.462***	1.372***	1.189***
	[0.099]	[0.069]	[0.040]	[0.056]	[0.045]	[0.024]	[0.040]	[0.032]	[0.032]
TERIF	-0.075***	-0.125***	-0.063***	-0.076***	-0.097***	-0.035***	-0.078***	-0.017*	-0.068***
	[0.017]	[0.013]	[0.010]	[0.013]	[0.010]	[0.007]	[0.009]	[0.009]	[0.010]
Obs	16450	32021	75445	33704	61838	106991	92322	86861	112367
R-squared	0.75	0.72	0.59	0.68	0.69	0.82	0.62	0.72	0.73

Notes: Robust standard errors are presented in parentheses. $***$, $**$ and $*$ represent statistical significance at the .01, .05 and .10 levels, respectively. The results in this table are estimated from equation (1) for 177 countries from 1968 to 1999. Each column is the basic gravity model including time and country fixed effects. Each column represents a different region or time period. SASIA represents South Asia, EASIA is East Asia, MIDEAF is Middle East and North Africa, LATCA is Latin America and Caribbean, HIGHIN is high income and LOWIN is low income country.

peace treaties. Table 6 reports the results from this estimation. In this case, we again find a strong negative impact of violence on trade. Note that the magnitudes of the coefficients are somewhat larger, although there is no evidence of mis-specification as the over-identifying restrictions are not rejected in each of the specifications. Hence, our earlier results of the tariff cost withstand the scrutiny of exogeneity.

4 Conclusions

Our work follows from Rose (2004) who shows that many of the usual suspects in determining the magnitude of trade flows, e.g. WTO/GATT, are not as important as the adoption of the Generalized System of Preferences [GSPs]. From the analysis presented in this paper, it appears that the impact of conflict on trade is quite strong – even larger than GSPs.

What are the policy implications of our paper? While pursuing trade promotion through bilateral vehicles like GSPs have important effects on trade, another avenue is likely to have a larger impact on trade – peace. We find peace has a large and positive impact on trade. This is obviously a lower bound on the welfare gain to peace, though it is an important component to raising economic welfare.

Along the same line, Hess (2003) analyzes the consumption welfare loss from internal and external conflict in order to answer "How much would individual be willing to pay to avoid just the economic costs of conflict?" Remarkably, his estimates suggest that these pure economic welfare losses from conflict are quite large: namely, on average, individuals who live in a country that have experienced some conflict since 1960 would **permanently** give up to approximately 8 percent of their current level of consumption to live in a purely peaceful world. Taken together, the large potential welfare gains to consumption identified in Hess (2003), in addition to those from bilateral trade identified in this paper, suggests that economists and policy-makers should continue

Table 6: IV Panel Regression: Trade and Violence

	1	2	3	4	5
	TERIF	T	E	R	IF
ONEIN	-0.097**	-0.006	0.1	-0.085**	-0.146***
	[0.041]	[0.066]	[0.141]	[0.039]	[0.050]
GSP	0.562***	0.611***	0.565***	0.556***	0.552***
	[0.024]	[0.072]	[0.122]	[0.024]	[0.025]
BOTHIN	-0.271***	-0.183	0.063	-0.186***	-0.396***
	[0.083]	[0.196]	[0.227]	[0.068]	[0.106]
LN(RGDP)	0.106**	0.745	-0.164*	0.236***	-0.248***
	[0.051]	[0.471]	[0.095]	[0.064]	[0.021]
LN(RGDP/POP)	0.702***	0.225	0.916***	0.539***	1.030***
	[0.060]	[0.411]	[0.170]	[0.077]	[0.030]
REGIONAL	1.021***	0.55	2.238***	1.088***	1.104***
	[0.062]	[0.343]	[0.860]	[0.060]	[0.061]
CUSTRICT	1.252***	1.232***	1.480***	1.286***	1.221***
	[0.058]	[0.089]	[0.354]	[0.062]	[0.062]
LDIST	-1.437***	-1.450***	-1.694***	-1.428***	-1.439***
	[0.010]	[0.018]	[0.216]	[0.011]	[0.011]
COMLANG	0.292***	0.267***	0.424***	0.291***	0.300***
	[0.018]	[0.035]	[0.127]	[0.019]	[0.019]
BORDER	0.373***	0.284***	4.011	0.374***	0.358***
	[0.035]	[0.065]	[2.941]	[0.037]	[0.037]
COMCOL	0.529***	0.467***	0.736***	0.531***	0.546***
	[0.025]	[0.050]	[0.203]	[0.026]	[0.027]
CURCOL	3.082	4.551	3.169	2.81	2.835
	[2.030]	[3.260]	[10.071]	[2.136]	[2.175]
COLONY	1.226***	1.303***	0.481	1.209***	1.226***
	[0.044]	[0.076]	[0.645]	[0.047]	[0.047]
TERIF	-1.108***				
	[0.175]				
T		-6.542**			
		[3.243]			
E			-453.555		
			[364.793]		
R				-4.822***	
				[0.688]	
IF					-5.365***
					[0.888]
Chi-Sq(1)	1.302	1.702	1.640	1.522	1.054
P-Value	[0.254]	[0.192]	[0.200]	[0.217]	[0.305]
Observations	149862	149862	149862	149862	149862

Notes: robust standard errors are presented in parentheses. $***$, $**$ and $*$ represent statistical significance at the .01, .05 and .10 levels, respectively. Each column is the basic gravity model including country fixed effects. Instruments include factors based on annual UN voting records. Test of over-identifying restrictions are reported as Chi-Sq(1) with the associated P-Values.

to investigate and advocate for domestic and international institutions that promote peace in order to realize such gains.

References

[1] Anderson, J. (1979) "A Theoretical Foundation for the Gravity Equation," *American Economic Review*, 69(1): 106-116.

[2] Anderson, J. and Marcouiller, D. (2002) " Insecurity and the Pattern of Trade: An Empirical Investigaton," *Review of Economics and Statistics*.

[3] Anderson, J. and Van Wincoop, E. (2003) "Gravity with Gravitas: A Solution to the Border Puzzle," *American Economic Review*, May 2003.

[4] Bennett, Scott and Alan Stam (1999), *EUGENE: Expected Utility Generation and Data Management Program*.

[5] Brecher, Michael, Wilkenfeld, Jonathan, and Moser, Sheila. "Crises in the Twentieth Century," In *Handbook of International Crises, Volume I*, Oxford, UK: Pergamon Books, 1988.

[6] Blomberg, S. Brock, 1996 "Growth, Political Instability and the Defence Burden," *Economica*.

[7] Blomberg, S. Brock, Gregory D. Hess, and Athansios Orphanides, 2004 "The Macroeconomic Consequences of Terrorism," *Journal of Monetary Economics*, forthcoming.

[8] Blomberg, S. Brock, Gregory D. Hess, and Akila Weerapana, 2004 "Economic Conditions and Terrorism," *European Journal of Political Economy* , forthcoming.

[9] Blomberg, S. Brock, and Gregory D. Hess, 2002 "The Temporal Links Between Conflict and Economic Activity," *Journal of Conflict Resolution*, 46(1), 74-90.

[10] Blomberg, S. Brock, Hess, Gregory D., and Siddharth Thacker, 2004. "Is There a Conflict-Poverty Trap?," mimeo.

[11] Eaton, J., and S. Kortum (2002), "Technology, Geography and Trade", *Econometrica* September 2002, 1741-1779.

[12] Enders, Walter and Todd Sandler, (2004). "9-11, Is it all different now?," *mimeo*.

[13] Feenstra, Robert, 2002. *Advanced International Trade: Theory and Evidence* , Princeton University Press.

[14] Glick, Reuven and Alan Taylor, 2004. "Collateral Damage: The Economic Impact of War," *mimeo*.

[15] Gurr, T.R., K. Jaggers, and W. Moore, 2003. Polity Handbook IV, 2003, University of Colorado Press, Boulder.

[16] Hess, Gregory D., 2003. "The Economic Welfare Cost of Conflict: An Empirical Assessment," *CESifo Working Paper*, # 852.

[17] Hess, Gregory D. and Athanasios Orphanides, 1995. "War Politics: An Economic, Rational-Voter Framework," *American Economic Review*, 85(4), 828-846.

[18] Hess, Gregory D. and Athanasios Orphanides, 2001a. "Economic Conditions, Elections, and the Magnitude of Foreign Conflicts," *Journal of Public Economics*, 80(1), 121-140.

[19] Hess, Gregory D. and Athanasios Orphanides, 2001b. "War and Democracy," *The Journal of Political Economy*, 109(4), 776-810.

[20] Kaufmann, D., Kraay, A., Zoido-Lobatn, P., (2000). "Governance matters: From Measurement to Action", *Finance and Development* June 2000.

[21] Mansfield, Edward 1994 *Poverty, Trade and War*, Princeton University Press.

[22] Mickolus, Edward, Sandler, Todd, Murdock, Jean and Peter Flemming, 1993. "International Terrorism: Attributes of Terrorist Events (ITERATE)," Dunn Loring: VA, Vinyard Software.

[23] Nitsch, Volber and Dieter Schumacher 2004. "Terrorism and interational trade: an emprical investigation," *European Journal of Political Economy*, forthcoming.

[24] Oneal, John, and Bruce Russett 1999 "The Kantian Peace: The Pacific Benefits of Democracy, Interdependence, and International Organizations, 1885-1992" *World Politics*, 52(1): 1-37.

[25] Rose, Andrew 2004. "Do we really know that the WTO increases trade," *American Economic Review*, forthcoming.

[26] Rose, Andrew and Eric Van Wincoop, 2001. "National Money as a Barrier to Trade: the Real Case for Currency Union," *American Economic Review Paper and Preceedings*, 386-390.

[27] Subramanian, Arvind and Shang-Jin Wei 2004. "The WTO Promotes Trade Strongly but Unevenly," *mimeo.*

Key Non-Conflict Variables of Interest

BORDER is a dummy variable which is 1 if both countries share a border.

BOTHIN is a dummy variable which is 1 if both countries are members of WTO.

COLONY is a dummy variable which is 1 if countries were ever colonies before 1945.

COMCOL is a dummy variable which is 1 if both countries have common colonizer.

COMLANG is a dummy variable which is 1 if countries have a common language and 0 otherwise.

CURCOL is a dummy variable which is 1 if countries were colonized by the given year.

CUSTRICT is a dummy variable which is 1 if both countries use the same currency.

GSP is a dummy variable which is 1 if both countries are a part of a GSP.

LDIST is natural log of the distance between countries as measured in Rose (2004).

ONEIN is a dummy variable which is 1 if one country is a member of WTO.

POP is population.

REGIONAL is a dummy variable which is 1 if both countries belong to the same regional trade agreement.

RGDP is real Gross Domestic Product.

X denotes the average value of real bilateral trade as calculated in Rose (2004).

Z is a vector of a comprehensive set of time and dyad fixed effects.

Supplemental Appendix

Table A.1: **1968-2000 Annual Averages of Trade, WTO, GSP and Terror**

year	ltrade	bothin	gsp	T	E	R	IF	TERIF
1968	10.738	0.418	0.016	0.417	0.000	0.056	0.064	-0.280
1969	9.970	0.389	0.015	0.573	0.045	0.054	0.063	-0.155
1970	9.837	0.418	0.014	0.676	0.041	0.050	0.057	-0.029
1971	9.826	0.436	0.229	0.700	0.040	0.052	0.095	0.012
1972	9.933	0.422	0.269	0.664	0.019	0.060	0.085	-0.081
1973	9.996	0.443	0.261	0.633	0.055	0.060	0.104	-0.006
1974	10.269	0.447	0.280	0.625	0.018	0.063	0.098	0.022
1975	10.310	0.444	0.277	0.591	0.146	0.085	0.126	0.028
1976	10.355	0.440	0.273	0.660	0.145	0.091	0.118	0.044
1977	10.365	0.433	0.323	0.647	0.018	0.105	0.099	0.024
1978	10.387	0.435	0.330	0.628	0.105	0.110	0.100	0.110
1979	10.372	0.439	0.326	0.609	0.085	0.122	0.088	0.068
1980	10.374	0.437	0.315	0.688	0.033	0.104	0.075	0.030
1981	10.125	0.440	0.295	0.679	0.064	0.126	0.080	0.051
1982	9.979	0.463	0.339	0.689	0.033	0.137	0.077	0.153
1983	9.846	0.463	0.346	0.764	0.016	0.151	0.084	0.179
1984	9.811	0.462	0.354	0.683	0.049	0.139	0.082	0.079
1985	9.680	0.460	0.337	0.755	0.016	0.153	0.082	0.152
1986	9.588	0.488	0.366	0.788	0.063	0.118	0.082	0.157
1987	9.557	0.509	0.324	0.746	0.063	0.135	0.072	0.101
1988	9.474	0.513	0.310	0.742	0.031	0.152	0.090	0.169
1989	9.448	0.506	0.299	0.779	0.044	0.182	0.100	0.261
1990	9.572	0.562	0.297	0.669	0.073	0.112	0.079	0.154
1991	9.720	0.578	0.303	0.810	0.061	0.133	0.050	0.255
1992	9.604	0.570	0.290	0.651	0.030	0.137	0.051	-0.026
1993	9.482	0.600	0.267	0.683	0.000	0.120	0.029	-0.071
1994	9.518	0.681	0.256	0.671	0.026	0.124	0.028	-0.078
1995	9.633	0.673	0.258	0.714	0.013	0.112	0.012	-0.092
1996	9.655	0.703	0.246	0.588	0.013	0.126	0.012	-0.179
1997	9.786	0.709	0.237	0.468	0.012	0.108	0.012	-0.314
1998	10.374	0.648	0.226	0.451	0.013	0.120	0.009	-0.293
1999	10.356	0.666	0.231	0.446	0.027	0.104	0.009	-0.336
Total	9.908	0.523	0.272	0.653	0.042	0.113	0.066	-0.000

Notes: E is multiplied by 100 for comparative purposes.

Table A.2: **Country Statistics (A-Ecuador), 1968-1999**

cty1name	bothin	gsp	T	E	R	IF	TERIF	OBS
ALBANIA	0.000	0.000	1.000	0.000	0.075	0.000	0.070	2.000
ALGERIA	0.000	0.185	0.618	0.131	0.351	0.035	0.305	32.000
ANGOLA	0.206	0.220	0.810	0.108	0.769	0.654	2.476	32.000
ANTIGUA AND BARB	0.670	0.175	0.402	0.000	0.047	0.004	-0.480	24.000
ARGENTINA	0.675	0.156	0.920	0.082	0.067	0.189	0.420	32.000
ARMENIA	0.000	0.000	0.385	0.000	0.047	0.000	-0.517	7.000
AUSTRALIA	0.658	0.699	0.670	0.023	0.063	0.038	-0.146	32.000
AUSTRIA	0.668	0.635	0.771	0.000	0.064	0.038	-0.057	32.000
AZERBAIJAN	0.000	0.000	0.267	0.000	0.060	0.013	-0.571	2.000
BAHAMAS	0.002	0.189	0.486	0.000	0.065	0.038	-0.303	32.000
BAHRAIN	0.204	0.195	0.533	0.000	0.066	0.043	-0.246	24.000
BANGLADESH	0.707	0.178	0.583	0.000	0.066	0.042	-0.209	28.000
BARBADOS	0.759	0.208	0.470	0.000	0.056	0.037	-0.333	32.000
BELARUS	0.000	0.000	0.273	0.000	0.059	0.009	-0.567	3.000
BELGIUM	0.775	0.000	0.513	0.000	0.061	0.006	-0.361	3.000
BELIZE	0.533	0.226	0.471	0.000	0.070	0.036	-0.315	32.000
BENIN	0.137	0.197	0.413	0.000	0.050	0.022	-0.429	32.000
BERMUDA	0.736	0.076	0.479	0.000	0.065	0.031	-0.324	29.000
BHUTAN	0.000	0.003	0.487	0.000	0.083	0.007	-0.335	17.000
BOLIVIA	0.348	0.229	0.781	0.000	0.065	0.024	-0.073	32.000
BOTSWANA	0.491	0.303	0.548	0.000	0.032	0.013	-0.359	31.000
BRAZIL	0.669	0.137	0.738	0.000	0.064	0.039	-0.081	32.000
BULGARIA	0.169	0.316	0.499	0.000	0.060	0.030	-0.313	31.000
BURKINA FASO	0.830	0.237	0.449	0.109	0.039	0.017	-0.426	32.000
BURMA(Myanmar)	0.801	0.258	0.616	0.000	0.128	0.072	-0.011	30.000
BURUNDI	0.851	0.292	0.596	0.000	0.042	0.201	0.083	32.000
CAMBODIA	0.000	0.000	0.579	0.000	0.056	0.000	-0.331	2.000
CAMEROON	0.783	0.203	0.397	0.072	0.058	0.030	-0.409	32.000
CANADA	0.672	0.573	0.621	0.000	0.063	0.039	-0.185	32.000
CAPE VERDE	0.007	0.342	0.500	0.000	0.056	0.027	-0.331	32.000
CENTRAL AFRICAN	0.811	0.212	0.468	0.000	0.036	0.031	-0.381	32.000
CHAD	0.859	0.240	0.556	0.000	0.037	0.033	-0.179	32.000
CHILE	0.729	0.186	0.829	0.073	0.065	0.137	0.193	32.000
CHINA	0.000	0.079	0.548	0.000	0.132	0.220	0.228	32.000
COLOMBIA	0.485	0.172	0.986	0.000	0.597	0.032	1.042	32.000
COMOROS	0.899	0.208	0.483	0.000	0.033	0.016	-0.405	32.000
CONGO, DEM. REP.	0.776	0.228	0.500	0.409	0.148	0.108	0.032	31.000
CONGO, REP. OF	0.788	0.213	0.447	0.000	0.145	0.033	-0.206	32.000
COSTA RICA	0.286	0.204	0.749	0.072	0.060	0.033	-0.091	32.000
COTE D'IVORIE (I	0.774	0.182	0.950	0.000	0.052	0.025	0.039	32.000
CROATIA	0.000	0.000	0.267	0.000	0.048	0.000	-0.618	2.000
CYPRUS	0.719	0.167	0.688	0.062	0.063	0.037	-0.061	32.000
CZECH REPUBLIC	0.791	0.000	0.352	0.000	0.067	0.012	-0.482	7.000
DENMARK	0.650	0.688	0.620	0.000	0.061	0.037	-0.192	32.000
DJIBOUTI	0.070	0.188	0.594	0.000	0.059	0.016	-0.250	29.000
DOMINICA	0.305	0.250	0.439	0.000	0.053	0.015	-0.418	24.000
DOMINICAN REP.	0.766	0.233	0.609	0.000	0.066	0.023	-0.226	32.000
ECUADOR	0.128	0.236	0.725	0.083	0.059	0.031	-0.119	32.000
Total	0.535	0.271	0.627	0.031	0.108	0.065	-0.046	30.583

Notes: E is multiplied by 100 for comparative purposes.

Table A.3: **Country Statistics (El Sal.-L), 1968-1999**

cty1name	bothin	gsp	T	E	R	IF	TERIF	OBS
EL SALVADOR	0.279	0.247	0.854	0.096	0.474	0.323	1.325	32.000
EQUATORIAL GUINE	0.000	0.186	0.503	0.000	0.033	0.000	-0.426	17.000
ESTONIA	0.095	0.000	0.434	0.000	0.067	0.008	-0.422	7.000
ETHIOPIA	0.000	0.240	0.800	0.130	0.544	0.155	1.180	32.000
FIJI	0.169	0.231	0.529	0.000	0.052	0.036	-0.289	32.000
FINLAND	0.664	0.636	0.382	0.000	0.063	0.039	-0.394	32.000
FRANCE	0.656	0.694	0.886	0.044	0.059	0.036	0.171	32.000
GABON	0.817	0.231	0.485	0.000	0.047	0.018	-0.374	32.000
GAMBIA	0.841	0.236	0.415	0.000	0.046	0.017	-0.444	32.000
GEORGIA	0.000	0.000	0.883	0.000	0.197	0.000	0.178	8.000
GERMANY	0.657	0.686	0.974	0.000	0.060	0.035	0.109	32.000
GHANA	0.738	0.174	0.463	0.067	0.060	0.039	-0.326	32.000
GREECE	0.678	0.439	0.955	0.000	0.064	0.039	0.109	32.000
GRENADA	0.221	0.228	0.431	0.070	0.046	0.016	-0.434	27.000
GUATEMALA	0.262	0.209	0.902	0.000	0.896	0.422	2.266	32.000
GUINEA	0.233	0.257	0.421	0.000	0.045	0.012	-0.447	32.000
GUINEA-BISSAU	0.222	0.072	0.443	0.000	0.110	0.025	-0.290	32.000
GUYANA	0.755	0.235	0.478	0.000	0.040	0.028	-0.375	32.000
HAITI	0.765	0.239	0.655	0.047	0.058	0.031	-0.181	32.000
HONDURAS	0.181	0.221	0.747	0.254	0.063	0.028	-0.066	32.000
HONG KONG	0.343	0.114	0.516	0.000	0.064	0.039	-0.276	32.000
HUNGARY	0.625	0.360	0.463	0.000	0.061	0.036	-0.328	32.000
ICELAND	0.738	0.000	0.457	0.101	0.061	0.039	-0.328	32.000
INDIA	0.663	0.135	0.941	0.070	0.057	0.036	0.109	32.000
INDONESIA	0.714	0.167	0.592	0.030	0.151	0.578	1.014	32.000
IRAN	0.000	0.193	0.925	0.210	0.229	0.337	1.089	32.000
IRAQ	0.000	0.177	0.663	0.116	0.034	0.449	0.828	20.000
IRELAND	0.666	0.669	0.516	0.000	0.063	0.039	-0.277	32.000
ISRAEL	0.763	0.159	0.919	0.033	0.065	0.026	0.293	32.000
ITALY	0.655	0.698	0.862	0.000	0.061	0.036	0.016	32.000
JAMAICA	0.715	0.180	0.553	0.000	0.062	0.035	-0.256	32.000
JAPAN	0.647	0.679	0.765	0.000	0.061	0.038	-0.065	32.000
JORDAN	0.000	0.194	0.736	0.069	0.108	0.052	0.052	32.000
KAZAKHSTAN	0.000	0.000	0.365	0.000	0.053	0.004	-0.516	6.000
KENYA	0.745	0.173	0.515	0.032	0.060	0.044	-0.271	32.000
KIRIBATI	0.004	0.217	1.000	0.000	0.035	0.006	0.012	30.000
KOREA,SOUTH(R)	0.681	0.134	0.659	0.000	0.067	0.038	-0.148	32.000
KUWAIT	0.633	0.182	0.635	0.114	0.060	0.047	-0.085	30.000
KYRQYZ REPUBLIC	0.000	0.000	0.356	0.000	0.034	0.003	-0.560	6.000
LAO PEOPLE'S DEM	0.000	0.251	0.622	0.414	0.077	0.014	-0.213	18.000
LATVIA	0.102	0.000	0.581	0.000	0.060	0.006	-0.312	8.000
LEBANON	0.000	0.000	1.000	0.000	0.073	0.007	0.099	1.000
LESOTHO	0.548	0.306	0.574	0.000	0.061	0.011	-0.283	31.000
LIBERIA	0.000	0.190	0.418	0.000	0.093	0.038	-0.309	19.000
LIBYA	0.000	0.174	0.951	0.000	0.051	0.045	0.089	30.000
LITHUANIA	0.000	0.000	0.445	0.000	0.066	0.006	-0.421	8.000
LUXEMBOURG	0.796	0.000	0.252	0.000	0.062	0.007	-0.583	3.000
Total	0.500	0.310	0.674	0.038	0.106	0.082	0.047	30.334

Notes: E is multiplied by 100 for comparative purposes.

Table A.4: **Country Statistics (M-Som.), 1968-1999**

cty1name	bothin	gsp	T	E	R	IF	TERIF	OBS
MACEDONIA	0.000	0.000	0.610	0.000	0.045	0.000	-0.322	2.000
MADAGASCAR	0.772	0.214	0.404	0.000	0.051	0.024	-0.429	32.000
MALAWI	0.826	0.230	0.421	0.000	0.055	0.033	-0.383	32.000
MALAYSIA	0.677	0.142	0.591	0.000	0.062	0.036	-0.220	32.000
MALDIVES	0.863	0.005	1.000	0.000	0.044	0.018	0.052	14.000
MALI	0.225	0.224	0.435	0.105	0.039	0.027	-0.415	32.000
MALTA	0.710	0.161	0.554	0.000	0.065	0.039	-0.238	31.000
MAURITANIA	0.808	0.237	0.419	0.438	0.038	0.021	-0.443	32.000
MAURITIUS	0.748	0.203	0.410	0.000	0.049	0.034	-0.403	32.000
MEXICO	0.369	0.175	0.786	0.000	0.066	0.032	-0.049	32.000
MOLDVA	0.000	0.000	1.000	0.000	0.054	0.003	0.038	5.000
MONGOLIA	0.176	0.056	0.508	0.000	0.041	0.000	-0.400	19.000
MOROCCO	0.326	0.155	0.593	0.243	0.057	0.037	-0.220	32.000
MOZAMBIQUE	0.235	0.202	0.710	0.000	0.515	0.037	0.670	32.000
NAMIBIA	0.482	0.000	0.450	0.000	0.026	0.004	-0.471	30.000
NEPAL	0.000	0.336	0.541	0.000	0.233	0.008	-0.019	32.000
NETHERLANDS	0.655	0.699	0.640	0.000	0.061	0.036	-0.176	32.000
NEW ZEALAND	0.668	0.620	0.486	0.000	0.062	0.038	-0.308	32.000
NICARAGUA	0.778	0.261	0.733	0.298	0.343	0.032	0.462	32.000
NIGER	0.824	0.253	0.433	0.000	0.029	0.021	-0.445	32.000
NIGERIA	0.753	0.173	0.539	0.063	0.231	0.036	0.029	32.000
NORWAY	0.660	0.648	0.546	0.000	0.061	0.038	-0.254	32.000
OMAN	0.000	0.190	0.498	0.000	0.215	0.043	-0.021	30.000
PAKISTAN	0.672	0.142	0.906	0.074	0.055	0.202	0.409	32.000
PANAMA	0.089	0.202	0.744	0.076	0.067	0.027	-0.097	32.000
PAPUA N.GUINEA	0.157	0.253	1.000	0.000	0.051	0.034	0.100	32.000
PARAGUAY	0.199	0.233	0.605	0.000	0.064	0.028	-0.221	32.000
PERU	0.727	0.192	0.887	0.067	0.582	0.035	0.936	32.000
PHILIPPINES	0.514	0.158	0.957	0.000	0.820	0.157	1.654	32.000
POLAND	0.706	0.379	0.540	0.000	0.060	0.036	-0.267	30.000
PORTUGAL	0.680	0.058	0.656	0.000	0.064	0.040	-0.150	32.000
QATAR	0.126	0.216	0.482	0.000	0.054	0.050	-0.286	30.000
REUNION	0.816	0.000	0.463	0.000	0.047	0.023	-0.386	22.000
ROMANIA	0.658	0.124	0.497	0.000	0.092	0.041	-0.238	32.000
RUSSIA	0.000	0.000	1.000	0.000	0.065	0.008	0.077	2.000
RWANDA	0.838	0.280	0.535	0.301	0.046	0.069	-0.223	32.000
SAMOA	0.000	0.322	1.000	0.000	0.047	0.011	0.043	22.000
SAO TOME & PRINC	0.000	0.000	1.000	0.000	0.026	0.000	-0.015	15.000
SAUDI ARABIA	0.000	0.131	0.639	0.051	0.064	0.043	-0.077	32.000
SENEGAL	0.746	0.180	0.441	0.095	0.060	0.033	-0.362	32.000
SEYCHELLES	0.005	0.270	0.488	0.000	0.047	0.022	-0.365	31.000
SIERRA LEONE	0.827	0.261	0.552	0.000	0.306	0.027	0.150	32.000
SINGAPORE	0.602	0.161	0.488	0.000	0.062	0.039	-0.301	32.000
SLOVAK REPUBLIC	0.783	0.000	0.337	0.000	0.062	0.010	-0.509	7.000
SLOVENIA	0.675	0.000	0.334	0.000	0.063	0.010	-0.509	7.000
SOLOMON ISLANDS	0.255	0.245	1.000	0.000	0.045	0.005	0.027	31.000
SOMALIA	0.000	0.204	0.569	0.209	0.130	0.141	0.202	22.000
Total	0.531	0.240	0.607	0.045	0.129	0.045	-0.063	30.595

Notes: E is multiplied by 100 for comparative purposes.

Table A.5: **Country Statistics (S. Afr.-Z), 1968-1999**

cty1name	bothin	gsp	T	E	R	IF	TERIF	OBS
SOUTH AFRICA	0.733	0.000	0.726	0.143	0.254	0.029	0.215	32.000
SPAIN	0.662	0.097	0.947	0.000	0.061	0.037	0.093	32.000
SRI LANKA	0.682	0.177	0.643	0.000	0.167	0.112	0.164	32.000
ST. KITTS & NEVIS	0.371	0.067	0.395	0.000	0.038	0.002	-0.505	25.000
ST.LUCIA	0.382	0.227	0.423	0.000	0.033	0.009	-0.478	25.000
ST.VINCENT & GRE	0.225	0.138	0.453	0.000	0.057	0.031	-0.365	22.000
SUDAN	0.000	0.197	0.725	0.076	0.050	0.678	1.167	30.000
SURINAME	0.598	0.245	0.543	0.000	0.056	0.032	-0.286	32.000
SWAZILAND	0.272	0.299	0.622	0.000	0.040	0.019	-0.267	31.000
SWEDEN	0.655	0.670	0.622	0.000	0.062	0.038	-0.188	32.000
SWITZERLAND	0.658	0.640	0.691	0.000	0.063	0.038	-0.128	32.000
SYRIA	0.000	0.210	0.665	0.074	0.052	0.103	0.159	32.000
TAJIKISTAN	0.000	0.000	1.000	0.000	0.526	0.000	0.851	2.000
TANZANIA	0.760	0.205	0.505	0.153	0.050	0.041	-0.229	32.000
THAILAND	0.443	0.138	0.731	0.076	0.484	0.039	0.641	32.000
TOGO	0.808	0.228	0.532	0.090	0.049	0.024	-0.317	32.000
TONGA	0.000	0.366	1.000	0.000	0.059	0.013	0.069	25.000
TRINIDAD n TOBAGO	0.748	0.193	0.515	0.000	0.067	0.031	-0.292	32.000
TUNISIA	0.293	0.160	0.539	0.000	0.060	0.040	-0.255	32.000
TURKEY	0.713	0.153	0.985	0.056	0.063	0.037	0.187	32.000
TURKMENISTAN	0.000	0.000	0.276	0.000	0.047	0.000	-0.612	2.000
UGANDA	0.782	0.250	0.707	0.404	0.120	0.498	0.967	32.000
UKRAINE	0.000	0.000	0.498	0.000	0.063	0.000	-0.390	7.000
UNITED ARAB EMIR	0.171	0.191	0.553	0.000	0.067	0.047	-0.215	27.000
UNITED KINGDOM	0.661	0.701	0.978	0.086	0.060	0.035	0.221	32.000
UNITED STATES	0.656	0.490	1.000	0.152	0.060	0.035	0.271	32.000
URUGUAY	0.741	0.194	0.636	0.000	0.066	0.040	-0.164	32.000
UZBEKISTAN	0.000	0.000	0.293	0.000	0.049	0.000	-0.595	2.000
VANUATU	0.001	0.320	1.000	0.000	0.049	0.005	0.036	21.000
VENEZUELA	0.269	0.193	0.819	0.000	0.061	0.029	-0.036	32.000
VIETNAM	0.000	0.000	0.266	0.000	0.067	0.008	-0.555	2.000
YEMEN, REPUBLIC	0.000	0.000	1.000	0.000	0.168	0.021	0.293	9.000
YUGOSLAVIA	0.632	0.126	0.648	0.000	0.061	0.052	-0.135	23.000
ZAMBIA	0.463	0.201	0.634	0.156	0.074	0.053	-0.123	32.000
ZIMBABWE	0.731	0.133	0.646	0.174	0.117	0.034	-0.083	30.000
Total	0.526	0.271	0.713	0.058	0.097	0.073	0.048	30.276

Notes: E is multiplied by 100 for comparative purposes.

CESifo Working Paper Series

(for full list see www.cesifo.de)

1160 Romain Ranciere, Aaron Tornell, and Frank Westermann, Crises and Growth: A Re-Evaluation, March 2004

1161 Assaf Razin and Efraim Sadka, Transparency, Specialization and FDI, March 2004

1162 Ludger Woessmann, How Equal Are Educational Opportunities? Family Background and Student Achievement in Europe and the United States, March 2004

1163 B.M.S. van Praag and Barbara E. Baarsma, Using Happiness Surveys to Value Intangibles: The Case of Airport Noise, March 2004

1164 Aaron Tornell, Frank Westermann, and Lorenza Martínez, The Positive Link Between Financial Liberalization, Growth, and Crises, March 2004

1165 Helge Berger and Carsten Hefeker, One Country, One Vote? Labor Market Structure and Voting Rights in the ECB, March 2004

1166 Clemens Fuest and Martin Kolmar, A Theory of User-Fee Competition, March 2004

1167 Friedrich Schneider and Robert Klinglmair, Shadow Economies around the World: What Do We Know?, April 2004

1168 Horst Raff and Nicolas Schmitt, Exclusive Dealing and Common Agency in International Markets, April 2004

1169 M. Hashem Pesaran and Allan Timmermann, Real Time Econometrics, April 2004

1170 Sean D. Barrett, Privatisation in Ireland, April 2004

1171 V. Anton Muscatelli, Patrizio Tirelli and Carmine Trecroci, Can Fiscal Policy Help Macroeconomic Stabilisation? Evidence from a New Keynesian Model with Liquidity Constraints, April 2004

1172 Bernd Huber and Marco Runkel, Tax Competition, Excludable Public Goods and User Charges, April 2004

1173 John McMillan and Pablo Zoido, How to Subvert Democracy: Montesinos in Peru, April 2004

1174 Theo Eicher and Jong Woo Kang, Trade, Foreign Direct Investment or Acquisition: Optimal Entry Modes for Multinationals, April 2004

1175 Chang Woon Nam and Doina Maria Radulescu, Types of Tax Concessions for Attracting Foreign Direct Investment in Free Economic Zones, April 2004

1176 M. Hashem Pesaran and Andreas Pick, Econometric Issues in the Analysis of Contagion, April 2004

1177 Steinar Holden and Fredrik Wulfsberg, Downward Nominal Wage Rigidity in Europe, April 2004

1178 Stefan Lachenmaier and Ludger Woessmann, Does Innovation Cause Exports? Evidence from Exogenous Innovation Impulses and Obstacles, April 2004

1179 Thiess Buettner and Johannes Rincke, Labor Market Effects of Economic Integration – The Impact of Re-Unification in German Border Regions, April 2004

1180 Marko Koethenbuerger, Leviathans, Federal Transfers, and the Cartelization Hypothesis, April 2004

1181 Michael Hoel, Tor Iversen, Tore Nilssen, and Jon Vislie, Genetic Testing and Repulsion from Chance, April 2004

1182 Paul De Grauwe and Gunther Schnabl, Exchange Rate Regimes and Macroeconomic Stability in Central and Eastern Europe, April 2004

1183 Arjan M. Lejour and Ruud A. de Mooij, Turkish Delight – Does Turkey's accession to the EU bring economic benefits?, May 2004

1184 Anzelika Zaiceva, Implications of EU Accession for International Migration: An Assessment of Potential Migration Pressure, May 2004

1185 Udo Kreickemeier, Fair Wages and Human Capital Accumulation in a Global Economy, May 2004

1186 Jean-Pierre Ponssard, Rent Dissipation in Repeated Entry Games: Some New Results, May 2004

1187 Pablo Arocena, Privatisation Policy in Spain: Stuck Between Liberalisation and the Protection of Nationals' Interests, May 2004

1188 Günter Knieps, Privatisation of Network Industries in Germany: A Disaggregated Approach, May 2004

1189 Robert J. Gary-Bobo and Alain Trannoy, Efficient Tuition Fees, Examinations, and Subsidies, May 2004

1190 Saku Aura and Gregory D. Hess, What's in a Name?, May 2004

1191 Sjur Didrik Flåm and Yuri Ermoliev, Investment Uncertainty, and Production Games, May 2004

1192 Yin-Wong Cheung and Jude Yuen, The Suitability of a Greater China Currency Union, May 2004

1193 Inés Macho-Stadler and David Pérez-Castrillo, Optimal Enforcement Policy and Firms' Emissions and Compliance with Environmental Taxes, May 2004

1194 Paul De Grauwe and Marianna Grimaldi, Bubbles and Crashes in a Behavioural Finance Model, May 2004

1195 Michel Berne and Gérard Pogorel, Privatization Experiences in France, May 2004

1196 Andrea Galeotti and José Luis Moraga-González, A Model of Strategic Targeted Advertising, May 2004

1197 Hans Gersbach and Hans Haller, When Inefficiency Begets Efficiency, May 2004

1198 Saku Aura, Estate and Capital Gains Taxation: Efficiency and Political Economy Consideration, May 2004

1199 Sandra Waller and Jakob de Haan, Credibility and Transparency of Central Banks: New Results Based on Ifo's *World Economicy Survey*, May 2004

1200 Henk C. Kranendonk, Jan Bonenkamp, and Johan P. Verbruggen, A Leading Indicator for the Dutch Economy – Methodological and Empirical Revision of the CPB System, May 2004

1201 Michael Ehrmann, Firm Size and Monetary Policy Transmission – Evidence from German Business Survey Data, May 2004

1202 Thomas A. Knetsch, Evaluating the German Inventory Cycle – Using Data from the Ifo Business Survey, May 2004

1203 Stefan Mittnik and Peter Zadrozny, Forecasting Quarterly German GDP at Monthly Intervals Using Monthly IFO Business Conditions Data, May 2004

1204 Elmer Sterken, The Role of the IFO Business Climate Indicator and Asset Prices in German Monetary Policy, May 2004

1205 Jan Jacobs and Jan-Egbert Sturm, Do Ifo Indicators Help Explain Revisions in German Industrial Production?, May 2004

1206 Ulrich Woitek, Real Wages and Business Cycle Asymmetries, May 2004

1207 Burkhard Heer and Alfred Maußner, Computation of Business Cycle Models: A Comparison of Numerical Methods, June 2004

1208 Costas Hadjiyiannis, Panos Hatzipanayotou, and Michael S. Michael, Pollution and Capital Tax Competition within a Regional Block, June 2004

1209 Stephan Klasen and Thorsten Nestmann, Population, Population Density, and Technological Change, June 2004

1210 Wolfgang Ochel, Welfare Time Limits in the United States – Experiences with a New Welfare-to-Work Approach, June 2004

1211 Luis H. R. Alvarez and Erkki Koskela, Taxation and Rotation Age under Stochastic Forest Stand Value, June 2004

1212 Bernard M. S. van Praag, The Connexion Between Old and New Approaches to Financial Satisfaction, June 2004

1213 Hendrik Hakenes and Martin Peitz, Selling Reputation When Going out of Business, June 2004

1214 Heikki Oksanen, Public Pensions in the National Accounts and Public Finance Targets, June 2004

1215 Ernst Fehr, Alexander Klein, and Klaus M. Schmidt, Contracts, Fairness, and Incentives, June 2004

1216 Amihai Glazer, Vesa Kanniainen, and Panu Poutvaara, Initial Luck, Status-Seeking and Snowballs Lead to Corporate Success and Failure, June 2004

1217 Bum J. Kim and Harris Schlesinger, Adverse Selection in an Insurance Market with Government-Guaranteed Subsistence Levels, June 2004

1218 Armin Falk, Charitable Giving as a Gift Exchange – Evidence from a Field Experiment, June 2004

1219 Rainer Niemann, Asymmetric Taxation and Cross-Border Investment Decisions, June 2004

1220 Christian Holzner, Volker Meier, and Martin Werding, Time Limits on Welfare Use under Involuntary Unemployment, June 2004

1221 Michiel Evers, Ruud A. de Mooij, and Herman R. J. Vollebergh, Tax Competition under Minimum Rates: The Case of European Diesel Excises, June 2004

1222 S. Brock Blomberg and Gregory D. Hess, How Much Does Violence Tax Trade?, June 2004