THE CROSS-BORDER IMPACT OF VIOLENT EVENTS

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Abstract

This paper argues that violent events have two economic effects: a direct loss from the destruction of physical and human capital, and a reallocation of financial and economic resources. It is the first to document the positive cross-border impact that follows violent events as a result of this reallocation. Thus, it reconciles the two existing perspectives in the literature on whether violence has a small or large economic effect. Our results show that, in globally integrated markets, the substitution of financial and economic activities away from afflicted countries magnifies their losses. Additionally, the paper evaluates the impact of certain geographic, political and financial country characteristics on the reallocation of capital.

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1 Introduction

This paper investigates the cross-border financial impact of violence. It examines the global reallocation of capital in the wake of violent events, and analyzes its determinants. Consequently, this paper helps reconcile the divergent arguments in the existing discourse on the magnitude of the economic impact of violent events. It does so by highlighting the role played by interconnected financial and economic global markets.

There is a dichotomy in the literature on the magnitude of the economic impact of terrorism and violence. Studies that measure the direct impact of violent events tend to find a small impact on the economy. Such studies argue that terrorism and violent events destroy only a small portion of human and physical capital. Thus, they argue terrorism results in a small negative impact. Other economists argue, however, that the impact of violence is large, and use reduced form estimates to demonstrate that.

Abadie and Gardeazabal (2008) take the first key step toward bridging the two camps by arguing that "the mobility of productive capital in an open economy may account for much of the difference between the direct and the equilibrium impact of terrorism" (Abadie and Gardeazabal 2008, 1). They further assert that "diversification opportunities that arise in an integrated world economy can greatly amplify the economic impact of terrorism" (Abadie and Gardeazabal 2008, 8). Abadie and Gardeazabal (2008) find that a standard deviation increase in terrorism risk is associated with a 5 percent drop of GDP in Foreign Direct Investment (FDI).

We offer an approach to reconcile these existing points of view and propose that violence causes two types of economic effects. The first is a small actual loss caused by the destruction of physical and human capital. The second takes the form of a reallocation of financial and economic activity from the event country to alternative non-event countries. This reallocation causes a large negative effect on the event country.

However, if reallocation of assets to other countries exists, then we should be able to document both sides of this transaction. Numerous studies have successfully recorded the negative impact of violence on affected countries. Yet, no study has previously recorded the other side of this transaction i.e. the positive impact on the other countries to which capital has been reallocated. This is the first study to document the positive flow from countries where violence took place to other countries. We find support for the argument that while the direct impact of violence on the afflicted country is relatively small, the interconnectedness of global markets results in an outflow of financial and economic activity that intensifies its effects. This global reallocation leads us to believe that the net global impact of terror is smaller than previously thought. This study also explores factors that determine the magnitude of this cross-border reallocation. Specifically, it examines the effects of geographic distance, relative safety, openness of global financial markets, and depth of financial markets in the event country.

This research uses financial data covering 57 stock exchanges in 49 countries over a period of 20 years. It analyzes the impact of 66 violent events that took place in 32 countries. Throughout this paper, the term "violent events" is used to describe politically motivated acts of violence including wars, bombings, assassinations, hijackings, and firearm shootings. Also, we will refer to a country that suffers a specific violent event as the "event country" and to countries that were not directly afflicted by the violent event as "non-event countries".

The rest of this paper is organized in the following seven sections. Section 2 reviews the existing literature on the impact of violence and instability on an economy. Section 3 introduces the theoretical models and hypotheses and section 4 presents the methodology used in this study. Section 5 discusses the empirical model and data, while Section 6 displays the results of the analyses, and section 7 concludes.

2 Literature Review

In his book *What Makes a Terrorist*, Alan Krueger outlines the two existing views on how terrorism impacts the economy of the country it targets (Krueger 2007). The first view argues that human capital is the primary engine in modern economies and, fortunately, only a small fraction of it falls victim to violent events. The substitution from activities that are highly susceptible to violence such as tourism toward less susceptible activities in an afflicted city mitigates the impact of violence. Finally, the fact that defense and security companies actually benefit from such events, as Berrebi and Klor (2005) show in the case of Israel, dampens the negative impact of violence.

Supporters of this small impact view include Alan Krueger himself, who wrote an article in the *New York Times* several days after the September 11 attacks in which he argued that terrorist events lead to a small impact on the economy (Krueger 2001). Supporters of this argument also include Gary Becker and Kevin Murphy. In their *Wall Street Journal* article “Prosperity Will Rise Out of the Ashes,” published shortly after the 9/11 attacks, they argue that the attacks destroyed only 0.06 percent of the total productive assets in the US. Even with conservative estimates, the impact of the attacks on US GDP would only amount to a loss of 0.3 percent (Becker and Murphy 2001). Like Krueger, they compare terrorist attacks to natural disasters and point to the earthquake that destroyed more than 100,000 buildings in the Japanese city of Kobe in 1995 yet left the region’s GDP almost unaffected one year later.

The second view argues that the economic impact of terrorism is large. Its supporters point out that, in the wake of a fresh attack, people overreact to the threat of future violent events and the economy experiences increased uncertainty. Bloom (2006) depicts stock market volatility around key events in history. The period after 9/11 witnessed a significant increase in volatility. Supporters of the “large impact” argument further assert that while the economy as a whole may successfully adjust following an attack, certain industries, such as the tourism and travel industries, suffer long-term effects.

A number of empirical studies find evidence for the “large impact” argument. Abadie and Gardeazabal (2003) measure the impact of terrorism on the economy of the Basque region. They use the ceasefire truce of September 1998 as a natural experiment to evaluate the impact of violence. Their event study finds that the stocks of firms with significant presence in the Basque region experience significant positive performance as the truce becomes credible. The stocks, however, suffer negative performance once the truce comes to an end. Additionally, Abadie and Gardeazabal (2003) construct a counterfactual Basque region from other Spanish regions that economically resemble the

Basque region prior to the outbreak of conflict in the 1970s. They find that the GDP per capita for the Basque region dropped by 10 percent as compared to its counterfactual control region. The gap was shown to widen following spikes in terrorist events.

The majority of empirical studies that support the “large impact” argument rely on the event study methodology to evaluate the impact of violent events. The use of event studies to measure the impact of various events has long been established. As MacKinlay (1997, 13) points out, “perhaps the first published study is James Dolley (1933)”. Key improvements to the utilized methodology have been deployed over the decades, most notably by Eugene Fama et al. (1969). Event studies are commonly used to evaluate the impact of firm-level events on their stock prices, such as quarterly earnings announcements. Recently, event studies have been used to evaluate the impact of terrorism and conflict. Generally, these studies found that such turbulent events lead to a large negative impact on the valuation of listed securities.

Chen and Seims (2004) deploy the event study to evaluate the impact of 14 negative events, such as Pearl Harbor and Iraq’s invasion of Kuwait in 1990 on stock market indices. They report negative market reaction ranging from -6.45 percent for Pearl Harbor, to -7.90 percent for the 9/11 attacks over an 11-day window. They show that U.S. stock exchange markets are more resilient than in the past and that they require less time to recover from negative shocks than other global capital markets. They argue that the increased market resilience is partially explained by a stable financial sector that offers sufficient liquidity and minimizes panic (Chen and Seims 2004, 20).

Berrebi and Klor (2005) evaluate the impact of such attacks on Israeli companies during the period 1998 to 2000. In order to isolate common industry shocks from negative events, they pair US and Israeli companies with similar characteristics. They find that the second Palestinian Intifada had a negative impact of 5 percent on non-defense firms, while defense and security companies had a significant positive reaction to this event of 7 percent.

Karolyi and Martell (2005) examine the impact of 75 terrorist attacks against firms on their valuation. They find a statistically significant negative impact of 0.83

percent. Their results differ depending on whether the attack resulted in a loss of physical or human capital. They found that attacks against human capital, like kidnappings of firm executives, lead to higher losses in stock prices than those resulting from attacks against physical targets such as facilities or buildings. They also found that attacks in wealthier and more democratic countries result in larger drops in share prices.

Eldor and Melnick (2004) investigated the impact of violent events in Israel on its stock market. They find that suicide attacks result in a permanent impact on the stock and foreign exchange markets. The number of fatalities and injuries also left a permanent impact. On the other hand, the location of a terror attack had no effect on either market. They found that markets did not become desensitized to terror attacks. They concluded that financial markets continued to efficiently perform and that market-liberalization policies contributed to coping with terror.

So far, existing literature has documented only the negative impact of violent events. The single outlier is the study of Berrebi and Klor (2005) that found a positive impact of such events on Israeli defense companies. Nonetheless, the existing research has not explored the cross-border effects of such turbulent events.

Abadie and Gardeazabal (2008) introduce the integrated world economy channel to the investigation of the impact of terror. Their model emphasizes the one-sidedness of terror shocks and their effect on decreasing the mean of expected return to capital, in addition to increasing its variance (Abadie and Gardeazabal 2008, 5). They analyze the impact of terrorism risk, measured using the Global Terrorism Index for the period 2003/2004, on FDI positions of a cross-section of countries using World Bank data. Their findings reveal a 5 percent drop in FDI positions (normalized by GDP) for a one standard deviation increase in the intensity of terrorism (Abadie and Gardeazabal 2008, 21).

3 Theoretic Model and Hypotheses

Building on the aforementioned literature, we offer a way to reconcile the two existing positions regarding the economic impact of violence. We propose that violence causes two types of economic effects. The first is an actual loss caused by the destruction of physical and human capital. This is a small negative impact that event countries suffer, and is documented by researchers using direct measurements. The second is a reallocation of financial and economic activity from the event country to alternative non-event countries in the wake of the event. This reallocation causes a large negative effect on the event country and is documented by reduced form estimate studies. It is this substitution effect, resulting from the integration of global financial and economic markets, which magnifies the effect of violence on the event country, and is consistent with Abadie and Gardeazabal (2008).

In order for this proposition to hold, however, we must be able to document the other side of the substitution effect: the positive impact that non-event countries experience in the wake of violent events. So far, the literature has focused exclusively on the impact of violence on event countries and therefore only documents its negative effect. In order to document the positive, we examine the impact of violence on non-event countries.

Two frameworks can predict the cross-border impact of violent events. The first model works through the financial channel and the second through the economic one. Both channels will result in the substitution of financial investments and economic activities from an event country to non-event countries. Both frameworks are discussed below.

A Financial Framework for Violence-Induced Substitution of Optimal Equity Allocation

We base our model on Merton's (1976) model of an asset that is susceptible to shock as a result of new information that occurs according to a Poisson process.

$$dS/S = \alpha dt + \sigma\, dZ - \lambda\delta\, dq(t)$$

Where α is the instantaneous expected return on the stock, σ^2 is the instantaneous variance of the return, which is conditional on no arrival of new information and follows a standard Gauss-Wiener process, dZ, q(t) is the independent Poisson process and λ is the rate of arrival of new information. Note that the above equity pricing equation follows the same dynamics as the return to capital equation from the AK model that Abadie and Gardeazabal (2008) used.

Using the Abadie and Gardeazabal (2008) model, consider an investor who is choosing to invest his wealth in the equities of two countries i and j. Each country has a single equity. Countries i and j are susceptible to violent shocks that cause a Poisson jump in their equity at a rate of λ_i and λ_j respectively. If the Poisson event takes place, the equity in the event country suffers a change equal to δ. The investor is solving the following utility maximizing problem by choosing the optimal consumption plan, and the fraction of wealth to invest in country i, $v_{i,}$ with the remainder (1-v_i) to be invested in country j (Abadie and Gardeazabal 2008, 6):

$$\text{Max} \quad E\left[\int_0^{\infty} e^{-\beta t}\, \frac{C(t)^{1-\gamma}-1}{1-\gamma}\, dt\right] \qquad \text{Eq. (1)}$$

$$\begin{aligned} \text{s.t.} \qquad dK(t) = \quad & (\alpha_i v_i(t)K(t) + \alpha_j(1 - v_i(t))K(t) - C(t))dt \\ & + \sigma_i v_i(t)K(t)dZ(t) + \sigma_j(1 - v_i(t))K(t)dZ(t) \\ & - \delta v_i(t)K(t)dq_i(t) - \delta(1 - v_i(t))K(t)dq_j(t) \end{aligned}$$

Abadie and Gardeazabal (2008) show that the impact of terrorism on the optimal share of world capital invested in country i (v_i) is governed by the equation:

$$\frac{d\hat{v}_i}{d\lambda_i} = -\frac{\delta_i(1 - \delta_i\hat{v}_i)^{-\gamma}}{\gamma\left(\sigma_i^2 + \sigma_j^2\right) + \lambda_i\delta_i^2\gamma(1 - \delta_i\hat{v})^{-\gamma-1} + \lambda_j\delta_j^2\gamma(1 - \delta_j(1 - \hat{v})^{-\gamma-1}} < 0 \qquad \text{Eq. (2)}$$

The above equation indicates that as the rate of occurrence of violent event increases in country i (λ_i), the optimal share of world capital invested in that country (v_i) drops.

We can expect investors to positively update their estimates of the rate at which violent events afflict an event country (λ_i) when a violent event indeed hits that country due to cognitive heuristics. Among these heuristics are availability and representativeness. The availability heuristic describes how "people assess the frequency …or the probability of an event by the ease with which instances or occurrences can be brought to mind" (Tversky and Kahneman 1974, 1127). While the representativeness heuristics describes how "the subjective probability of an event, or a sample, is determined by the degree to which it: (i) is similar in essential characteristics to its parent population; and (ii) reflects the salient features of the process by which it is generated" (Tversky and Kahneman 1972, 430).

Thus, capital will flow out of event countries and into non-event countries as a result of investors raising their estimates of the rate of violent events in country i (λ_i). As a result, the valuation of firms in event countries will drop following an event due to capital outflow resulting in selling of equities, which decreases their prices (hypothesis 1 below). On the other hand, the valuation of firms in non-event countries will rise as a result of the increased demand from capital inflow, which increases their prices. (hypothesis *2* below).

Hypothesis 1: *The valuation of equities in an event country will decrease upon suffering a violent event.*

Hypothesis 2: *The valuation of equities in non-event countries will increase once an event-country suffers a violent event.*

A Framework for Reallocation of Economic Activities

The value of firms in non-event countries can also increase through economic channels. In the wake of a violent attack in an event country, economic activities that are highly sensitive to violence, such as tourism and transportation, will shift from the event country to non-event countries. Also, firms in the event country will face higher security, insurance, and shipping costs following an event. Therefore, event country firms will become less competitive *vis-à-vis* firms in non-event countries. This, along with the migration of certain activities such as tourism into non-event countries, will raise the profitability and, hence, the valuation of firms in non-event countries, and decrease it in event countries. The economic channels, therefore, work in the same direction as the financial one, as described in hypotheses 1 and 2 above.

Determinants of the Impact of Violence on Non-Event Countries

In addition to evaluating hypotheses 1 and 2 above, we examine the effect of the following factors on the reallocation of financial and economic activities to non-event countries as a result of violent events.

Geographic Distance

While the financial and economic channels lead us to the same conclusions about the impact of violent events, they may differ in the geographic dispersion of these effects. Reallocating capital across large distances is not necessarily associated with large increases in transaction costs, as is the case for reallocation of economic activities. Capital flows are also more sensitive to risk than economic activity due to their lower transaction costs of reallocation and, as a result, may follow a different geographic dispersion that emphasizes risk mitigation.

On the other hand, distance has a large impact on information, transportation, and transaction costs associated with reallocating economic activities. Geographic specialization in certain products and services, such as olive oil and Caribbean tourism, also plays an important role in the geographic reallocation of economic activities. This imposes distance restrictions on potential substitute destinations. Also, given regional specialization, the valuation of firms in regional non-event countries may increase as a result of the decreased competitiveness of firms in the event country due to their higher transportation and security costs and lower available capital. Regional countries, therefore, may receive a positive windfall from the violent event.

The different effect that distance has on financial and economic reallocation leads us to believe that the relationship between the geographic distance and the valuation of securities in non-event countries is not necessarily monotonic. As a result, we use two variables to ascertain this relationship. The first is the distance between the event and non-event countries and the second is the geographic contiguity of these two countries.

Relative Safety

An increase in (λ_j) in equation (2) above will decrease the capital outflow from event country i to non-event country j. We will empirically verify this prediction by investigating the impact of perceived relative safety between the event and non-event countries on the reallocation of financial and economic activity.

Alternative Open Country Destinations

Abadie and Gardeazabal (2008) show that the optimal share of world capital invested in country i (v_i) is a decreasing function of the number of economies in the world to which capital can flow. In other words, the more diversification locations that exist in the world, the less the share of world capital any given country will receive. We test if this prediction holds - that is whether the amount of capital that will flee to a certain non-event country will decrease as the number of alternative potential destinations increases.

Depth of the Event Countries Financial Markets

Chen and Seims (2004) propose that a well-functioning and developed financial market is a key determinant to an economy's ability to absorb shocks such as violent events (Chen and Seims 2004, 361). While the depth of financial markets is a sign of their maturity, it can also be an indicator of a market bubble that leaves it susceptible to violent shocks. We investigate how the depth of the event country's financial markets affects the cross-border reallocation of capital and its ability to absorb shocks and prevent reallocation.

4 Methodology

The event study is used to measure the impact of a violent event on the valuation of the equities in event and non-event countries. Parametric and nonparametric tests of the event study results will test hypotheses 1 and 2 that violent events impact the equities of event countries negatively and those of non-event countries positively. Then, the measured impacts from the event study on non-event countries will be entered into a cross-sectional regression to assess the determinant of cross-border reallocation.

The Event Study Design

The event study begins with the assumption that stock markets are rational and therefore reflect investors' valuation of firms as soon as new information becomes available. Given this rationality assumption, investors update their valuation of firms upon receiving new information. The impact of an event on an economy is evaluated through measuring the response it generates on its stock market. For example, if violent events negatively impact investors' perception of the attractiveness or wellbeing of country *i*'s economy, this information will be transmitted rapidly to the country's financial market.

The event study starts by describing a specific event that will be investigated and the specific equities that will be analyzed. First, the event date is established. If the event took place during the working hours of the stock market, then the day of the event's occurrence is the event date. If the event took place after the working hours of the market or on a holiday, then the event date is the first trading day after the event.

Second, the study selects an event window during which the event is expected to affect the stock market. If the event was unexpected, such as a terrorist attack, the event window begins on the event date and usually includes a number of days after the event date, during which the event is still affecting market performance. If the event has been expected, such as the declaration of war on Iraq in 2003, then the event window includes the days leading up to the event date, and hence the effect of anticipation of the event on the stock market. This event window, including the days before the event date, depicts a visual comparison of the trend before and after the event date. We include both kinds of event windows in our analysis. For the sake of robustness, eight event windows are deployed in this study. Together, these eight event windows compose a comprehensive evaluation of the impact of an event.

Table 1 Event Windows Used in this Study

Event Window:	Begins	…and ends
(0,1)	on the event day,	one trading day after.
(0,2)	on the event day,	two trading days after.
(0,5)	on the event day,	five trading days after.
(0,10)	on the event day,	ten trading days after.
(-1,1)	one trading day before the event day,	one trading day after.
(-2,2)	two trading days before the event day,	two trading days after.
(-5,5)	five trading days before the event day,	five trading days after.
(-10,10)	ten trading days before the event day,	ten trading days after.

Third, an estimation period is assigned during which the "normal" performance of the stock market prior to the event taking place is scrutinized. The estimation period commences prior to the event date, in order to establish a counterfactual return for each security had the event not taken place. In this analysis, the estimation period starts one day prior to the event window and extends back 100 trading days. This 101-day period is sufficiently lengthy to establish a robust expected return for each security. At the same time, it is not too long as to yield outdated estimates. This is especially important in the case of emerging stock markets, which undergo relatively sharp trends over short periods of time. The normal expected return of the equities, which is extrapolated during this estimation period, will be used to generate predictions about the future performance of these equities at the event's onset. The impact of the event on the economy and investors can be assessed using firms' abnormal return (AR), which measures the difference between actual returns for these equities during the event window vis-à-vis their estimation period's predicted returns. If the event was well received by investors, the AR will on average be positive. If investors perceived the event as detrimental to the future valuation of firms, the AR will be negative. By observing the ARs during the event window period and evaluating their statistical significance, we can gauge the impact of the event on the economy.

There are several methods to measure the normal performance of equities during the estimation period. The most deployed of these are the constant mean, market, and factors models**.** This study utilizes the constant mean model for two reasons. First, the constant mean model has been found by Brown and Warner (1980, 1985) to perform as well as other more sophisticated models in their widely quoted simulated investigation of the performance of different event study methodologies. Second, while most studies focus on firm-level events such as earning announcements, this study focuses on market-level macro events like violent events that impact the whole market and are not restricted to specific firms. Unlike other methods, the constant mean model allows for analyzing the impact of events affecting the whole market. For example, the market return model uses the stock market's performance to predict the performance of specific firms. Yet, when the whole market is impacted by the event, we cannot use its performance to make predictions for specific firms. Thus, the constant mean model was utilized in this study for its convenience and performance. This model is individually applied to the returns of each of the stock exchange indices.

Measuring Abnormal Return

The actual return for exchange (*i*) on day (t) is calculated as the arithmetic change in the value of the index (P) from its closing price on the previous trading day:

$$R_{it} = (P_{it} - P_{i(t-1)}) / P_{i(t-1)} \qquad \text{Eq. (3)}$$

Under the constant mean model, the long-term return $\overline{R_i}$ of an exchange (*i*) is assumed constant, and is calculated during the estimation period as the average return of exchange (*i*) during the period. Hence, the actual return R of exchange (*i*) on day (t) is

$$\boldsymbol{R_{it} = \overline{R}_i + \varepsilon_{it}} \qquad \text{Eq. (4)}$$

Where ε_{it} is error term for exchange (*i*) during period *t* with the following characteristics:

$$E(\varepsilon_{it}) = 0 \text{ and } Var(\varepsilon_{it}) = \sigma^2(\varepsilon_{it})$$

Thus, the Abnormal Return (AR) of exchange (*i*) on day (t) is equal to;

$$AR_{it} = \varepsilon_{it} = R_{it} - \overline{R}_i \qquad \text{Eq. (5)}$$

The Average Abnormal Return (AAR) of all exchanges on day (t) is the average of the abnormal returns of all N exchanges on day (t) within each of the event and non-event country categories:

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{it} \qquad \text{Eq. (6)}$$

As discussed above, this study investigates the total impact of the event during the event period, by measuring the Cumulative Average Abnormal Return (CAAR) for all exchanges within each of event and non-event country categories throughout the duration of the event window, which starts on day t1 and ends on day t2:

$$CAAR_{t1,t2} = \sum_{t=t1}^{t2} AAR_t \qquad \text{Eq. (7)}$$

Hypothesis Testing

Hypotheses 1 and 2 are evaluated via four commonly used parametric and non-parametric methods to test the statistical significance of the $CAAR_{t1,t2}$. The first two methods are parametric tests that have been traditionally used in event studies. These methods place certain assumptions on the distribution of the abnormal returns of individual firms. The third method is the non-parametric Generalized Sign Test, and the fourth, Corrado's rank test, is the most resilient event study test.

Method 1: The Parametric Traditional Test

This method is outlined in Binder (1998). Under the null hypothesis that the event under investigation has no impact on the equities, the distribution of the Abnormal Returns is assumed to be normally distributed with mean zero and variance $\sigma^2(\varepsilon_{it})$:

$$AR_{it} \sim N(0, \sigma^2(\varepsilon_{it})) \qquad \text{Eq. (8)}$$

Furthermore, individual AR_{it} 's are assumed to be independent and identically distributed. It is further assumed that the standard deviation of the exchanges' abnormal returns remains unchanged during the event window period. That is, the event affects the mean only, and leaves other parameters unchanged. Hence, the AAR_t 's standard deviation ($\sigma(AAR_t)$) is estimated by calculating the standard deviation of the AR_{it} of each index on the same day (t) and dividing by the square root of the number of exchanges (Binder 1998). Under the assumption that the AR_{it} 's are normally distributed, the estimated standard deviation of AAR_t has a t-distribution (Binder 1998):

$$\sigma(AAR_t) = \sigma(AR_t) \big/ \sqrt{N} \qquad \text{Eq. (9)}$$

The statistical significance of the AAR_t is then tested through:

$$Z_1 = AAR_t \;/\; (\sigma(AR_t) \big/ \sqrt{N}\;) \qquad \text{Eq. (10)}$$

The $CAAR_{t1,t2}$'s standard deviation $(\sigma(CAAR_{t1,t2})$ is calculated from the cross-section estimate of the standard deviation of AAR_t as follows (Binder 1998):

$$\sigma(CAAR_{t1,t2}) = [\sum_{t1}^{t2} \sigma^2(AAR_t)]^{1/2} \qquad \text{Eq. (11)}$$

The test statistic is constructed as:

$$T_1 = (CAAR_{t1,t2}) / [\sum_{t1}^{t2} \sigma^2(AAR_t)]^{1/2} \qquad \text{Eq. (12)}$$

Method 2: The Parametric Standardized Test

The second method, developed by Boehmer, Musumeci, and Poulsen (1991), relaxes some of the assumptions imposed in the first. Specifically, Brown and Warner (1980 and 1985) in addition to Brown, Harlow, and Tinic (1988) find that several events have in fact changed the standard deviation of the abnormal returns during the event period, in addition to changing the mean. The new approach does not depend on the assumption of an unchanged standard deviation. It constructs the Standardized Abnormal Returns (SAR) for each exchange by dividing the exchange's return by its standard deviation. The latter is estimated from its abnormal returns during the estimation period.

$$SAR_{it} = AR_{it} / \sigma_i \qquad \text{Eq. (13)}$$

To test the null hypothesis that the abnormal returns for all N exchanges on day t of the event period are equal to zero we construct the test statistic:

$$Z_2 = (\sum_{i=1}^{N} SAR_{it}) / \sqrt{N} \qquad \text{Eq. (14)}$$

Boehmer, Musumeci, and Poulsen (1991) construct a test to evaluate the hypothesis that the Standardized Cumulative Abnormal Returns (SCAR) for all exchanges during the whole event window is equal to zero. Their test is:

$$T_2 = \frac{\frac{1}{N} \sum_{i=1}^{N} SCAR_{it2}}{\sqrt{\frac{1}{N(N-1)} \sum_{i=1}^{N} (SCAR_{it2} - \overline{SCAR})^2}} \qquad \text{Eq. (15)}$$

where $SCAR_{it2}$ is the standardized cumulative abnormal return for exchange *(i)* over the whole event window period starting on day t_1 and ending on t_2. $\overline{SCAR}$ is the cross-section average of the N exchanges $SCAR_{it2}$. The test statistic T_2 is asymptotically distributed as a standard normal variable.

Method 3: The Nonparametric Generalized Sign Test

The non-parametric tests above impose certain conditions on the distribution of abnormal returns. Previous studies show that these restrictions are not necessarily held in practice. Therefore, non-parametric tests are usually used to get more robust results. This paper uses the generalized sign test as explained by Cowan (1992). The traditional sign test is a binomial test of whether the frequency of positive (negative) cumulative abnormal returns across exchanges in the event period exceeds a standard population median of p=0.5. The generalized sign test used in this study tests whether the frequency of positive (negative) cumulative abnormal returns across exchanges in the event period exceeds the proportion of positive (negative) abnormal returns in the estimation period under the null hypothesis of no positive (negative) abnormal performance. By calculating the benchmark median of positive (negative) returns from the estimation period, we take into account any existing skewness in the distribution of abnormal returns. We deploy a positive generalized test and a negative one.

To establish the benchmark median of positive (negative) returns during the estimation period p(+) (or p(-)), we calculate the proportion of positive (negative) abnormal returns in the estimation period. Define (pos) as the number of indices whose cumulative average abnormal returns at the end of the event period are positive. Define (neg) as the number of indices whose cumulative abnormal returns at the end of the event period are negative. N is the number of exchange events. The positive and negative generalized sign tests are constructed as follows:

Positive Generalized Sign Test	Negative Generalized Sign Test	
$Z_{Sign\ positive} = \frac{pos - Np_{(+)}}{\sqrt{Np_{(+)}(1-p_{(+)})}}$	$Z_{Sign\ negative} = \frac{neg - Np_{(-)}}{\sqrt{Np_{(-)}(1-p_{(-)})}}$	Eq. (16)
$p_{(+)} = \frac{1}{N}\sum_{i=1}^{N} S_{(+),it}$	$p_{(-)} = \frac{1}{N}\sum_{i=1}^{N} S_{(-),it}$	Eq. (17)
$S_{+,it} = \begin{cases} 1\ if\ CAAR_{it} > 0 \\ 0\ \ otherwise \end{cases}$	$S_{-,it} = \begin{cases} 1\ if\ CAAR_{it} < 0 \\ 0\ \ otherwise \end{cases}$	

These statistics have standard normal distribution. The null hypothesis is that the proportion of positive (negative) cumulative abnormal returns in the event period is the same as the proportion of positive to negative (negative to positive) returns during the estimation period.

Method 4: The Nonparametric Rank Test

The nonparametric rank test was developed by Corrado (1989). Campbell and Wasley (1993) find this test to be "consistently the best-specified and most powerful test statistic across numerous event conditions" (Campbell and Wasley 1993, 75). This test does not require abnormal returns to be normally distributed to achieve proper specification under the null hypothesis, and "remains immune to misspecification under the null hypothesis" (Campbell and Wasley 1993, 88). The test is constructed by ranking the abnormal returns for each exchange for each event. The rank of exchange i's abnormal return for a certain event on day t is k_{it}. The Corrado rank measure as used in Meznar, Nigh, and Kwok (1998) is constructed as:

$$Z_{Rank} = \frac{\sum_{t=1}^{L} \bar{k}_t}{\sqrt{\sum_{t=1}^{L} s^2\overline{(k_t)}}} \qquad \text{Eq. (18)}$$

where N is the number of exchange events, L is the length of the event window, T_1 is the first day of the estimation period, and T_2 is the last day of the event window.

$$\bar{k}_t = \frac{1}{N}\sum_{i=1}^{N}(k_{it} - E(k_i)) \qquad \text{Eq. (19)}$$

$$E(k_i) = (0.5 * (T_2 - T_1 + 1)) + 0.5 \text{ , and} \qquad \text{Eq. (20)}$$

$$s^2\overline{(k_t)} = \frac{1}{(T_2 - T_1 + 1)}\sum_{t=T_1}^{T_2}\{\frac{1}{N}\sum_{i=1}^{N}(k_{it} - E(k_i))\}^2 \qquad \text{Eq. (21)}$$

The Z_{Rank} statistic converges to unit normal as the number of securities in the portfolio increases.

5 Empirical Design and Data

Event Study Data

The financial data for the event study include 57 daily stock exchange indices from 49 countries, gathered from Global Financial Data, covering the period from

January 1, 1988 to December 31, 2007. Appendix A lists the stock exchange indices used in this study.

Sixty-six violent events that took place in 32 countries during the period from January 1988 to December 2007 are investigated in the event study. Table 2 lists the investigated violent events. The main source for this data is the Memorial Institute for the Prevention of Terrorism's (MIPT) Terrorism Knowledge Base (TKB).[1] The list of events from TKB is further augmented by media sources that report violence and conflict information not included in the TKB database. The compiled list of events is then filtered to exclude clustered events, i.e. incidents whose event windows overlap, in order to ensure that the measured impact belongs clearly to its allocated incident and not to other contemporaneous events. All events have more than one fatality, except assassinations.

Table 2 List of Violent Events Used in Event Study

Actual Event Date	Event Country	Event name	Number of Fatalities	Type of event
July 3, 1988	Iran	US shoots down an Iranian civilian plane over the straits of Hormuz	290	Bomb
December 21, 1988	United Kingdom	Bombing of Pan Am Flight 103 over Lockerbie, Scotland	270	Bomb
August 2, 1990	Kuwait	Iraq invades Kuwait	300	War
January 17, 1991	Iraq	The Second Gulf War	30000	War
March 17, 1992	Argentina	Bombing of Israel's embassy in Argentina	29	Bomb
February 26, 1993	United States of America	First bombing of World Trade Center	6	Bomb
October 3, 1993	Somalia	Battle of Mogadishu	1500	War
January 1, 1994	Mexico	Zapatista National Liberation Army attacks a government entity in San Cristobalde de las Casas	57	Firearm
March 20, 1995	Japan	Poison gas attack in Japanese subway	12	Bomb
April 19, 1995	United States of America	Oklahoma bombing	168	Bomb
July 24, 1995	Israel	Suicide Bomb	6	Bomb
November 4, 1995	Israel	Assassination of PM Rabin	1	Assassination
April 11, 1996	Lebanon	Grapes of Wrath War	162	War

[1] Currently residing under the National Consortium for the Study of Terrorism and Responses to Terrorism at the University of Maryland, URL: (http://www.start.umd.edu/data/gtd).

Actual Event Date	**Event Country**	**Event name**	**Number of Fatalities**	**Type of event**
June 25, 1996	Saudi Arabia	Khobar bombing	20	Bomb
August 5, 1996	Ethiopia	Bombing of Wabe Shebelle hotel	2	Bomb
November 23, 1996	Ethiopia	Hijacking and crashing of Ethiopian Airlines Flight 961	127	Hostages/Hijacking
December 17, 1996	Peru	Japanese embassy hostage crisis in Peru	17	Hostages/Hijacking
February 1, 1997	Indonesia	Dayak militants attack local residents	300	Other
March 13, 1997	Jordan	Israeli children shot by Jordanian soldier	7	Hostages/Hijacking
November 17, 1997	Egypt	Luxor shooting	74	Firearm
January 11, 1998	Algeria	Sidi-Hamed massacre	400	Bomb
February 14, 1998	China	Bombing of Wuhan bus and passengers	50	Bomb
March 31, 1998	Pakistan	Bombing of a Karachi market	2	Bomb
July 29, 1998	India	Bombing of the Dhamdhama weekly market	11	Bomb
October 18, 1998	Colombia	Bombing of Ecopetrol oil pipeline in Segovia	71	Bomb
December 16, 1998	Iraq	US bombs Iraq in the wake of the Lewinsky scandal (Operation Desert Fox)	1300	War
March 24, 1999	Former Yugoslavia	Nato's bombing of Serbia	150	War
July 2, 1999	Angola	Attack on the Catholic Relief Services convoy in Baixo Pundo	15	Firearm
September 4, 1999	Russian Federation	Bombing of Russian army barracks in Dagestan	64	Bomb
September 13, 1999	Russian Federation	Apartment bombing in Moscow	121	Bomb
January 5, 2000	Sri Lanka	Assassination attempt against Sri Lanka's Prime Minister	7	Bomb
July 9, 2000	Russian Federation	Bombing of the Vladikavkaz market	6	Bomb
September 13, 2000	Indonesia	Bombing of the Jakarta Stock Exchange Building	15	Bomb
October 12, 2000	United States of America	USS Cole attack in Yemen	17	Bomb
April 9, 2001	Angola	National Union for the Total Independence of Angola attack on Angolan Armed Forces	129	Other
May 19, 2001	Yemen	Bombing of Al-Beidha market	32	Bomb

Actual Event Date	Event Country	Event name	Number of Fatalities	Type of event
September 11, 2001	United States of America	September 11 attacks	2749	Bomb
November 19, 2001	Philippines	Attack against army bases on Jolo Island	52	Bomb
January 22, 2002	India	Attack against the American Center in Calcutta	5	Bomb
March 30, 2002	Israel	The Passover suicide bombing	33	Bomb
May 2, 2002	Colombia	Fuerzas Armadas Revolucionarias de Colombia (FARC) bombs a church in the town of Bojaya	119	Bomb
October 12, 2002	Indonesia	Bali bombings	202	Bomb
October 28, 2002	Jordan	Assassination of a USAID employee	1	Assassination
March 19, 2003	Iraq	The Iraq War	30000	War
May 16, 2003	Morocco	Casablanca bombings	45	Bomb
August 7, 2003	Iraq	Bombing of the Jordanian embassy in Baghdad	10	Bomb
August 19, 2003	Iraq	Bombing of the UN Headquarters in Baghdad	23	Bomb
August 29, 2003	Iraq	The Najaf bombing	126	Bomb
March 11, 2004	Spain	Bombing of the Madrid trains	191	Bomb
April 21, 2004	Iraq	Bombing of Iraq’s police department	73	Bomb
July 2, 2004	Turkey	Bombing of the convoy of the governor of eastern Turkey's Van province	5	Bomb
September 1, 2004	Russian Federation	Beslan school attack	331	Hostages/Hijacking
September 14, 2004	Iraq	Haifa street bombing	47	Bomb
October 7, 2004	Egypt	Sinai bombings	34	Bomb
February 14, 2005	Lebanon	Assassination of PM Hariri	22	Assassination
June 2, 2005	Lebanon	Assassination of journalist Samir Kassir	1	Assassination
June 21, 2005	Lebanon	Assassination of politician George HawaiHrawi	1	Assassination
July 7, 2005	United Kingdom	London metro bombings	27	Bomb
July 23, 2005	Egypt	Sharm El-Sheikh bombings	76	Bomb
November 9, 2005	Jordan	The three hotels’ bombings	63	Bomb
January 16, 2006	Afghanistan	Suicide attack in Kandahar	22	Bomb
April 24, 2006	Egypt	Dahab bombing	23	Bomb
July 12, 2006	Lebanon	The summer of 2006 war	1200	War

Actual Event Date	Event Country	Event name	Number of Fatalities	Type of event
September 18, 2006	Somalia	Assassination attempt against Somali transitional president Abdullahi Yusuf Ahmed outside the National Parliament	11	Bomb
November 21, 2006	Lebanon	Assassination of politician Pierre Gemayel	1	Assassination
August 14, 2007	Iraq	The Yazidi Bombing	796	Bomb

The Cross Sectional Model and its Data

The determinants of the cross-border impact are evaluated using a fixed effects panel, cross-sectional regression. The measured CAAR for each non-event country's financial market for each event is entered as a dependent variable. In addition to our determinants of interest, we include the following control variables: type of event (war, bombing, assassination, or hijacking), its date (to control for potential desensitization to increased violence), the number of fatalities, and fatalities squared (to control for the size of the event). Following is the regression model used:

$$\begin{aligned} CAAR_{non\text{-}event,i} = \; & \beta_0 + \beta_1\, Dist_{event,\, non\text{-}event} + \beta_2\, Contig_{event,\, non\text{-}event} \\ & + \beta_3\, Safety\_ratio_{event,\, non\text{-}event,t} + \beta_4\, World\_Kaopen_t \\ & + \beta_5\, Mkt\_Depth_{event,t} + \beta_6\, War_i + \beta_7\, Bomb_i + \beta_8\, Assassin_i + \beta_9\, Date_i \\ & + \beta_{10}\, Fatalities_i + \beta_{11}\, Fatalities_i^2 + \varepsilon \end{aligned}$$

where,

Variable		Description	Proxies for	Source
$CAAR_{non\text{-}event,i}$	=	the end of event window CAAR for non-event financial markets for event *i*	Capital inflow and outflow	Event study calculation. Stock exchange data from Global Financial Data. Violent events data from the Terrorism Knowledge Base, and other media sources. See details below.
$Dist_{event,\, non\text{-}event}$	=	the distance in km between the capital of the event country and that of the non-event country in logarithms,	Geographic distance	Centre d'Études Prospectives et d'Informations Internationales (CEPII)

Variable		Description	Proxies for	Source
$Contig_{event, non\text{-}event}$	=	dummy variable that takes the value 1 if the event and non-event countries are geographically contiguous, and zero otherwise,		
$Safety\_Ratio_{event, non\text{-}event,t}$	=	The ratio of the non-event country's political risk index to that of the event country at time *t*	Relative political safety of non-event country to event country	The Political Risk Services Group political risk index. See details below.
$World\_Kaopen_t$	=	World average of each country's degree of capital account openness at time *t* weighted by its GDP	Alternative open country destinations	The Chinn-Ito Financial Openness Variable. See details below.
$Mkt\_Depth_{event,t}$	=	the ratio of the event country's market capitalization to its GDP at time *t* in 1990 US dollars,	Depth of the event country's financial market	UN statistics
War_i	=	dummy variable that takes the value 1 if $event_i$ is a war, and zero otherwise,	Attributes of the violent event	The Terrorism Knowledge Base, and other media sources.
$Bomb_i$	=	dummy variable that takes the value 1 if $event_i$ is a bomb, and zero otherwise,		
$Assassin_i$	=	dummy variable that takes the value 1 if $event_i$ is an assassination, and zero otherwise.		
$Date_i$	=	the date when $event_i$ took place,		
$Fatalities_i$	=	the number of fatalities as a result of $event_i$,		
$Fatalities_i^2$	=	The square of $fatalities_i$		

The relative political safety of the non-event country to the event country is measured as the ratio of the non-event country's political risk index to that of the event country at time *t*. The political risk index, constructed by the Political Risk Services Group, takes into account each country's government stability, socioeconomic conditions, investment profile, internal conflict, external conflict, corruption, military in politics, religious tensions, law and order, ethnic tensions, democratic accountability, and bureaucracy quality.

We proxy the number of alternative open economies that capital can flow to using the Financial Openness Variable (Kaopen) developed by Chinn and Ito (2008). The Kaopen combines four binary dummy variables reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions to measure the nature and extent of a country's capital account openness. We use the average of Kaopen across all countries for a given year weighted by each country's GDP for that year, to proxy for the number of open countries in a given time.

6 Results

Table 3 describes summary statistics for the geographic distance and contiguity, economic size, violent event, risk ratio, and capital openness variables.

Figure 1 depicts the evolution of the CAAR for event windows (0, 10) and (-10,10). As per our prediction, both figures show the CAAR for event countries increasing while the non-event countries' CAAR decreasing. The graphs for the remaining event windows are in Appendix B.

Table 3 Variables Summary Statistics

Variable	N	Mean	Std. Dev.	Min	Max
$Dist_{event, non-event}$	3065	8.639	0.818	4.719	9.892
$Contig_{event, non-event}$	3065	0.037	0.188	0.000	1.000
$Safety\_Ratio_{event, non-event,t}$	3065	1.635	1.433	0.345	13.357
Weighted $World\_Kaopen_t$	3065	1.804	0.081	1.440	1.864
$Mkt\_Depth_{event,t}$	3065	1.682	9.900	0.000	82.542
War_i	3065	0.106	0.308	0.000	1.000
$Bomb_i$	3065	0.660	0.474	0.000	1.000
$Assassination_i$	3065	0.097	0.295	0.000	1.000
$Date_i$	3065	18-Nov-2000	1,548.265	3-Jul-1988	14-Aug-2007
$Fatalities_i$	3065	874	4,506.79	1	30,000
$Fatalities_i^2$	3065	21,100,000	135,000,000	1	900,000,000

Figure 1 CAAR Evolution

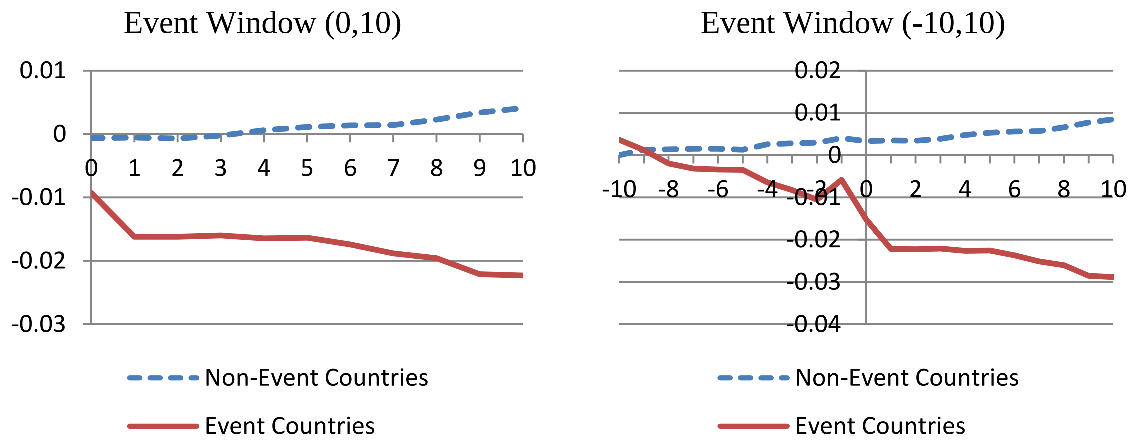

Table 4 reports the end of event period CAAR and the four parametric and nonparametric tests for all event windows. The results below show that stock markets in event countries are negatively impacted in all event windows. They drop an average of -0.018 percent across all event windows with their biggest drop of -0.029 percent occurring in the (-10,10) window. These drops are significant in all four parametric and nonparametric tests, with the exception of the rank test for the (0,5), (0,10), and (-5,5) windows. **Thus, hypothesis 1 holds: the valuation of equities in an event country will decrease upon suffering a violent event.**

On the other hand, stock markets in non-event countries react positively in six of the eight event windows with an average of 0.002 percent across all event windows. The highest increase of 0.008 percent occurs on the (-10,10) window. The increases in windows (0,10), (-5,5), and (-10, 10) are significant across all parametric and nonparametric tests. The negative generalized test fails to reject the null hypothesis that the proportion of negative abnormal returns in the event window is equal to those in the estimation window. However, the positive generalized sign test in seven out of eight windows rejects the null hypothesis in favor of the alternative that more positive abnormal returns occur during the event period than the estimation one. All positive CAARs are significant at the 5 percent level in one or more of the four tests. **Hence, hypothesis 2 holds: the valuation of equities in non-event countries will increase once an event-country suffers a violent event.**

Table 4 CAAR, Parametric and Non-Parametric tests

Two-tailed significance test for Method 1, 2 and 4. Right sided one-tailed test for Method 3 with the alternative hypothesis is that the ratio of positive (negative) CAARs in the event period is more than that in the estimation period. Methods 1, 2,and 3 are conducted on the CAARs in the event period. Method 4 is conducted on the ARs of the event period.

Country Type	**Event countries**								**Non-event countries**							
Event Window	**0,1**	**0,2**	**0,5**	**0,10**	**-1,1**	**-2,2**	**-5,5**	**-10,10**	**0,1**	**0,2**	**0,5**	**0,10**	**-1,1**	**-2,2**	**-5,5**	**-10,10**
N	51	51	51	51	51	51	51	51	3144	3144	3121	3121	3207	3144	3121	3121
CAAR	-0.016	-0.016	-0.016	-0.022	-0.011	-0.014	-0.019	-0.029	-0.001	-0.001	0.001	0.004	0.000	0.000	0.004	0.008
Parametric Tests																
Method 1. T1	-3.152 ***	-2.721 ***	-2.132 **	-2.458 **	-1.964 *	-2.012 **	-2.095 **	-2.592 **	-1.303	-1.400	1.616	4.611 ***	0.734	0.565	4.000 ***	7.081 ***
Method 2. T2	-6.816 ***	-6.716 ***	-6.276 ***	-5.829 ***	-5.212 ***	-5.829 ***	-4.954 ***	-5.274 ***	-18.294 ***	-19.881 ***	14.198 ***	45.976 ***	-2.303 **	6.584 ***	39.973 ***	53.906 ***
Non-Parametric Tests																
Method 3. Positive Generalized Sign Test	-3.042	-1.641	-1.921	-1.921	-1.550	-1.429	-2.506	-1.789	-0.659	2.658 ***	2.673 ***	5.215 ***	2.155 **	4.202 ***	4.883 ***	6.760 ***
Method 3. Negative Generalized Sign Test	3.042 ***	1.641 ***	1.921 ***	1.921 ***	1.550 ***	1.429 ***	2.506 ***	1.789 ***	0.659	-2.658	-2.673	-5.215	-2.155	-4.202	-4.883	-6.760
Method 4. Rank Test — **N**	5202	5253	5406	5661	5202	5253	5406	5661	319169	322313	330411	346016	325547	322313	330411	346016
Method 4. Rank Test — Z_{Rank}	-3.724 ***	-2.552 **	-1.479	-1.481	-2.449 **	-2.247 **	-1.490	-1.756 *	-0.289	-0.146	0.925	2.701 ***	1.964 **	0.456	1.677 *	2.765 ***

* indicates test result is significant at the 10% level, ** at the 5% level, *** at the 1% level.

Table 5 below reports the results of the cross-section fixed effects panel regression for all event windows. The coefficient of the geographic distance between event and non-event countries ($Dist_{event,\ non\text{-}event}$) is positive and significant at the 5 percent level across all event windows. However, the ($Contig_{event,\ non\text{-}event}$) dummy variable, which describes whether the event and non-event countries are geographically contiguous, is also positive and significant. This confirms predictions that the impact of geographic distance on the valuation of securities in non-event countries is not monotonic. It is possible that capital is flowing from event countries to geographically distant destinations to mitigate its risk exposure in the wake of the violent event, while economic activities are shifting to geographically contiguous destinations. Further research is required to test this proposition and examine the underlying interactions between distance and each of the financial and economic channels following a violent event.

The relative perceived safety of the non-event country to the event country ($Safety\_ratio_{event,\ non\text{-}event,\ ,t}$) is positive as predicted. It is significant in seven of the eight event windows. In seeking to mitigate risk, investors will reallocate more of their investment and economic activities into safer non-event countries.

The ($World\_Kaopen_t$) variable, which proxies the number of alternative open non-event destinations into which capital can flow, is positive in seven of the eight event windows, and is significant in three of these instances. This is the opposite direction of the prediction of Abadie and Gardeazabal (2008) that the more alternative open destinations into which capital can flow, the less the share that a given country will receive. It is possible that our proxy is measuring the ease of reallocating capital due to the openness of financial markets rather than the number of alternative open destinations and is, therefore, inadequate. This would yield a positive result, as opposed to the negative one resulting from increased competing destinations.

The coefficient for ($Mkt\_Depth_{event,t}$) is negative and significant, indicating that event countries with deeper financial markets are less susceptible to capital reallocation following an event. This supports Chen and Seims’ (2004) proposition that mature financial markets play an important role in enabling countries to absorb shocks from violent events.

Table 5 Cross-Section Regression Results

VARIABLES	(1) CAAR (0,1)	(2) CAAR (0,2)	(3) CAAR (0,5)	(4) CAAR (0,10)	(5) CAAR (-1,1)	(6) CAAR (-2,2)	(7) CAAR (-5,5)	(8) CAAR (-10,10)
$Dist_{event, non-event}$ (ln Km)	0.0021**	0.0024**	0.0031**	0.0053***	0.0029***	0.0041***	0.0057***	0.0113***
	(0.0008)	(0.0011)	(0.0013)	(0.0019)	(0.0010)	(0.0012)	(0.0019)	(0.0031)
$Contig_{event, non-event}$	0.0043*	0.0059**	0.0093**	0.0216***	0.0043	0.0066*	0.0070	0.0275**
	(0.0022)	(0.0028)	(0.0036)	(0.0060)	(0.0029)	(0.0038)	(0.0057)	(0.0106)
$Safety\_ratio_{event, non-event, ,t}$	0.0005**	0.0005*	0.0008**	0.0021***	0.0004*	0.0006**	0.0009	0.0027***
	(0.0002)	(0.0003)	(0.0004)	(0.0005)	(0.0003)	(0.0003)	(0.0006)	(0.0008)
$World\_Kaopen_t$	0.0156	0.0475***	0.0474**	0.0031	0.0147	0.0507***	0.0216	-0.0020
	(0.0100)	(0.0129)	(0.0202)	(0.0239)	(0.0104)	(0.0110)	(0.0220)	(0.0294)
$Mkt\_Depth_{event,t}$	-0.0001**	-0.0001**	-0.0001***	-0.0002***	-0.0001**	-0.0001**	-0.0002***	-0.0003***
	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0000)	(0.0000)	(0.0001)	(0.0001)
War_i	0.0112***	0.0133***	0.0143***	0.0136**	0.0150***	0.0193***	0.0228***	0.0404***
	(0.0030)	(0.0041)	(0.0053)	(0.0055)	(0.0032)	(0.0046)	(0.0063)	(0.0074)
$Bomb_i$	-0.0070***	-0.0080***	-0.0063***	-0.0107***	-0.0072***	-0.0091***	-0.0056*	-0.0060
	(0.0011)	(0.0015)	(0.0022)	(0.0033)	(0.0013)	(0.0019)	(0.0032)	(0.0042)
$Assassination_i$	-0.0041***	-0.0025	-0.0020	-0.0051	-0.0034**	-0.0016	0.0013	0.0100*
	(0.0013)	(0.0016)	(0.0024)	(0.0038)	(0.0014)	(0.0020)	(0.0035)	(0.0053)
$Date_i$	-0.0000*	-0.0000***	-0.0000***	-0.0000	-0.0000	-0.0000***	-0.0000	0.0000**
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
$Fatalities_i$	-0.0000***	-0.0000***	-0.0000***	-0.0000***	-0.0000***	-0.0000***	-0.0000***	-0.0000***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
$Fatalities_i^2$	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Constant	-0.0304	-0.0783***	-0.0762*	-0.0275	-0.0382*	-0.0940***	-0.0646	-0.1113**
	(0.0227)	(0.0282)	(0.0432)	(0.0514)	(0.0228)	(0.0266)	(0.0454)	(0.0542)
Observations	2993	2993	2993	2993	2993	2993	2993	2993
R-squared	0.121	0.140	0.063	0.036	0.108	0.139	0.067	0.039
Number of panel groups	57	57	57	57	57	57	57	57
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The cross-section regression reveals other interesting results. The event date is negatively correlated with the impact on non-event countries. This may indicate a desensitization effect whereby investors become less apprehensive of violent events as time goes by, even as global markets become more integrated. This may be due to investors' better assessment of the true risk in the event-country, or to their belief that non-event countries are not less prone to such events.

Finally, war events lead to more positive reactions in non-event countries, unlike bombings and assassinations. This result may arise because investors perceive war as a permanent and real risk and are thus more likely to move their activities elsewhere. It could also be because war is beneficial to certain economic activities such as the defense and logistics industries.

7 Conclusion

This is the first study to document a positive cross-border impact of violent events. In doing so, it reconciles the two perspectives in the existing literature on the impact of violence. While some researchers argue that violent events have a small effect on the economy based on direct measurements, others use reduced form estimates to show that it has a large impact. This study argues that these two points of view reflect two different effects and are therefore not necessarily contradictory. The first effect is a small one, resulting from the destruction of physical and human capital. The second effect is large, resulting from the reallocation of financial and economic activity from the event country to non-event countries in the wake of violence. The small actual impact of violence on afflicted countries is, therefore, magnified through substitution to other destinations in the globally integrated financial and economic markets. This means that the magnitude of the net global impact of violence is less than that documented by equilibrium studies on event countries.

This study also evaluates certain factors that affect the impact of violence on non-event countries. Geographic distance is not monotonic in its effect on the valuation of equities in non-event countries. Larger distances between the event and non-event countries are associated with greater positive impacts in non-event countries. Non-event countries that are geographically contiguous to the event country, however, pick up a positive windfall in the valuation of their firms. This may reflect differences in the geographic dispersion patterns between financial and economic activities. Also, the safer a non-event country is perceived to be relative to the event country, the greater the positive impact on its financial markets following a violent event. Finally, event countries with deeper financial markets are less susceptible to capital reallocation following an event.

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Appendix A. List of Stock Exchanges Used in the Events Study

Stock Exchange	Country Name	Market Capitalization Aug, 2007 (Million USD)
Buenos Aires SE General Index	Argentina	52,192
DJ Australian Index	Australia	135,283
DJ Austria Stock Index	Austria	212,570
DJ Belgium Stock Index	Belgium	429,034
Brazil Special Corporate Governance Stock	Brazil	1,092,573
DJ Canada Stock Index	Canada	149,214†
S&P/CDNX Composite Index	Canada	149,214†
Canada S&P/TSX 300 Composite	Canada	149,214†
Santiago SE Indice General De Precios De Acciones	Chile	210,974
Shanghai SE Composite	China	3,089,293
DJ Germany Stock Index	Germany	1,894,080
Cairo SE Efg General Index	Egypt	109,441
Madrid SE General Index	Spain	1,497,133
DJ Finland Stock Index	Finland	345,114
DJ France Stock Index	France	2,281,249
UK FTSE All-Share Index	United Kingdom	3,853,708
DJ Greece Stock Index	Greece	236,045
DJ Hong Kong Stock Index	Hong Kong	2,276,153
Jakarta SE Composite Index	Indonesia	164,771
Bombay SE Sensitive Index	India	1,110,216†
Calcutta SE Index	India	1,110,216†
DJ Ireland Stock Index	Ireland	159,631
Tel Aviv SE All-Security Index	Israel	201,759
DJ Italy Stock Index	Italy	1,060,442
Jordan Afm General Index	Jordan	30,816
Tokyo SE Price Index	Japan	4,517,752
DJ South Korea Stock Index	Korea	1,102,182
Kuwait SE Index	Kuwait	156,709
Beirut Stock Exchange Index	Lebanon	10,705
Colombo SE All-Share Index	Sri Lanka	7,207
Casablanca SE General Index	Morocco	586,300†
Morocco Casablanca SE Most Active Index	Morocco	586,300†
Mexico SE Indice De Precios Y Cotizaciones	Mexico	402,862
DJ Malaysia Stock Index	Malaysia	274,002
DJ Netherlands Stock Index	Netherlands	935,571
DJ Norway Stock Index	Norway	321,606

† Market Capitalization is for the country not the index. In the case of the US, it is for the NYSE.

Stock Exchange	**Country Name**	**Market Capitalization Aug, 2007 (Million USD)**
DJ New Zealand Stock Index	New Zealand	45,061
Karachi SE All-Share Index	Pakistan	58,631
Lima SE General Index	Peru	60,109
Manila SE Composite Index	Philippines	87,878
DJ Portugal Stock Index	Portugal	126,398
Russia Micex Composite	Russian Federation	1,149,784
Saudi Arabia Tadawul SE Index	Saudi Arabia	372,740
DJ Singapore Stock Index	Singapore	482,977
DJ Sweden Stock Index	Sweden	772,849
DJ Thailand Stock Index	Thailand	183,079[†]
Bangkok Book Club Index	Thailand	183,079[†]
Tunisia Indice BVM	Tunisia	4,708
Istanbul SE IMKB-100 Price Index	Turkey	234,898
DJ Taiwan Stock Index	Taiwan	678,145
FTSE-Nasdaq 500 Index	United States of America	15,600,000[†]
NYSE Composite	United States of America	15,600,000[†]
S&P 500 Composite Price Index	United States of America	15,600,000[†]
DJ Venezuela Stock Index	Venezuela	10,007
Viet Nam Stock Exchange Index	Viet Nam	5,000
DJ South Africa Stock Index	South Africa	777,425[†]
Johannesburg SE Overall Index	South Africa	777,425[†]

[†] Market Capitalization is for the country not the index. In the case of the US, it is for the NYSE.

Appendix B. CAAR Evolution Across the Remaining Event Windows