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Investment?**

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Abstract

The relevance of political risk to international trade and investment remains a topic of continuing interest. However, summary measures of political risk, including country corruption, do not give consistent results. In this paper, we bring together two recent streams of literature to highlight the role of political risk. We find that violence in the form of terrorism, revolutions, and wars is harmful to international investment. Violence in a source country encourages investment away from the parent to a safer host. Host country violence hurts investment, mainly in developing countries. Developing countries also attract more investment through membership in the World Trade Organization (WTO). We interpret WTO membership as a commitment device that limits the possibility of arbitrary policy changes.

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1 Introduction

The year 1991 marks two turning points. For several years thereafter, the worldwide intensity of transnational violence—violence motivated by international political considerations—fell steadily. In the late 1980s, approximately, 1.5 transnational violent events occurred every day. This frequency declined to less than 0.5 events a day by 2000. The decline implied that the number of countries affected by a violent event fell over that period (Figure 1A).¹ The year 1991 also marks the point of a decisive break in global foreign investment. A sharp increase occurred in the Foreign Direct Investment (FDI) to global investment ratio for the rest of the decade.

While the run-up of FDI in the 1990s, especially in the second half of that decade, has several explanations, the correlation with a decline in worldwide violence is striking.² Did the shift towards a more peaceful world contribute to the large increase in foreign investment during that period? And, if the world has since become less peaceful, can the worsening of external security be blamed for the drop-off in FDI over the past few years?

Another secular trend comoving with FDI through the 1980s and 1990s was increased membership of the General Agreement on Tariffs and Trade and its successor the World Trade Organization (WTO). In a recent paper, Rose (2004) concludes that the spread of membership in the WTO did not contribute to an increase in world trade despite the reduction of trade barriers that membership implied. One explanation of Rose's (2004) surprising finding, to which he himself alludes, is that WTO members typically extend the benefits of lower tariffs even to non-members and, hence, additional membership has only a limited influence on trade flows. We examine if the

¹Other measures of violence also ebbed during the 1990s. For example, the threat of nuclear holocaust, as defined by the Doomsday Clock, fell sharply in 1991 with the signing of the Strategic Arms Reduction Treaty between the United States and the Soviet Union. The Doomsday Clock is calculated by the Bulletin of the Atomic Scientists (www.thebulletin.org/clock.html). Russett and Slemrod (1993) demonstrate the trends in the doomsday clock have a significant impact on savings.

²Since 1991, the simple correlation coefficient between violence and FDI is -0.91.

WTO helped the growth in cross-border investment. Through much of this period, WTO rules were not specifically directed towards FDI. However, the policy commitment underlying the acceptance of WTO discipline could have been of value in reducing a country's political risk.

Both violence and WTO entry, therefore, potentially influence international investment through their impact on country risk. If so, were trends in violence and WTO membership especially correlated with FDI to developing countries? Figure 1B suggests that for much of the 1980s and 1990s, an inverse relationship existed between developing country violence and the share of these economies in world investment flows. WTO membership was also associated with an increasing developing country share of world investment, but primarily in the 1990s.

To estimate the quantitative implications of violence and WTO membership on international investment, we use a gravity model of bilateral FDI flows. In its simplest form, a gravity model postulates that bilateral flows are positively related to the size of the two economies and are negatively influenced by the distance between them. In our estimations, we also include other control variables commonly used. Importantly, we rely on estimates that include bilateral country-pair dummies, which control not only for distance but for all unobserved and unchanging relationships between the countries. In addition, we consider specifications of gravity models suggested by modern theories of FDI.³ Wherever appropriate, we present, for comparison, the evidence for the influence of violence and WTO membership on bilateral trade.⁴

Finally, a gravity model allows, in a natural manner, examination of the possibility that the farther away a receiving country is from the FDI source, the more it is hurt by violence. Such would be the case if less is known about countries at a distance and, hence, violence is viewed

³Markusen and Maskus (1999) and Carr, Markusen and Maskus (2001a,b) investigate gravity models for FDI.

⁴Blomberg and Hess (2004) focus on trade, comparing the costs of conflict to benefits from trade promotion. 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.

with greater concern. Distance between countries may also arise by virtue of differing levels of development, political arrangements and economic philosophies.

Three findings emerge from our analysis. First, violence at home tends to move investment abroad. Second, violence in the host country deters both trade and FDI flows. Host country violence hurts inflows of investment with particular force in developing countries. And, third, while confirming Rose’s empirical finding for trade flows, we find a strong positive impact of WTO membership on bilateral FDI flows. Our results, therefore suggest that while violence raises political risk and discourages investment flows, WTO membership acts as a commitment device that, by limiting the possibility of arbitrary policy changes, lowers country risk. These results are robust to a variety of specifications checks.

The rest of the paper is organized as follows: Section 2 describes the data on international violence. Section 3 illustrates the significant effect of violence in a basic gravity model. Section 4 presents our main results comparing the quantitative effects of violence and WTO membership, differentiating also between developed and developing country effects. Section 5 investigates the effect of violence on different forms of FDI—identified as “horizontal” and “vertical” FDI in the recent literature. Section 6 concludes.

2 Measures of International Violence

The data for international violence comes from three different sources.⁵ First, the incidence of country-year terrorism (T) is obtained from the ITERATE data set (see Mickolus *et al* (1993)). An international/transnational terrorist event in ITERATE is defined 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

⁵See Blomberg and Hess (2004) for more details.

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.” (Mickolus *et al* (1993, p 2)).

Since we cannot judge the significance of individual events, we define a dummy variable T, which takes the value 1 if a terrorist event is recorded for the country in a given year (see Blomberg, Hess and Orphanides (2004)). The dummy variable has the advantage of defining the incidence of terrorism in a manner comparable to the incidence of other forms of conflict that we employ.⁶

Next, we consider 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 Brecher, Wilkenfeld and Moser (1988, p. 3) 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.”

We code E to equal one if a country is engaged in external conflict (this follows Hess and Orphanides (1995,2001a,b), Blomberg and Hess (2002), Blomberg, Hess and Thacker (2005), and Blomberg, Hess and Orphanides (2004)). Thus, countries that sent troops in the first Gulf War in 1991 have E coded as 1 for the period they were engaged in that conflict.

⁶Blomberg, Hess and Orphanides (2004) show that the effects of terrorism on growth are similar if number of incidents-per-capita is the measure of terrorism.

Data for revolutions (R) is obtained from Gurr *et al* (2003). Revolutionary conflict (R) is defined as conflict between the government and politically organized groups—political parties, labor organizations, or parts of the regime itself—seeking to overthrow those in power. The mobilization of more than 1000 individuals and 100 fatalities define a revolution. R is given the value 1 if a revolution event is recorded.

The variables T , E , and R are used to construct a measure of violence V . In any given year, V_h is the average value of T , E , and R for the host country, and V_s is the average value of the sum of T , E , and R for the source country. As a robustness check, we estimate the separate impact from terrorism ($V_{h,s}^T$) versus other forms of violence ($V_{h,s}^{ER}$) on FDI and trade.

The violence data display four main features.⁷ First, terrorism occurs more frequently than other forms of violence, with the greatest incidence occurring in the Americas and Europe.⁸ However, two of the high terrorist 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. Second, revolutions have been most persistent in non-democratic regimes and in low-income countries. Third, not surprisingly, external wars are much less frequent due to the high cost of waging a war. When a war, however, does occur, it has a large negative impact on growth (Blomberg, Hess and Orphanides (2004)).

3 The Basic Gravity Model and an Illustration

The gravity model has been the “workhorse” of empirical trade research and has, more recently, been used in the empirical FDI literature. In its most basic form, the gravity equation postulates trade/financial flows to increase with host and source country sizes and decrease with the distance between two countries. Anderson (1979), Anderson and Van Wincoop (2003 and 2004) suggest that

⁷See Blomberg and Hess (2004) for a more detailed discussion.

⁸This is partly due to the fact that a terrorist event is a low cost operation for most insurgents.

the trade gravity model can be derived from a general equilibrium analysis of global trade. Carr, Markusen, and Maskus (2001a, b) and Blonigen, Davies, and Head (2001) lay the groundwork to support a "modified" FDI gravity model.

The source of data on FDI flows is the International Direct Investment Database of OECD.⁹ From 12 source countries, FDI inflows to 43 host countries are available on an annual basis from 1981 to 1998.¹⁰ To facilitate comparison with trade flows, we use exports from the same source countries to the same host countries, using the IMF's Direction of Trade Statistics. From the host country's perspective, these are imports and we refer to them as such. FDI and trade flows are deflated using an index of unit value of manufactured exports obtained from the IMF's World Economic Outlook. All data are averaged over three year intervals providing us with a panel data set, in principle, of 6 observations for each source-host country pair for a total of more than 3000 observations. However, missing observations on dependent and independent variables reduce somewhat the usable set of observations. The remaining economic data originate from a variety of sources described in Appendix A.

To illustrate and motivate the relationship between violence and international investment, consider first a basic gravity model relating FDI between country pair h, s at time t :

$$\log(\text{FDI})_{hst} = \alpha_0 + \alpha_1 y_{ht} + \alpha_2 y_{st} + \alpha_3 Y_{ht} + \alpha_4 Y_{st} + \alpha_5 \text{distance}_{hs} + \varepsilon_{hst} \quad (1)$$

where h, s denote respectively, the host and source partners, t denotes time, y is the log of real Gross Domestic Product per capita, Y is log of real Gross Domestic Product, distance is the

⁹We used the series on outflows from a source country but also relied on the outward position (stock of FDI) for crosschecking, see www.oecdsource.org.

¹⁰The source countries are: Austria, Canada, France, Germany, Italy, Japan, Netherlands, Norway, Sweden, United Kingdom and United States. The developed host countries are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom. The developing host countries are: Argentina, Brazil, Chile, China, Colombia, Ecuador, Hong Kong, India, Korea, Kuwait, Malaysia, Mexico, Nigeria, Peru, Philippines, Saudi Arabia, Singapore, South Africa, Taiwan, Thailand, Turkey and Venezuela.

natural log of distance between two countries. Over one-third of the bilateral FDI observations are zero. To correctly estimate the elasticities, then, it is necessary to consider the bias on account of censoring. We employ the Tobit model that estimates the coefficients through a maximum likelihood procedure.

We run regression (1) and, in Figure 2, plot the partial, predicted relationship between distance and FDI. Each data point represents the cross-sectional average of host country FDI over the time period 1981-1998 versus distance. Some of the high violence-incidence countries are denoted by dots. All of these points lie below the line, implying a loss in FDI. The effects are potentially large, as quantified in Table 1, where high violence countries, indicated by dots in Figure 2, are highlighted in bold face. Colombia and Peru, for example, are predicted to receive substantially more FDI inflows than they actually do. Colombia's predicted value is on par with that of Chile. In Asia, the Philippines has low actual FDI and a predicted value close to that of Korea. Could it be that greater peace in Colombia and the Philippines would bolster FDI to these countries? We examine this question more directly in following section.

4 Augmenting the Gravity Model

The key empirical challenge is to isolate the influence of violence on investment. We pursue two approaches. First, we add a number of explanatory variables to equation (1), variables that explain bilateral investment flows and are also potentially correlated with violence. Second, we include country-pair dummies that summarize all unchanging features of the bilateral relationship. To the extent that the second approach is more demanding because it controls for variables that the econometrician cannot hope to observe, we rely on the results that include country-pair dummies.

$$x_{hst} = \alpha_0 + \alpha_1 \cdot y_{ht} + \alpha_2 \cdot y_{st} + \alpha_3 \cdot Y_{ht} + \alpha_4 \cdot Y_{st} + \alpha_5 \cdot \text{distance}_{hs} + \alpha_6 \cdot \text{CommLanguage}_{hs} + \alpha_7 \cdot \text{land}_h \quad (2)$$

$$+ \alpha_8 \cdot \text{land}_s + \alpha_9 \cdot \text{corruption}_{ht} + \alpha_{10} \cdot \text{capcontrol}_{hst} + \alpha_{11} \cdot \text{telecom}_{hst} + \alpha_{12} \cdot \text{GSP}_{hst} + \alpha_{13} \cdot \text{WTO}_{hst} + \alpha_{14} \cdot V_{kt} + \varepsilon_{hst}$$

x denotes the log value of real bilateral FDI or imports. As above, y is the log of real GDP per capita, Y is log of real Gross Domestic Product, distance is the natural log of distance between two countries. CommLanguage is a dummy variable which is 1 if both countries have a common language and 0 otherwise, and land is a dummy variable which is 1 if either country is landlocked and 0 otherwise.

Corruption may be an important influence in directing FDI (Wei 2000). Since corruption reflects poor governance, it may be correlated with violence. We include an index of corruption, such that a higher value implies lower corruption. Similarly, policy manipulation through capital controls may arise in an environment of weak governance and violence. The variable "capcontrol" is an index of capital controls from 0 to 4 with higher values implying more capital controls (see Mody and Murshid (2005)).

The variable "telecom" is a measure of the intensity of communication between the two countries. Because telephone communications can be endogenous, we follow Loungani, Mody, and Razin (2002) and use the predicted value of bilateral telephone traffic between the two countries under consideration, with the telephone density in the two countries being the key exogenous variables used for identifying the exogenous component of bilateral telephone traffic.

We use two variables representing international trade agreements. First, if a host country benefits from the so-called Generalized System of Preferences offered by the source country, the dummy variable GSP takes the value 1 and is zero otherwise. Under GSP, developed countries use

especially low tariff rates to encourage imports from developing countries.¹¹ Second, WTO is a dummy variable which takes the value 1 if both countries are in the WTO and is 0 otherwise. Rose (2004) concludes that the WTO is less effective than in promoting trade than commonly believed and that GSPs do a better job. Yet, this experiment has not been considered for FDI. Because WTO and GSP are dummies, we can compare the impact of these agreements with our violence measures, V , which are also similarly bounded.

Finally, V is a measure of organized violence. We distinguish between violence in the host and source countries. We begin by representing V as a dummy variable taking the value 1 if any form of violence occurred during the particular time period. We subsequently distinguish between the different forms of violence.

Although, we include many of the usual suspects that may influence FDI, it is impossible to consider all possible covariates in a regression. Throughout, we include time dummies to control for global shifts in FDI trends. But, in addition, we present specifications that include country-pair dummies. Since these dummies include all characteristics of the bilateral relationship, the variables distance, common language, and land are subsumed in the bilateral dummies and cannot be separately included. An important advantage of the country-pair dummies is that they account also for the so-called "multilateral resistance," i.e., the relationship between the two countries and the rest of the world. The alternatives of including host or source country dummies are special cases of the country-pair dummy. The gravity model can thus be expressed as follows:

$$x_{hst} = \alpha_0 + \alpha_{hs} + \alpha_t + \beta Z + \omega V_{hst} + \varepsilon_{hst} \quad (3)$$

¹¹Though a program for developing countries, Portugal is the one developed country in our sample that has been a recipient of GSP. Also, because in our trade equations we use imports as the dependent variable, we do not directly test for the export promotion effect; instead, we assess if GSP stimulates more imports and FDI from the preference granting country.

with α_t representing the vector of time dummies, α_{hs} the vector of country-pair dummies and Z representing the vector of other controls. We believe that our country-pair and time dummy model is a severe specification that controls for many possible omitted variables. In addition, by considering various sub-samples (e.g. developing vs developed), we further attempt to alleviate the concerns associated with an omitted variable bias.¹²

4.1 Baseline Results

Throughout, we report results for bilateral trade to provide a link to the existing literature on trade gravity models and to serve as a comparison with our FDI results. In Table 2, columns 1-6 include variables that do not change over time. These include distance as well as dummy variables for common language and being landlocked. When we include country-pair fixed effects in columns 7-12, these unchanging variables drop out since the fixed effects proxy for them as well as other long-term relationships between the source and host countries.

Consider, first, the traditional gravity variables. Richer countries (higher per capita GDP) generate more FDI. Larger country size (higher GDP) increases both trade and FDI. Note, however, that while trade increases close to proportionately with host and source country GDP, FDI is significantly more responsive to country size. Greater distance between the source and host countries reduces trade (as has been well documented). However, the influence of distance on FDI is ambiguous when communications distance (our telecom variable) is included (see Loungani, Mody, and Razin (2002)). As we discuss below, physical distance acts differently for developed and developing countries, reflecting alternative motivations for FDI in these two country groups.

Common language increases trade and has an even more important influence on FDI. Landlocked

¹²We also examined the differences between democracies and non-democracies and found our main results to be robust and similar to those obtained when distinguishing developed and developing economies. These results are available from the authors upon request.

host countries trade less and also receive less FDI. Landlocked source countries initiate less trade and less FDI.

A higher value for the corruption measure denotes lower corruption. Thus, trade actually appears to decline with reduced corruption, the result applying especially when country dummies are included. Reduced corruption is associated with somewhat more FDI but only when country-pair dummies are not included, casting some doubt on Wei's (2000) finding. Stronger capital controls reduce trade and FDI. Finally, a higher intensity of telecommunications between the two countries facilitates trade and, especially, FDI.

As in Rose (2004), we find that a country benefiting from GSP trades more, this being the case with and without country-pair dummies. This positive influence applies also to FDI, with the influence quantitatively stronger when country-pair dummies are included. Similarly, we find as Rose (2004) does, that joint membership of the WTO does not increase trade (and appears actually to hurt it). In contrast, WTO commitment helps FDI. The WTO effect falls when country-pair dummies are included but remains both quantitatively and statistically strong in the case of FDI.

We can now consider the effect of violence on trade and FDI. First, violence in a host country significantly reduces its bilateral trade flows, confirming earlier work by Blomberg and Hess (2004), who demonstrate the robustness of this result. Second, host-country violence has a negative and statistically significant impact on FDI, with a somewhat stronger quantitative influence than on trade. Once country-pair dummies are included, the magnitudes of the coefficients on violence do decline in absolute value. The implication is that some common factors cause violence and lower FDI. The fact that the coefficients on violence nevertheless remains highly significant suggests that the result is robust. *Ceteris paribus*, the impact of a violent event in a country causes imports to fall by 19 percent (column 9) while FDI declines by 34 percent (column 12). Notice, the quantitative

gain in FDI from a country's participation in the WTO significantly outweighs the reduction in FDI on account of domestic violence. Finally, violence in the source country causes FDI to leave its borders (column 12) but has little impact on trade (column 9).

Next we consider if the influence of violence varies across levels of development, and is conditioned by physical distance. This we do in Table 3 by interacting violence (V_h) in host countries with: (a) a dummy for developing countries (columns 1 and 3), and (c) physical distance (columns 2 and 4). We include, but do not report, the same control variables that are used in columns 1 through 6 of Table 2. The results show that developing countries and countries at a physical distance from the source country suffer more from violence than do other countries. To illustrate the quantitative impact of the development and physical distance, we report in the bottom panel of Table 3 the effect of violence on US trade and investment with two of its partners, Canada and the Philippines. Canada is a developed neighbor while the Philippines is a distant developing country partner. Note, that, as before, the effective influence of violence on FDI is greater than that on trade for both countries. Relative to the Philippines, Canada is, however, much less influenced by violence both on account of its developed status and much shorter distance to the United States. An event of violence reduces Philippines trade by about 40-50 percent and investment by 70-80 percent, compared to the average of 19 and 34 percent to the average of all countries reported above when discussing Table 2.

4.2 Developed and Developing Countries: A Closer Look

When we reestimate the relationships separately for developed and developing country samples, certain additional insights become possible. Notice, first, for FDI, the distance variable has a negative sign for developed countries but is ambiguous for developing countries (Table 4). This suggests that a substantial portion of developed country FDI is of a "vertical" character, i.e.,

investment is located across countries to facilitate trade in intermediate products as part of a production chain. In contrast, while some of the FDI to developing countries may be of this nature, horizontal FDI is of equal or greater importance, which leads investors to move production facilities to distant countries to serve those markets rather than export to them (a more detailed discussion of this result is in Loungani, Mody, and Razin 2002).¹³.

Table 4 clarifies that though source country violence drives investment away, it does so mainly to other developed countries (column 7). Also, host country violence in developed economies does not appear to reduce trade once country-pair fixed effects are taken into account: thus, some unobserved factors lead to both an increase in violence and to a decline in trade in developed economies. Host country violence is actually associated with more FDI in developed countries, though the statistical significance is weak. We discuss this result further below in a model that allows a more precise distinction between vertical and horizontal FDI; it appears that vertical FDI is dampened by developed host country violence but an increase in horizontal FDI compensates for that decline. In contrast, host country violence hurts developing countries severely.

GSP and WTO membership also have different effects across developed and developing countries. Though GSP arrangements are mainly intended to facilitate export development in poor countries, the results paradoxically suggest that GSP actually stimulates trade between developed economies. In practice, this result is driven by Portugal. It appears as if GSP diverts international transactions towards trade and away from investment and this is reversed with the elimination of GSP. Because all developed countries in our sample have been members of the WTO (or its predecessor the General Agreement on Trade and Tariffs) through the period under consideration, the influence of WTO membership on developed country trade and investment cannot be identified.

¹³Further evidence for this conclusion is presented in section 5, based on a more nuanced model of cross-border investment

Thus, Rose's (2004) finding of a negative relationship between WTO and trade is mainly seen to be a developing country phenomenon. The contrast with the positive influence on FDI is strong. It is as if WTO membership shifts a developing country's international commercial relationship from trade to investment.

4.3 Differentiating between forms of violence

In Table 5, distinguish the impact of terrorism from that of other forms on violence.¹⁴ We employ the exact same specification as in Table 2 except that we include violence as two variables (terrorism $V_{h,s}^T$ and wars and revolutions $V_{h,s}^{ER}$). When country-pair dummies are not included, host violence is seen to hurt trade by the same measure regardless of whether the violence comes in the form of terrorism or war. The coefficients associated with V_h^T and V_h^{ER} are negative, of similar magnitude, and statistically significant. When country-pair dummies are included, the coefficients on violence decline in size in the trade equation but effects of the two forms of violence remain of the same order of magnitude and still highly significant. For FDI, however, the impact of wars and revolutions is huge while that of terrorism is not significant when country-pair dummies are included. As above, these results apply with special force to developing countries. The impact from source violence continues to cause FDI to flow outbound when violence is due to terrorism.

5 Violence in a FDI Model of Knowledge Based Capital

We pursue the relationship between violence and FDI a step further in the context of the Carr, Markusen, and Maskus (2001a) models that seek to distinguish vertical and horizontal FDI (Table 6). We use the following specification:

¹⁴As a final exercise, we also re-estimated the original model in Table 2 using the Arellano-Bond technique to control for possible endogeneity with similar results.

$$\log(FDI)_{hs} = \beta_0 + \beta_1(Y_h + Y_s) + \beta_2(Y_h - Y_s)^2 + \beta_3(y_h - y_s)^2 + \beta_4(Y_h - Y_s)(y_h - y_s) + \delta V_{hs} + \alpha Z + \varepsilon_{hs} \quad (4)$$

$$V_{hs} = \tau_0 + V_s + \gamma_0 V_h + \gamma_1 V_h (y_h - y_s)^2$$

where income per capita y proxies for skill level in a country and the host specific violence (V_h), is interacted with skill differences between the host and source countries.

$(Y_h + Y_s)$ is the sum of host and source country GDP and is expected to have a positive effect on horizontal affiliate activity, when the FDI flow is intended principally to serve the host market. $(Y_h - Y_s)^2$, the squared difference of GDP, measures the dissimilarity of country size and is expected to have a negative impact on horizontal affiliate activity. Hence, if $\beta_1 > 0, \beta_2 < 0$, then horizontal FDI activity is favored against the alternative of a vertical model, $\beta_1 = \beta_2 = 0$. The variable $(y_h - y_s)^2$ measures the relative difference in skill endowments, which is also interacted with the GDP difference between the countries. A finding of $\beta_3 > 0$ is consistent with the knowledge based capital model which predicts vertical FDI that is motivated by opportunities to exploit production links between host and source countries with large skill differentials. The interaction term predicts that differences in skills will stimulate affiliate activity even more when country sizes differ. In our empirical specification, we include the sum and difference of y and Y in log form, a slight departure from the original Carr, Markusen and Maskus (2001a) paper, based on Blonigen and Davies (2004), who have demonstrated that the log form follows more directly from theory and fits the data significantly better.¹⁵

Taking the partial derivative of (4) with respect to violence costs, we have

$$\frac{\partial \log(FDI)_{hs}}{\partial V_s} = \delta$$

¹⁵Blonigen and Davies (2004) demonstrate that the FDI data are large skewed with non-normal residuals when entered in the linear form.

$$\frac{\partial \log(FDI)_{hs}}{\partial V_h} = \delta\gamma_0 + \delta\gamma_1(y_h - y_s)^2. \quad (5)$$

From a host country perspective, if violence hurts mainly by raising the perceived costs of investment, then the term $\delta\gamma_0$ will be negative. However, if violence is primarily a trade cost, i.e., it disrupts the international flow of trade, then firms may be inclined to substitute the trade-based vertical FDI for horizontal foreign investment to directly serve the domestic market.

Table 6 reports the results from estimating this class of models. The results support the conjecture above that developing country FDI has a significant horizontal character whereas developed country FDI is generated to a greater degree by vertical relationships. With $\beta_1 > 0$ and $\beta_2 < 0$ for both developed and developing countries, both groups of countries benefit from horizontal FDI. The implication is that larger host and source country GDP encourages FDI and greater dissimilarity in size decreases FDI. However, more vertical FDI between developed economies is supported by the positive effect of per capita income (skill) differences across countries; in contrast, the skill-differential variable is negative for developing countries. These findings may seem surprising in view of a perception that multinational firms take advantage of low cost developing country labor by splitting their production process, a form of vertical FDI. While such FDI is likely important, the findings here suggest that horizontal FDI to serve domestic developing country markets dominates. In contrast, the ease of trade between developed countries makes possible trade in intermediate goods at low cost and quick turnaround times, such that even small skill differences can be exploited to engage in vertical FDI.

Notice from Table 6 that for developed countries the coefficient on the term interacting violence with skill differences is negative. Thus, violence appears to hurt vertical FDI between developed countries: such FDI depends on low cost and high reliability of trade and is dampened if violence acts as an impediment to trade. However, as above, the coefficient on violence itself is

positive and is now significant at the 5 percent level. The implication is that while vertical FDI is especially hurt by violence, firms substitute for that decline in business by engaging in more horizontal FDI.

Thus, this specification, by permitting a more precise representation of horizontal and vertical FDI suggests a more nuanced view of the implications of violence on developed country FDI. The results suggest that in the 1990s, as violence decreased, the natural tendency of developed economies to engage in vertical FDI, or intra-firm trade, was reinforced. The implication also is that within the group of developed economies, FDI from the richer source countries moved to the poorer countries. The overall effect of violence is the sum of two terms: the coefficient of the uninteracted violence term plus the coefficient of the interacted term times the square of the difference between source and host country per capita incomes. For developed countries, FDI was encouraged by a decline in violence once the per capita income differential was in the top quartile of income differentials in developed countries. Put differently, such a differential implied that countries such as Greece and the Portugal benefited from German investment during peaceful transitions.

For developing countries, the opposite effect seems to prevail: increased host country violence reduces trade (as noted above) but also induces a shift to vertical FDI. It could be that for a developing country an increase in violence requires a substitution from arms-length trade to a more controlled environment with direct management control. However, the main influence for developing economies occurs through a strongly deterrent investment cost on account of host country violence, as seen in the uninteracted V_h term. For developing countries, the mean value of the square of the income differences is 6.1 and at this mean value the overall effect of violence is minus 67 percent.

When we decompose the effect of host violence into shocks due to external wars and rev-

olutions, $V^E R$, and shocks due to terrorism V^T , we find results consistent with those in Table 5. When all countries are pooled, the impact from terrorism is seen to be smaller in magnitude than the impact from wars and revolutions, though both discourage FDI. Once again, however, there are differences between developed and developing countries. For developed countries, the numbers of wars and revolutions is small and hence the parameters are estimated imprecisely. However, of interest is the implication of the results that countries with relatively low per capita incomes within the developed country group received substantially lower FDI when the violence was due to wars rather than to terrorism. For example, our model predicts that Japanese investment in Israel should be two times greater during years when the Israeli conflict was characterized as terrorism rather than as war. This may explain why investment from Japan to Israel was positive only during the mid 1990s during a time of relative Israeli peace. For developing countries, the direct effect of wars and revolutions is much more pervasive and stronger than that of terrorism.

6 Conclusions

In this paper, we investigated the impact of violence on trade and foreign direct investment (FDI). We found that conflict deters both trade and FDI in a manner that is as economically significant. This negative impact of violence particularly characterizes the developing world.

We can thus return to the question posed at the start of the paper. The decline in violence during the course of the 1990s had mainly a compositional effect on FDI inflows within the group of developed countries. Trends in violence had apparently little to do with the boom in aggregate flows; the mergers and acquisitions activity towards the end of that decade was likely the result of technological change and financial exuberance. However, with the decline in violence, the results suggest that the tendency within developed economies to engage in vertical FDI was strengthened. For developing countries, our results are consistent with significant benefits from declining violence.

At the same time, increased commitment to policy consistency and predictability through WTO membership further enhanced FDI, possibly even shifting their international engagement from trade towards investment flows.

Appendix A: Key Variables of Interest

Log Imports denotes the value of nominal import flows deflated by an index of the unit value of manufactured trade in log terms. The data is taken from IMF Direction of Trade Statistics denoted as imports from the host country perspective. The data is deflated using an index of unit value of manufactured exports from IMF's World Economic Outlook.

Log FDI denotes the value of nominal Foreign Direct Investment flows into host countries deflated by an index of the unit value of manufactured trade in log terms. The data is taken from the International Direct Investment Database of OECD. The series on outflows is denoted from the source country but we also relied on the outward position (stock of FDI) for crosschecking.

$\ln(\text{GDP})_h$ is real Gross Domestic Product of host country in log form. Source: the World Banks' World Development Indicators.

$\ln(\text{GDP})_s$ is real Gross Domestic Product of source country in log form. Source: the World Banks' World Development Indicators.

$\ln(\text{GDP}/\text{POP})_h$ is real Gross Domestic Product per capita of host country in log terms. Source: the World Banks' World Development Indicators.

$\ln(\text{GDP}/\text{POP})_s$ is real Gross Domestic Product per capita of source country in log terms. Source: the World Banks' World Development Indicators.

distance is natural log of the distance between countries as measured in Wei dataset at <http://nber15.nber.org/> we

CommLanguage is a dummy variable which is 1 if countries have a common language and 0 otherwise. Source: Rose (2004).

capcontrol is an index of capital controls from 0 controls to 4. Source: the IMF and is taken from Mody and Murshid (2005)

corruption is an index of corruption where higher numbers mean less corruption. Source: International Country Risk Group.

Land_h is a dummy variable which is 1 if host country is landlocked and 0 otherwise. Source: Rose (2004).

Land_s is a dummy variable which is 1 if source country is landlocked and 0 otherwise. Source: Rose (2004).

telecom is the predicted bilateral telephone traffic between countries, with instruments of all right hand side variables and the logs of telephone densities in the host and source countries, and time dummies. Source: International Telecommunications Union, "Direction of Traffic: Trends in International Telephone Tariffs". See Loungani, Mody, and Razin (2002).

WTO is a dummy variable if both countries are in the WTO. Source: Rose (2004).

GSP is a dummy variable which takes a value of one if host country benefits from Generalized System of Preferences. Source: Rose (2004).

$\mathbf{V}_h^{T,ER}$ takes the value of 1 if there was a terrorist event (T), an external war or revolution (ER) in host country in a given year. Source: Gurr *et al* (2003), Mickolus *et al* (1993), and Brecher *et al* (1988) and their updates.

$\mathbf{V}_s^{T,ER}$ takes the value of 1 if there was a terrorist event (T), an external war or revolution (ER) in source country in a given year. Source: Gurr *et al* (2003), Mickolus *et al* (1993), and Brecher *et al* (1988) and their updates.

$\Sigma Y_h Y_s$ is the log sum of GDP of country year pairs.

$(Y_h - Y_s)^2$ is the squared log difference of GDP in country i and j.

$(y_h - y_s)$ is the log difference of GDP per capita in country i and j.

y_1, \dots, y_6 time dummies.

\mathbf{Dev}_h dummy variable for developing host country.

Table 1: Cross-Sectional Average FDI and Violence: By Selected Region

Region	Log(FDI)	Log($\hat{\text{FDI}}$)	Region	Log(FDI)	Log($\hat{\text{FDI}}$)
Latin America and Caribbean					
Chile	2.12		Austria	2.58	
Mexico	2.70		Belgium	5.04	
Colombia	1.22	2.21	Denmark	2.70	
Peru	0.00	0.98	Finland	1.93	
Average	1.51	1.60	Italy	3.99	
Europe and Middle East					
Asia			Netherlands	4.91	
China	2.49		Norway	2.27	
Hong Kong	3.27		Portugal	2.83	
Japan	2.99		Spain	4.24	
Korea	2.48		Switzerland	4.14	
Malaysia	2.27		Greece	2.06	2.24
Singapore	3.41		Turkey	2.09	2.31
Taiwan	1.96		Egypt	1.03	1.60
Thailand	2.42		Israel	1.22	1.53
India	1.97	2.22			
Philippines	1.93	2.89			
Average	2.52	2.55	Average	2.93	1.92

Notes: Economies in bold-face are those with highest incidence of relative violence in time sample. Log(FDI) is average log of real FDI from 1981 to 1998. Log($\hat{\text{FDI}}$) the predicted value if there were no relative conflict for bold-faced economy.

Table 2: Violence in Traditional Gravity Models for FDI and Trade

	1	2	3	4	5	6	7	8	9	10	11	12
	Log Imports	Log Imports	Log Imports	Log FDI	Log FDI	Log FDI	Log Imports	Log Imports	Log Imports	Log FDI	Log FDI	Log FDI
$\ln(\text{GDP}/\text{POP})_h$	-0.057 [0.117]	-0.061 [0.106]	-0.008 [0.093]	0.001 [0.078]	-0.049 [0.079]	-0.087 [0.080]	-0.093*** [0.029]	-0.118*** [0.030]	-0.054* [0.030]	0.051 [0.117]	0.001 [0.118]	0.113 [0.122]
$\ln(\text{GDP}/\text{POP})_s$	-0.041 [0.221]	0.001 [0.215]	-0.005 [0.214]	2.370*** [0.291]	2.714*** [0.296]	2.622*** [0.293]	-0.142 [0.172]	-0.1 [0.175]	-0.071 [0.169]	2.143*** [0.673]	2.151*** [0.674]	2.104*** [0.668]
$\ln(\text{GDP})_h$	0.751*** [0.136]	0.821*** [0.122]	0.869*** [0.098]	1.812*** [0.112]	1.981*** [0.115]	2.042*** [0.114]	1.061*** [0.033]	1.091*** [0.034]	1.149*** [0.033]	1.962*** [0.128]	2.002*** [0.129]	2.122*** [0.130]
$\ln(\text{GDP})_s$	0.944*** [0.045]	0.961*** [0.044]	0.968*** [0.045]	1.401*** [0.061]	1.288*** [0.069]	1.294*** [0.069]	0.887*** [0.039]	0.874*** [0.039]	0.865*** [0.038]	1.386*** [0.146]	1.310*** [0.147]	1.309*** [0.146]
distance	-0.846*** [0.201]	-0.826*** [0.202]	-0.887*** [0.208]	-0.071 [0.141]	0.079 [0.145]	-0.03 [0.144]						
CommLanguage	0.417* [0.215]	0.417* [0.229]	0.446** [0.183]	0.619*** [0.223]	0.553** [0.228]	0.506** [0.226]						
Land _h	-0.623*** [0.185]	-0.541*** [0.170]	-0.446*** [0.145]	-0.631** [0.253]	-0.407 [0.259]	-0.271 [0.256]						
Land _s	-0.553*** [0.085]	-0.535*** [0.081]	-0.533*** [0.079]	-0.776*** [0.219]	-1.059*** [0.230]	-1.068*** [0.227]						
telecom	0.447 [0.680]	0.665 [0.604]	0.629 [0.566]	4.813*** [0.707]	5.509*** [0.716]	5.253*** [0.708]	2.113*** [0.153]	2.183*** [0.154]	2.239*** [0.149]	4.681*** [0.604]	4.763*** [0.603]	4.602*** [0.599]
corruption	-0.04 [0.068]	-0.115* [0.063]	0.031 [0.060]	0.099 [0.064]	0.005 [0.066]	0.168** [0.074]	-0.086*** [0.019]	-0.103*** [0.020]	-0.055*** [0.020]	-0.021 [0.076]	-0.061 [0.078]	0.039 [0.080]
capcontrol	-0.141** [0.070]	-0.114* [0.066]	-0.135** [0.056]	-0.185*** [0.051]	-0.146*** [0.052]	-0.184*** [0.052]	-0.060*** [0.014]	-0.057*** [0.014]	-0.083*** [0.014]	-0.232*** [0.058]	-0.246*** [0.059]	-0.259*** [0.059]
GSP			0.798** [0.379]			0.990*** [0.170]			0.692*** [0.073]			1.590*** [0.287]
WTO			-0.137 [0.194]			1.463*** [0.240]			-0.427*** [0.071]			0.820** [0.343]
V_h		-0.439*** [0.100]	-0.400*** [0.092]		-0.703*** [0.125]	-0.787*** [0.126]		-0.194*** [0.034]	-0.191*** [0.033]		-0.276** [0.139]	-0.343** [0.139]
V_s		-0.01 [0.059]	-0.032 [0.062]		0.836*** [0.189]	0.813*** [0.187]		0 [0.040]	0.002 [0.039]		0.336** [0.167]	0.339** [0.166]
Observations	2423	2355	2355	2472	2404	2404	2423	2355	2355	2472	2404	2404

Notes: clustered 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 time fixed effects. Columns 6 - 12 also include host-source country fixed effects where we allow for different fixed effects for country-pair ij and ji . Columns -6 and 10 -12 were estimated using the Tobit Method to allow for substantial number of zero value observations. Included in the regression are: Real GDP Y_i and Real GDP per capita y_i for host $i = h$ and source $i = s$ countries, log physical distance (distance), dummy variable for language (CommLanguage), dummy variables for landlocked host and source countries (Land _{i}), dummy variable for general system of preferences (GSP) and if both are in WTO (WTO), corruption is an index measured in such a way that higher values mean less corruption, capcontrol is a 0-4 index with higher values meaning more capital market restrictions, and relative violence between host and source countries $V_{h,s}$, $V_h = 1$ if terrorism, external conflict or revolution occurs in each year for host and zero otherwise) ($V_s = 1$ if terrorism, external conflict or revolution occurs in each year for source and zero otherwise).

Table 3: Interacting Violence with Development and Physical Distance

	Log FDI			
	Development	Physical	Development	Physical
	1	2	3	4
V_h	0.036 [0.068]	1.177*** [0.306]	-0.340* [0.197]	0.991 [0.954]
$V_h \cdot z$	-0.531*** [0.077]	-0.184*** [0.036]	-0.469* [0.243]	-0.196* [0.110]
z =Developing country dummy	1.399*** [0.089]		1.160*** [0.242]	
z = distance	-0.966*** [0.051]	-0.751*** [0.050]	-0.058 [0.145]	0.121 [0.153]

The Estimated Effect of Violence on Trade and FDI from US to CAN or PHL

US - CAN	0.036	-0.171	-0.340	-0.445
US - PHL	-0.495	-0.479	-0.809	-0.773
Observations	2355	2355	2404	2404

Notes: robust standard errors are presented in parentheses. ***, ** and * represent statistical significance at the .01, .05 and .10 levels, respectively. Each column is the gravity model from equation (2) including time fixed effects. Columns 3 - 4 were estimated using the Tobit Method to allow for substantial number of zero value observations. Included in the regression are: Real GDP (Y_i) and Real GDP per capita (y_i) for host $i = h$ and source $i = s$ countries, log physical distance (distance), dummy variable for language (CommLanguage), dummy variables for landlocked host and source countries (Land $_i$), dummy variable for general system of preferences (GSP) and if both are in WTO (WTO), corruption index (measured in such a way that higher values mean less corruption), and V_h included separately and interacted with different measures of distance ($V_h \cdot z$), where z refers to developing dummy or physical distance, (log distance). The controls are not reported.

Table 4: Violence in Gravity Models for Imports and FDI: Developing vs. Developed

	Log Imports		Log FDI		Log Imports		Log FDI	
	1	2	3	4	5	6	7	8
	Developed	Developing	Developed	Developing	Developed	Developing	Developed	Developing
$\ln(\text{GDP}/\text{POP})_h$	-0.527*** [0.095]	0.044 [0.028]	-1.751*** [0.286]	0.135 [0.093]	0.588*** [0.157]	0.150*** [0.052]	-0.358 [0.684]	0.157 [0.158]
$\ln(\text{GDP}/\text{POP})_s$	0.126 [0.173]	-0.331*** [0.121]	2.056*** [0.412]	1.691*** [0.420]	0.955*** [0.238]	0.367 [0.789]	2.979*** [0.598]	9.633*** [4.284]
$\ln(\text{GDP})_h$	0.997*** [0.077]	0.748*** [0.043]	1.188*** [0.218]	2.064*** [0.144]	1.606*** [0.053]	0.758*** [0.085]	1.81 [0.000]	1.959*** [0.285]
$\ln(\text{GDP})_s$	0.817*** [0.043]	1.066*** [0.031]	1.024*** [0.111]	1.401*** [0.099]	1.095*** [0.053]	-0.456 [0.806]	1.082*** [0.178]	-8.996** [4.272]
distance	-1.057*** [0.101]	-0.888*** [0.077]	-0.902*** [0.261]	0.026 [0.261]				
CommLanguage	0.555*** [0.145]	0.522*** [0.102]	1.843*** [0.391]	0.323 [0.343]				
Land _h	-0.038 [0.087]		-0.143 [0.311]					
Land _s	-0.747*** [0.114]	-0.397*** [0.086]	-1.634*** [0.281]	-0.827*** [0.300]				
telecom	-0.112 [0.516]	0.406 [0.249]	1.489 [1.393]	3.490*** [0.912]	4.056*** [0.211]	1.067*** [0.302]	5.290*** [0.437]	1.062 [1.259]
corruption	0.361*** [0.054]	0.129*** [0.032]	-0.079 [0.149]	0.462*** [0.106]	0.055 [0.043]	-0.039 [0.024]	-0.315* [0.176]	0.144 [0.091]
capcontrol	0.143*** [0.053]	-0.145*** [0.018]	-0.894*** [0.113]	-0.108 [0.069]	0.069* [0.039]	-0.090*** [0.016]	-0.370*** [0.137]	-0.328*** [0.082]
GSP	0.287*** [0.085]	-0.064 [0.101]	-0.481* [0.247]	2.195*** [0.370]	0.667** [0.269]	0.21 [0.150]	0.484 [0.491]	1.806*** [0.567]
WTO		-0.086 [0.062]		1.476*** [0.232]		-0.342*** [0.083]		0.780* [0.447]
V_h	-0.402*** [0.087]	-0.449*** [0.046]	0.148 [0.217]	-0.553*** [0.171]	-0.068 [0.056]	-0.231*** [0.042]	0.433* [0.241]	-0.563*** [0.210]
V_s	-0.043 [0.108]	-0.027 [0.080]	0.710*** [0.256]	0.847*** [0.277]	-0.002 [0.047]	0.041 [0.047]	0.453** [0.226]	0.299 [0.252]
Observations	1129	1226	1129	1275	1129	1226	1129	1275

Notes: robust standard errors are presented in parentheses. *, **, *** and * represent statistical significance at the .01, .05 and .10 levels, respectively. Each column includes time fixed effects. Columns 5 - 8 also include host-source country fixed effects. Columns 3,4,7 and 8 were estimated using the Tobit Method to allow for substantial number of zero value observations. See Table 2 for variable definitions

Table 5: Sensitivity Analysis: Treating Violence Separately

	1	2	3	4	5	6	7	8
	Log Imports		Log FDI		Log FDI		Log FDI	
	All	All	Developed	Developing	All	All	Developed	Developing
$\ln(\text{GDP}/\text{POP})_h$	-0.008 [0.025]	-0.023 [0.047]	0.590*** [0.157]	0.150*** [0.052]	-0.099 [0.077]	0.079 [0.148]	-0.347 [0.683]	0.201 [0.162]
$\ln(\text{GDP}/\text{POP})_s$	0.019 [0.103]	-1.301*** [0.223]	0.976*** [0.238]	-0.345 [0.384]	2.598*** [0.287]	2.174*** [0.519]	3.052*** [0.596]	10.098** [4.319]
$\ln(\text{GDP})_h$	0.884*** [0.036]	0.891*** [0.039]	1.609*** [0.053]	0.774*** [0.081]	1.972*** [0.117]	2.051 [0.000]	1.82 [0.000]	1.879*** [0.279]
$\ln(\text{GDP})_s$	0.964*** [0.026]	0.703*** [0.056]	1.095*** [0.053]	0.393* [0.235]	1.276*** [0.072]	1.288*** [0.151]	1.079*** [0.178]	-9.345** [4.296]
distance	-0.878*** [0.050]				-0.049 [0.143]			
CommLanguage	0.436*** [0.086]				0.548** [0.238]			
Land _h	-0.443*** [0.062]				-0.281 [0.248]			
Land _s	-0.559*** [0.074]				-1.103*** [0.216]			
telecom	0.684*** [0.222]	1.041*** [0.256]	4.067*** [0.209]	1.148*** [0.284]	5.088*** [0.717]	4.547*** [0.356]	5.330*** [0.435]	0.92 [1.255]
corruption	0.028 [0.022]	-0.046** [0.022]	0.056 [0.043]	-0.039 [0.024]	0.172** [0.075]	0.031 [0.081]	-0.309* [0.175]	0.137 [0.090]
capcontrol	-0.133*** [0.016]	-0.091*** [0.016]	0.070* [0.040]	-0.090*** [0.016]	-0.186*** [0.054]	-0.246*** [0.073]	-0.367*** [0.137]	-0.303*** [0.082]
GSP	0.800*** [0.070]	0.622*** [0.150]	0.668** [0.270]	0.203 [0.150]	0.946*** [0.176]	1.566*** [0.345]	0.49 [0.492]	1.641*** [0.539]
WTO	-0.139** [0.062]	-0.445*** [0.075]	-26.277*** [1.556]	-0.340*** [0.083]	1.467*** [0.226]	0.888* [0.486]		0.870* [0.453]
V_h^{ER}	-0.339*** [0.074]	-0.179** [0.087]	-0.299 [0.220]	-0.223** [0.088]	-1.360*** [0.297]	-1.931*** [0.436]	-0.495 [0.700]	-1.705*** [0.424]
V_s^{ER}	-0.577* [0.301]	0.162 [0.129]	-0.197 [0.140]	0.122 [0.176]	0.455 [0.709]	-0.501 [0.571]	-0.224 [0.799]	-0.942 [0.807]
V_h^T	-0.445*** [0.054]	-0.191*** [0.041]	-0.064 [0.061]	-0.234*** [0.046]	-0.554*** [0.164]	0.002 [0.157]	0.468* [0.253]	-0.097 [0.216]
V_s^T	0.042 [0.078]	-0.006 [0.043]	0.022 [0.052]	0.027 [0.053]	0.896*** [0.225]	0.463*** [0.194]	0.536** [0.254]	0.468 [0.293]
Observations	2355	2355	1129	1226	2404	2404	1129	1275

Notes: robust standard errors are presented in parentheses. ***, ** and * represent statistical significance at the .01, .05 and .10 levels, respectively. See Table 2 for variable definitions. Each column is the basic gravity model including time fixed effects. Columns 2 - 4 and 6-8 also include host-source country fixed effects. Columns 5 - 8 were estimated using the Tobit Method to allow for substantial number of zero value observations. Also included in the regression are: Relative violence between host and source countries $V_{h,s}^{TER}$, as measured by an index of dummies between host ($V_{h,s}^T=1$ if terrorism occurs in each year for host and zero otherwise) subtracted from dummies for source ($V_{h,s}^{ER}=1$ if external conflict or revolution occurs in each year for source and zero otherwise).

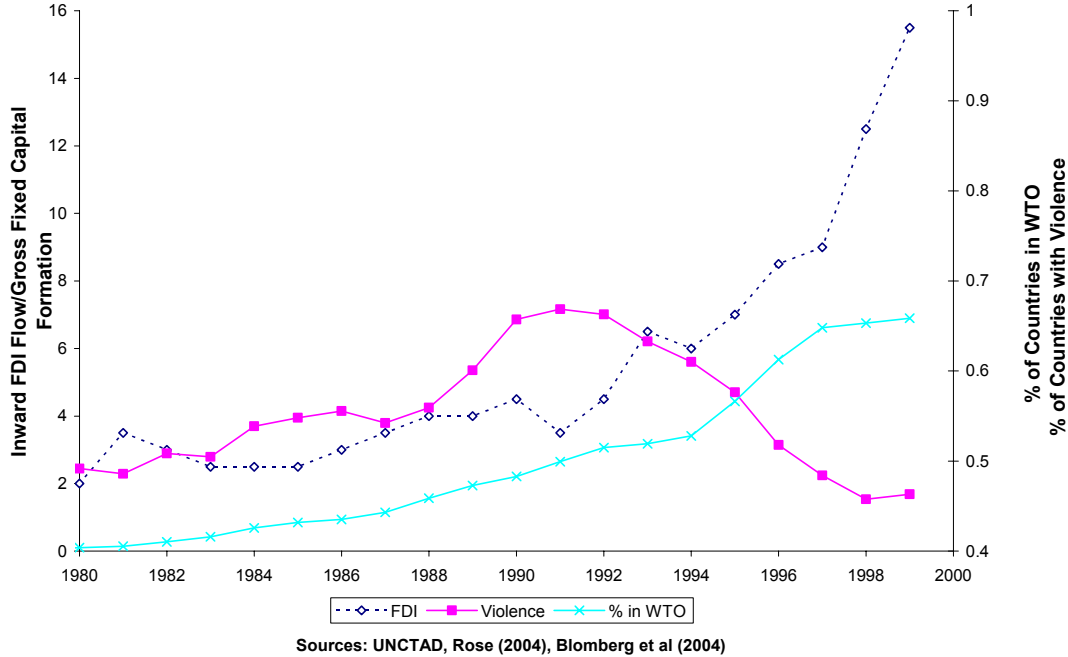
Table 6: Theoretical Gravity Models for Violence and FDI

	Log FDI					
	1	2	3	4	5	6
	Full	Developed	Developing	Full	Developed	Developing
distance	-0.091 [0.170]	0.059 [0.390]	-0.246 [0.291]	-0.109 [0.174]	0.073 [0.390]	-0.254 [0.296]
CommLanguage	1.057*** [0.244]	1.224** [0.506]	0.359 [0.356]	1.121*** [0.248]	1.209** [0.504]	0.494 [0.365]
Land _h	-0.493** [0.251]	-0.787*** [0.281]		-0.533** [0.251]	-0.767*** [0.282]	
Land _s		-0.468 [1.093]		-1.233*** [0.251]	-1.887*** [0.313]	-8.584*** [1.152]
telecom	3.950*** [0.829]	5.810*** [2.087]	1.674* [1.002]	3.764*** [0.851]	5.860*** [2.084]	1.518 [1.039]
corruption	0.063 [0.072]	-0.478*** [0.128]	0.379*** [0.102]	0.08 [0.072]	-0.482*** [0.129]	0.430*** [0.102]
capcontrol	-0.159*** [0.051]	-0.795*** [0.111]	0.015 [0.063]	-0.151*** [0.051]	-0.793*** [0.112]	0.028 [0.063]
GSP	0.783*** [0.168]	-0.549** [0.247]	1.798*** [0.347]	0.749*** [0.169]	-0.564** [0.254]	1.719*** [0.327]
WTO	1.170*** [0.229]		1.235*** [0.229]	1.115*** [0.233]		1.234*** [0.237]
$\sum Y_h Y_s$	1.692*** [0.134]	1.499*** [0.329]	0.539*** [0.207]	1.631*** [0.139]	1.504*** [0.328]	0.407* [0.213]
$(Y_h - Y_s)^2$	-0.090*** [0.015]	-0.078*** [0.019]	-0.218*** [0.028]	-0.090*** [0.015]	-0.078*** [0.019]	-0.222*** [0.028]
$(y_h - y_s)^2$	-0.076*** [0.026]	0.685* [0.410]	-0.104*** [0.035]	-0.083*** [0.029]	0.652 [0.412]	-0.073** [0.036]
$(Y_h - Y_s)(y_h - y_s)$	0.002 [0.027]	0.253** [0.112]	-0.134*** [0.036]	0.005 [0.027]	0.254** [0.112]	-0.153*** [0.037]
$V_h(y_h - y_s)^2$	0.052** [0.025]	-1.718*** [0.459]	0.147*** [0.035]			
$V_h^{ER}(y_h - y_s)^2$				0.176*** [0.059]	-3.412 [10.104]	0.358*** [0.063]
$V_h^T(y_h - y_s)^2$				0.050* [0.029]	-1.660*** [0.476]	0.085** [0.037]
V_h	-0.839*** [0.163]	0.753*** [0.250]	-1.523*** [0.275]			
V_s	0.185 [0.201]	0.440* [0.254]	0.092 [0.287]	0.184 [0.202]	0.450* [0.255]	0.113 [0.290]
V_h^{ER}				-1.978*** [0.434]	1.419* [0.841]	-3.151*** [0.506]
V_h^T				-0.547*** [0.181]	0.684** [0.274]	-0.657*** [0.328]
Observations	2407	1131	1276	2404	1129	1275

Notes: robust standard errors are presented in parentheses. ***, ** and * represent statistical significance at the .01, .05 and .10 levels, respectively. Each Column is a theoretical gravity model including country and time fixed effects and is estimated using the Tobit method to allow for substantial number of zero value observations. See table 3 and table 5 for definitions.

Figure 1: Violence, WTO Membership, and FDI Trade, 1981-1999

**Fig 1A: FDI Increases As Violence Fell After 1990
(3-year moving averages)**



**Fig 1B: Violence and FDI shares for Developing Countries
(3-year moving averages)**

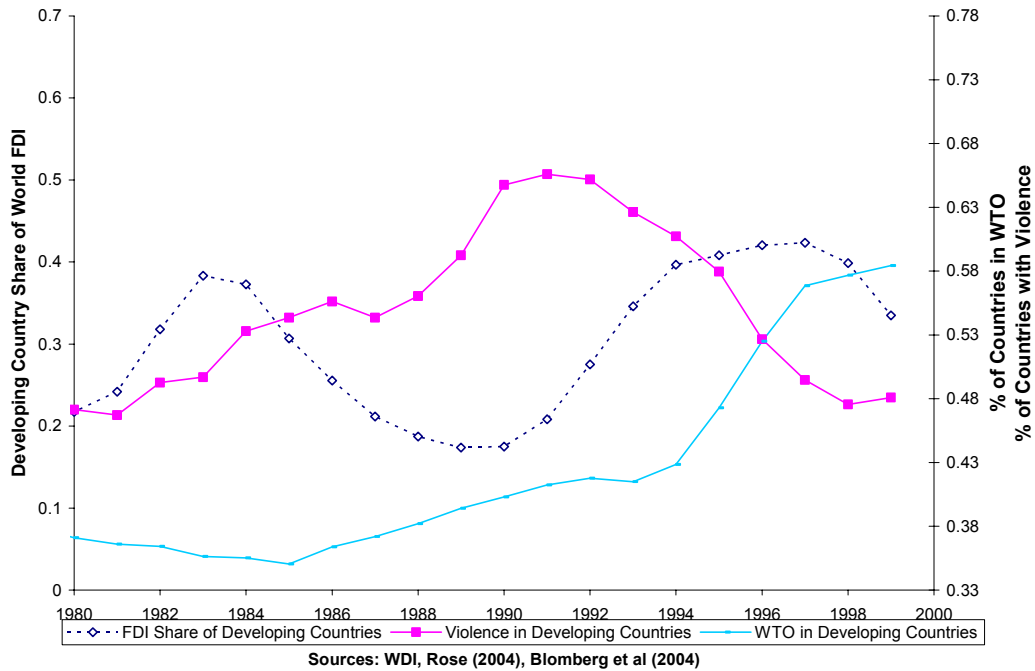
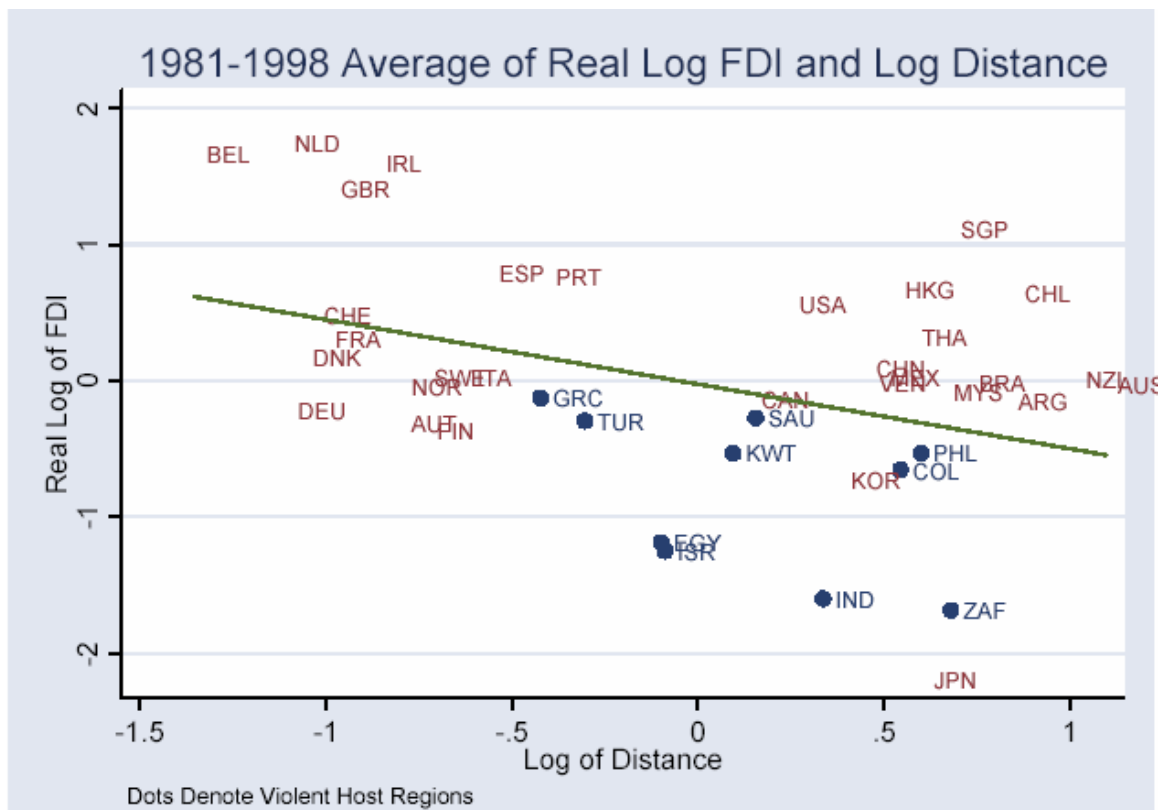


Figure 2: The Impact of Violence in the Gravity Equation



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