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Sovereign Risk and Armed Conflict: An Event-study for Colombia

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Abstract: We study the relationship between some of the most important recent events of the Colombian armed conflict and the foreign perception of sovereign risk, as measured by the Credit Default Swap (CDS) of the Colombian bonds. Using a recent methodology we estimate the causal effect of conflict events widely publicized by the international media on the price of the CDS. We construct a Synthetic Control Group to use as the non-conflict counterfactual of the Colombian CDS and compare its behavior around relevant conflict-event days with that of the actual (conflict-affected) Colombian CDS. Results suggest that the impact of conflict on the foreign perception of sovereign risk is rather idiosyncratic, and depends on the political context surrounding each event.

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1 Introduction

A recent boom in the academic literature trying to assess the economic consequences of civil strife has identified a number of theoretical channels through which violent conflict affects economic development (see Blattman and Miguel, 2010 for a thorough review): War destroys physical capital and public infrastructure; human capital decreases as people get killed or disabled; resources get diverted from productive investments to rent-seeking and defense activities; civil war deteriorates trust and social capital, affecting governance and thus making the negative effects on the economy long lasting. Importantly, conflict also creates uncertainty driving away private investment. For instance, violence might affect the sovereign risk perception of foreign investors and hence reduce the flow of FDI as well as debt financing. Our paper focuses on this last mechanism.

In contrast with the large number of theoretical reasons explaining why conflict hurts economic performance, there are only few empirical papers that quantify such impact and test the underlying channels. Indeed, the growing cross-country empirical literature on civil strife has largely concentrated on the determinants of war onset and its duration. However, there is no comparable body of literature on the economic effects of civil war. Collier (1999) estimates that countries that experience civil war grow on average 2.2 percentage points less per year. But Collier's model does not take into account potential reverse causation or omitted variable bias. This concern spans to other papers exploring the relationship between political instability and economic performance (for example Barro, 1991 and Alesina and Perotti, 1996).

A different strand of the literature tries to estimate the economic effect of conflict for specific countries. Most notably, Abadie and Gardeazabal (2003) (hereafter A&G) introduce a methodology to estimate the *causal* effect of ETA terrorism on the economic performance of the Basque Country. Using characteristics of the other Spanish regions A&G construct a synthetic Basque Country mimicking the pre-ETA features of the actual Basque region. The synthetic region is then used as a counterfactual of the actual one during the ETA terrorist upsurge, and hence the causal effect of the terrorist shock can be readily estimated. A&G estimate that the Basque Country had a 10% average drop in GDP per capita due to the ETA terrorism over a 20-year period.¹

We use A&G's methodology and combine it with the event-study approach introduced by Campbell et al. (1997) to assess the impact of specific events on financial markets.² By doing so we estimate

¹Abadie et al. (2010) refine this methodology further to measure the impact of a tobacco control program in California.

²Campbell et al. compute the residuals coming from a regression of the returns of a financial instrument on its

the causal effect of recent landmark events of the Colombian conflict on the foreign perception of sovereign risk, as measured by the Credit Default Swap (CDS) of the Colombian bonds.³

In doing this we follow Guidolin and La Ferrara (2007), who combine A&G’s methodology with the event-study approach to estimate the effect of the death of UNITA leader Jonas Savimbi on the performance of private companies doing business in civil war-affected Angola. They find that the death of Savimbi lowered the stock value of diamond companies in Angola, hence suggesting that under specific circumstances conflict may be good for business.

Armed conflict in Colombia has lasted for over four decades. In the late 1950s the two traditional parties (Liberal and Conservative) drafted a power-sharing agreement (the *National Front*) that allowed them to uncontestedly alternate the presidency every four years. This effectively crashed down any form of legal political opposition and constituted the seed for the formation in the 1960s of insurgent groups. The most famous such group is FARC (Revolutionary Armed Forces of Colombia, by the Spanish acronym), still active today and the biggest and most influential guerrilla in Colombia.⁴

While FARC activity is still ongoing, the last few years have witnessed a number of landmark events that seem to have weakened the armed group. These include the death of rebel founding leaders, the release of prisoners and the rescue of political hostages in military operations. Our hypothesis is that these events have shaped the Colombian sovereign risk perception in the international markets, thereby affecting the confidence of foreign investors and lowering investment rates and debt financing.

Our study focuses on three recent milestone events that have shaped the course of the conflict: The bombing-to-death of Raul Reyes, FARC’s second man in the chain of command, in March 2008; the release of politician Clara Rojas, who became famous for giving birth of the son of a guerrilla soldier while in captivity, in January 2008; and the rescue of Ingrid Betancourt, a former president candidate and a French national, in July 2008. While these are all “positive” events in terms of weakening FARC and bringing the government closer to a potential definite victory, our

structural determinants. This constitutes the fraction of the return left unexplained, or the “abnormal” returns. Since these are expected to be *white noise* provided the regression is well specified, any systematic deviation from 0 after some particular (exogenous) event is likely to be the effect of that event on the value of the financial instrument.

³CDS are insurance contracts traded to protect risky investments: The buyer of a CDS gives a series of payments to the seller in exchange of insuring the underlying financial instrument (in this case the Colombian bond) against some event (in this case default).

⁴The World Bank (2003) estimates that while in 1978 FARC had about 850 men, by 1987 its ranks had grown to over 6,000 soldiers, and by 2000 the number of combatants was around 16,000. FARC’s portfolio of actions today include looting and extortions of private business, the disruption of public infrastructure, bombings and road blocks, narcotrafficking, and the kidnapping and killing of civilians (Vargas, 2009).

findings suggest that, depending on its specific political context, each event has a different impact on sovereign risk perception.⁵ In particular, we show that both the release of politician Clara Rojas and the rescue of public figure Ingrid Betancourt were positively rewarded by the market. However, the killing of rebel leader Raul Reyes, despite the clear hit against FARC, created a diplomatic *impasse* with neighboring Ecuador that cancelled the immediate positive effect on the risk perception (drop in the CDS price). Indeed, while the event did generate longer fluctuations of risk assessment, there is no clear upward or downward trend in the abnormal returns after the killing took place.

We argue further that a key channel for Colombia-specific events to affect the behavior of foreign investors is the coverage of such events in the international press and newswire. Indeed, our criterion for choosing the three aforementioned events from the universe of potential facts that may have had an impact on the perception of investment risk is the extent to which each event hits the international media and newswire. We use the Google to count the number of hits that each event had in the international press on the day of the event and the next few days. Our three events feature the highest number of hits and hence our choice.

We test the hypothesis that out of the most important conflict events, only those that make a widespread appearance in the international media affect the foreign perception of sovereign risk by exploiting events that, while may have changed the course of the conflict in Colombia, featured only very little newswire coverage. Specifically, we look at changes in the foreign risk perception following the death of Manuel Marulanda, FARC's founder and commander. Because this event had no large echo in the international press, we see no deviation in the Colombian abnormal CDS relative to the synthetic control we use as counterfactual.

The rest of the paper is organized as follows: In section 2 we describe the empirical strategy, the choice of events and the data used. Section 3 discusses the main results as well as the robustness checks. Section 4 tests the hypothesis regarding the important role of the international media in shaping the risk perceptions of international investors. Section 5 concludes and offers avenues for future research.

⁵This is in line with Guidolin and La Ferrara (2007)'s finding for Angola: Savimbi's death (and the subsequent end of the civil war) drove *down* the price of the incumbent diamond firms, suggesting a *negative* effect of the end of conflict on specific private businesses. This gives evidence that conflict events may have positive or negative effects on foreign perceptions depending on the specific of the event. In the case of Angola, Savimbi protected the interest of diamond firms and exerted entry barriers in exchange for material benefits. Savimbi's death then constituted a sizable threat to the rents that the relationship with the rebels meant for some firms.

2 Data and Methodology

2.1 Milestone events

We consider three of the most relevant recent political events of the armed conflict in Colombia: The release of the hostage Clara Rojas, the rescue of Ingrid Betancourt, and the killing of Raúl Reyes, who was one of the most important leaders of FARC. The choice of these events is based on the extent to which these were covered by the international press.⁶ Using the Google News finder we base our choice of events on the amount of news that appeared on the day of the event, and one and two days later. Table 1 shows the international media spread of the events that this paper considers, which in turn are the top three events in terms of media hits during the last few years.

Table 1: Number of event-related international news

Event	t	t+1	t+2
Clara Rojas	810	136	67
Raul Reyes	1100	1130	214
Ingrid Betancourt	1040	2310	1550

Clara Rojas is the former campaign director of Ingrid Betancourt’s presidential campaign. Both were kidnapped by FARC on February 2002 while campaigning in an area known to be controlled by the rebels. In 2006, while in custody, Clara Rojas gave birth to Emanuel, whose unknown father is presumed to be a guerrilla member. On December 2007 FARC announced the unilateral release of Rojas and her son with the mediation of Venezuela’s president Hugo Chavez. After several failed attempts Rojas was freed on January 10 2008.

Ingrid Betancourt is a Colombian politician and former senator with French citizenship who ran for president in 2002 when she was kidnapped by FARC. Betancourt entered politics in 1990, and in 1994 was elected to the House of Representatives. During her captivity, several videos released by FARC revealed her poor health condition. Betancourt soon became a worldwide icon following continuous demonstrations of French citizens as well as public declarations of French and world leaders against her captivity. On July 2 2008, she was rescued, together with 14 other hostages (including three American citizens), by the Colombian army following a complex plan that was crafted over several months and that involved fooling her captors into releasing her with no

⁶While FARC has committed numerous misdeeds over the years, just a handful of them have had wide international newswire coverage and hence have affected the perception of foreign investors and their decision making.

resistance.

Raúl Reyes, was the spokesperson and the deputy leader of FARC. He was credited for leading FARC’s drug trafficking business and was in the Interpol list of top world terrorists. On March 1 2008, Reyes’ camp was bombed by the Colombian military, killing him and about a score of other presumed guerrillas. Because the camp laid near the border with Colombia in territory of Ecuador, however, Reyes’ killing generated formal complaints from Ecuador regarding the violation of the country’s sovereignty. Following president Correa of Ecuador, president Chavez of Venezuela also broke diplomatic relations with Colombia. Indeed, while Colombia’s military success may constitute a force helping reduce the country’s sovereign risk perception, its lessened political relationship with the region and the threat that this could transmit to the economy, are likely to constitute a force in the other direction. Our results are consistent with this hypothesis and thus corroborate that the effect of conflict events is specific to the event’s political context.

2.2 Financial data

Our outcome of interest is the price of the CDS of the Colombian sovereign bonds. The Colombia CDS series (as well as that of other Latin American countries used to construct the synthetic counterfactual) was obtained from the Bloomberg platform.⁷ The variables used to regress the CDS price on its determinants and so compute the *abnormal* CDS also come from Bloomberg. All the variables have daily frequency from January 2 2006 to September 23 2009.

Most time-series variables are not-stationary and so applied the relevant transformations to make them so: The Colombian CDS, for instance, features end-of-week seasonality, which we corrected by making the a week-long differentiation (Δ_7). In addition, the Dickey-Fuller unit root test reveals that other variables like the dollar exchange rate and the EMBI—both included in the regression of structural determinants of the CDS price to compute the *abnormal* price- are I(1). We corrected them by taking first differences (Δ_1).

⁷In constructing the Synthetic Control Group (SGC) (see the empirical strategy subsection) we limited the universe of potential controls to Latin America and ended up using information from five countries: Argentina, Brazil, Chile, Peru, Mexico and Venezuela. The choice of countries was limited by the availability of comparable information, as several Latin American countries did not have CDS data for the period of analysis. Additionally, Ecuador was left out intentionally since the country’s sovereign risk perception is likely to be at least to some extent shaped by Colombian conflict events. In fact, one of the events examined in this paper took place in Ecuador’s territory.

2.3 Empirical strategy

One potential way to assess the effect of conflict on the foreign perception of sovereign risk is by making a simple before-after comparison of the price of the bonds in the secondary market, around the conflict event and assign any difference in the bond's price to the event itself. One can look for example at bonds issued in the domestic market in either local or foreign currency. The latter, called Brandy Bonds, avoid the exchange rate risk inherent to the former. There are, however, several potential problems with this inferential approach. For instance, the before-after comparison could be capturing a secular trend in the bonds' price instead of the effect of the event. Moreover, in the case of Brandy Bonds, since conflict upsurge is likely to affect the entire domestic market, then its specific impact on debt instruments traded by international investors cannot be isolated.

This confounding effect of the systemic risk of the domestic market can be avoided by analyzing a market that incorporates the sovereign risk perception while trading local debt-related instruments in international markets. One such financial figure is the CDS, a two-sided insurance that allows the contracting agents to hedge against the default risk of a specific entity or country. In a CDS transaction the seller assumes the risk and the buyer pays the insurance (Weistroffer, 2009)⁸. Since the CDS embeds the sovereign risk perception of a country it follows that the occurrence of political turmoil in such country will affect the CDS-transaction price: If the event is interpreted as *good news* by foreign investors the perceived risk will be lower and the price of the CDS will drop. On the contrary, if the event is perceived as *bad news* the price of the CDS will rise.⁹

Sovereign risk, however, responds to number of factors. So, instead of looking at the effect of specific event on the CDS price level, we follow Campbell et al. (1997) and look at the *abnormal* CDS price, or the fraction of the price not explained by its determinants. In addition, using A&G's methodology, we construct an abnormal *synthetic* CDS using information from several Latin American countries (not affected by the Colombia-specific conflict episode) that replicates closely the pre-event behavior of the Colombian abnormal CDS. This serves as control group and allows us to contrast the actual post-event abnormal CDS with the counterfactual of what it would have

⁸Formally, the CDS is a swap-type credit derivative in which the buyer agrees to pay fixed premium on a notional principal (e.g. a government bond) to the seller for a period of time until a pre-defined event occurs or until the contract matures. In exchange the buyer receives from the seller a payoff that is contingent on the occurrence of such event (e.g. a default, a bankruptcy, a falling credit rating, a political event, etc.) (Hull, 2003).

⁹There is empirical evidence that the CDS price is closely correlated with the sovereign risk perception: Blanco et al. (2005) find a significant statistical association between the investment-grade bonds and the CDS and suggest that the latter helps explaining around 80% of the credit risk. Zhu (2004) shows that sovereign bond spreads and CDS prices move together in the long run.

looked like in the absence of the event, thereby determining whether the events had any impact on the foreign perception of Colombian sovereign risk.

While A&G and Abadie et al. (2010) compare the post-event evolution over time of the outcome of interest to that of the Synthetic Control Group (SCG), Campbell et al. look at the *cumulative* post-event deviations of the abnormal return of the financial asset of interest—or Cumulative Abnormal Return, CAR—but do not have a counterfactual to compare the CAR with.¹⁰

In the spirit of Guidolin and La Ferrara (2007) we combine the two approaches and compare both the post event evolution of the abnormal CDS and its post-event *cumulative* value, both against the synthetic counterfactual.

2.3.1 Obtaining the abnormal Credit Default Swap

The abnormal CDS are the residuals resulting from a regression of the CDS on the structural variables that effect its behavior: an auto-regressive structure; the exchange rate; the EMBI; and a set of dummies that capture idiosyncratic non-conflict political events that are likely to affect the foreign perception of sovereign credit risk. We estimate equation (1) and report the results in the Appendix (Table A1).¹¹

$$\begin{aligned} \Delta_7 CDS_{i,t} = & \alpha_i + \beta_{i,j} \sum_{j=1}^J \Delta_7 CDS_{i,t-j} + \gamma_{i,k} \sum_{k=1}^K \Delta_1 ER_{i,t-k} + \\ & + \phi_{i,z} \sum_{z=1}^Z \Delta_1 EMBI_{i,t-z} + \tau_{col} \mathbf{POL}_{col,t} + e_{i,t}^{CDS} \end{aligned} \quad (1)$$

This autoregressive model of order j includes two structural determinants of the CDS:¹² $ER_{i,t}$ is the exchange rate of the currency of country i against the US dollar at time t and it is used to take away the exchange rate risk of the emerging market. $EMBI_{i,t}$ is the JP Morgan’s *emerging market bond index*, a risk measure based on the Brandy Bonds spread between country i and the

¹⁰MacKinlay (1997) reviews the event study literature on stock markets and concludes that, when the event date is identified accurately, CAR is a technique that performs better than others in observing the impact of certain events on the development of firms’ prices. In cases in which the date of the event is not clear or it is partially anticipated by the agents, however, the technique is not as useful. Seiler (2000) points to the misuse of the CAR methodology when the variance is not controlled for within the *event window* (an interval of time surrounding the event date). This is important as the event itself often induces variance increases that might affect inference. In particular, Seiler suggests that when the variance of the *estimation window* (an interval of time before the event window, not affected by the event, where the structural parameters are estimated) is extrapolated into the event window the null hypothesis of zero *abnormal* returns will be rejected more than it should be.

¹¹The table reports the Huber-White robust standard errors, but the results are unchanged if errors are left uncorrected.

¹²The notation Δ_7 means that the CDS series was corrected for weakly seasonality (data frequency is daily).

US. This index is widely used by investors to assess credit risk. While we allowed the regressors to have for a flexible lag structure, in practice only the first lag of each right-hand-side variable was significant. The matrix **POL** represents a set of time dummies that control for other non-conflict political events which might have affected the behavior of the CDS during the estimation window. Adding these as controls helps the estimated abnormal CDS to be “cleaner” than what would be obtained by including just the structural variables in the regression.¹³

The residuals $e_{i,t}^{\widehat{CDS}} = CDS_{i,t} - \widehat{CDS}_{i,t}$ are then the *abnormal* CDS price and, provided the structural model is well specified, they are expected to be *white noise*. Any systematic shift from the 0 mean around an event date will be evidence that such event had an impact on the financial market, especially in the face of a lack of comparable deviations in the SCG.

2.3.2 Constructing the Synthetic Control Group

Finding a sensible control group when only one unit is *treated* is a difficult task as it is likely that no potential comparison unit is sufficiently similar. Instead of looking for closest comparison groups, the SCG method constructs a *single* control unit as a weighted average of the characteristics of several potential comparison units. By doing so, the methodology creates an artificial entity which matches the performance of the treated unit better than any single non-treated unit (Abadie et al, 2010).

Using as inputs the mean and variance of the abnormal CDS of the other Latin American countries, estimated from equation (1), we construct a synthetic abnormal CDS to replicate the pre-event abnormal CDS of Colombia. Formally, and using the notation in A&G and Abadie et al. (2010), let J be the number of countries in the set of potential controls.¹⁴ Further, let $W = (w_1, \dots, w_j)$ be a vector of nonnegative weights which add up to one. The scalar w_j is the weight of country j in the SCG. Each vector W returns a different synthetic control and therefore the election of W is the most important task of this step.

The chosen W must be one that helps replicating as close as possible the actual Colombian abnormal CDS, using a weighted average of the other countries’ abnormal CDS. Formally let Y_{col} be a $(T \times 1)$ vector of abnormal CDS for Colombia from period 1 to period T , and let \mathbf{Y}_J be a

¹³The political events include i) Announcement of the CPI by the statistical office; ii) News regarding the appreciation of the Colombian Peso; iii) Announcement that Senator Cordoba is serving as mediator in negotiations with guerrillas for the release of hostages; iv) Discovery of a new gold mine of important scale; v) Colombia agree to let Venezuela mediate in the negotiations for the release of hostages; vi) Ecuador breaks trade relations with Colombia.

¹⁴In this case $J = 6$: Argentina, Brazil, Chile, Mexico, Peru and Venezuela.

matrix of $(T \times J)$ containing the abnormal CDS for all countries in J . The goal is to find the vector W^* that minimizes the difference $Y_{col} - Y_J W^*$. Since this is achieved by making the SCG is as similar as possible to the treated one, in practice W^* must actually minimize the difference $\mathbf{X}_{col} - \mathbf{X}_J W^*$, where \mathbf{X}_{col} and \mathbf{X}_J are vectors of covariates for Colombia and the countries in J respectively.

2.3.3 Assessing the effect of conflict events

Following Guidolin and La Ferrara (2007), in order to assess the effect of the conflict events on the foreign perception of sovereign risk we need to define two “windows”: The *estimation window* is the interval of time in which the structural parameters in (1) are estimated to compute the abnormal CDS. The *event window*, on the other hand, is the period surrounding the event of interest, when the analysis is carried out. Let w_0 be the day of the event, and w_l and w_r the number of periods before and after the event date respectively. The length of the *event window* goes from $w_0 - w_l$ to $w_0 + w_r$. This is an interval of time when, given the expectations about the event, the impact of the latter on the market is likely to be observed.

Let η be the length of the estimation window and ρ the amount of days between the last day of this window and the first day of the event window. Then, the estimation of (1) uses data from period $w_0 - w_l - \eta - \rho$ to period $w_0 - w - \rho$.

Once we obtain the abnormal CDS for both Colombia and the other countries (used to construct the SCG), the abnormal CDS are forecasted into event window using the estimated structural parameters and the realized values during the event window period of the right-hand-side variables in (1). The forecasted abnormal CDS are then added up period by period within the event window to generate the cumulative abnormal CDS (CAC). That is:

$$CAC = \sum_{l=w_0-w_l}^{w_0+w_r} \widehat{e}_l^{CDS} \quad (2)$$

If the event of interest has no effect on the CDS behavior then we should not see systematic deviations from the zero mean of the abnormal CDS after the event and CAC should be equal to zero.

3 Results

This section is divided into two parts. We first compare the behavior of the Colombian abnormal CDS with that of the SCG before and after the event date. By visually inspecting the behavior of the Colombian CDS together with that of the CDS of the SCG, one can see: i) The extent to which the latter is a good counterfactual (by comparing the two series *before* the event date) and; ii) The extent to which the two series diverge after the event date (and the direction of the divergence).¹⁵ Second, following Campbell et al. (1997) and Guidolin and La Ferrara (2007) we look at the *cumulative* abnormal CDS of both Colombia and the SCG, four days after the event date.¹⁶

3.1 Synthetic Control Group

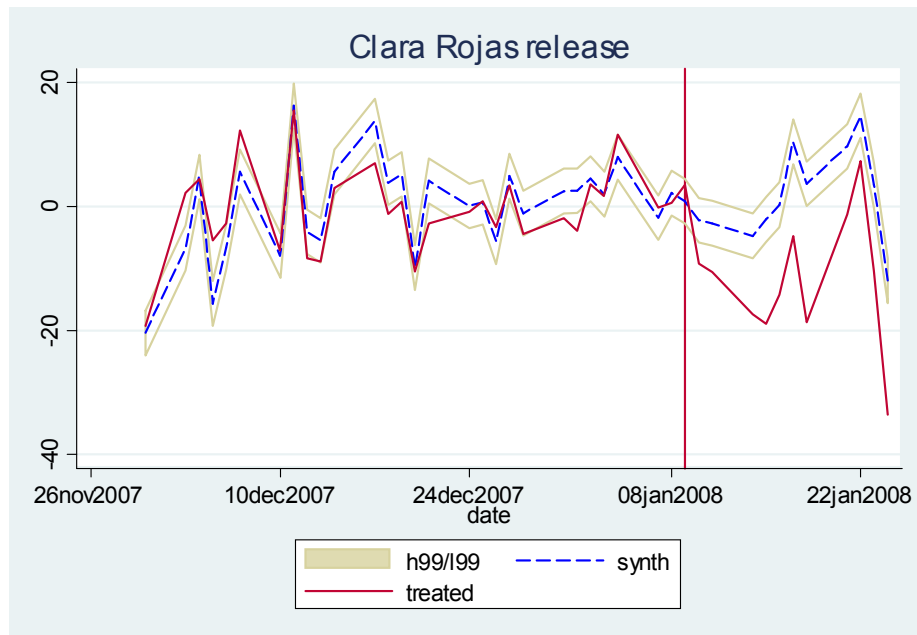
For each of the conflict events in consideration we report the evolution of both the Colombian abnormal CDS and that of the SCG.¹⁷ A vertical line is drawn on the day of the event across the horizontal axis (which represents time). Note that the date of the event is different in each picture, which means that the three events of the benchmark analysis are not overlapping. The opposite case would constitute a confounder of the effect of any single conflict event. The solid line in each figure shows the evolution of the Colombian abnormal CDS and the dotted line that of the SCG. The latter is encircled by a 95% confidence interval. We now turn to the analysis of each event.

¹⁵One property of both A&G's methodology and the event study approach is that inference is to a great extent visual. If the SCG can map the pre-treatment behavior of the treated unit sufficiently well then any differences arising between the two series after the treatment takes place can be interpreted as the impact of the event on the treated unit.

¹⁶Hence our benchmark event window has $w_l = 0$ and $w_r = 4$. Results are however robust to changing the length of both the event and the estimation windows.

¹⁷Table A2 in the appendix summarizes the optimal weights given to each of the potential control countries to construct the SCG of each of the events.

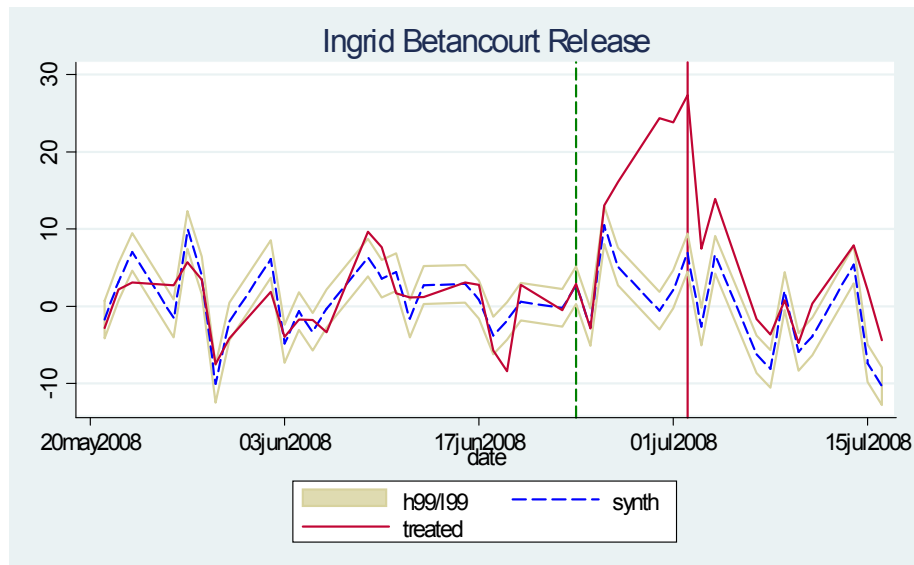
3.1.1 Release of Clara Rojas



Clara Rojas was released on January 10 2008. The picture indicates compellingly that the synthetic abnormal CDS matches quite closely the pre-event evolution of the actual Colombian one. The solid line, representing the latter, consistently lies within the confidence interval of the former. However, starting from the event date there is a gap that widens between the synthetic abnormal CDS (which continues to fluctuate around zero as it is expected for unaffected series) and the actual one, which drops significantly. The lower abnormal price of the Colombian CDS suggests that Rojas' release was interpreted by international investors as a reduction of Colombia's credit risk. This effect was relatively long lasting and the abnormal price of the Colombian CDS reached a daily saving of over \$20. This is a gap about 4,000% larger in absolute terms than the average deviation between the Colombia abnormal CDS and the SCG one, before the event took place.

The next section zooms-in over the few days after the event to complete the analysis by looking at the cumulative impact on the abnormal CDS.

3.1.2 Rescue of Ingrid Betancourt

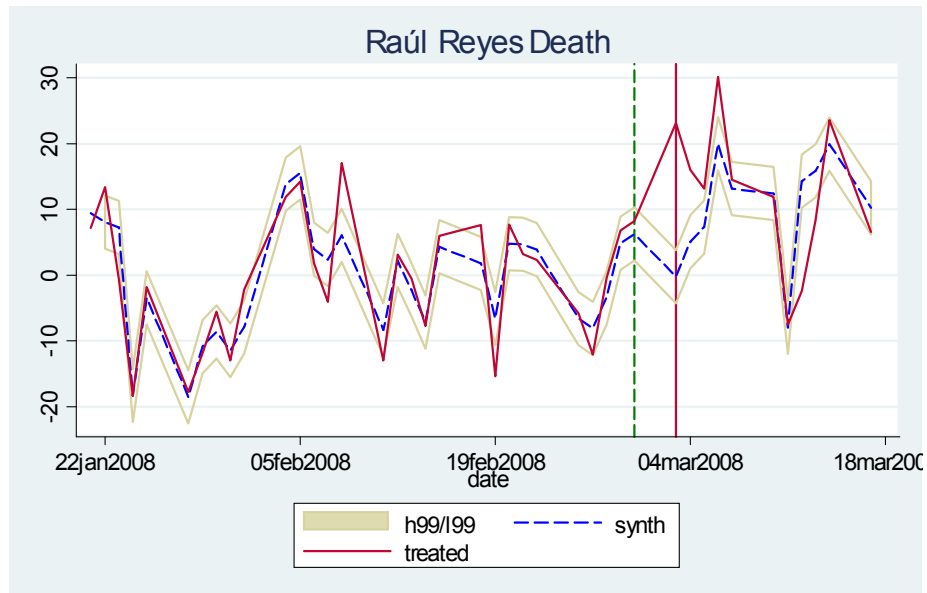


Ingrid Betancourt was running for president at the time of her abduction. Betancourt was rescued on July 2 2008 (see the solid vertical line on the figure), during the now famous *Operación Jaque* carried out by the Colombian army. However, the analysis of this event is more nuance than in the previous case: A few days before the rescue, on June 24 2008 (see *dashed* vertical line) Colombian and Ecuador broke diplomatic relations and threatened to halt bilateral trade. The diplomatic impasse shocked the market shortly before the rescue of Betancourt, making the Colombian abnormal CDS rise sharply and suggesting a higher-than-average sovereign risk perception on the eve of the rescue.

Taking the political context into account the picture does show that the rescue of Betancourt had the substantive effect of bringing the CDS price back down, offsetting the \$25 risk upward-shift felt by the markets during the previous week, and bringing the abnormal CDS back to the track of the events-absent counterfactual.

These patterns and their cumulative effect around the event day will also be more closely analyzed in the next section.

3.1.3 Killing of Raúl Reyes



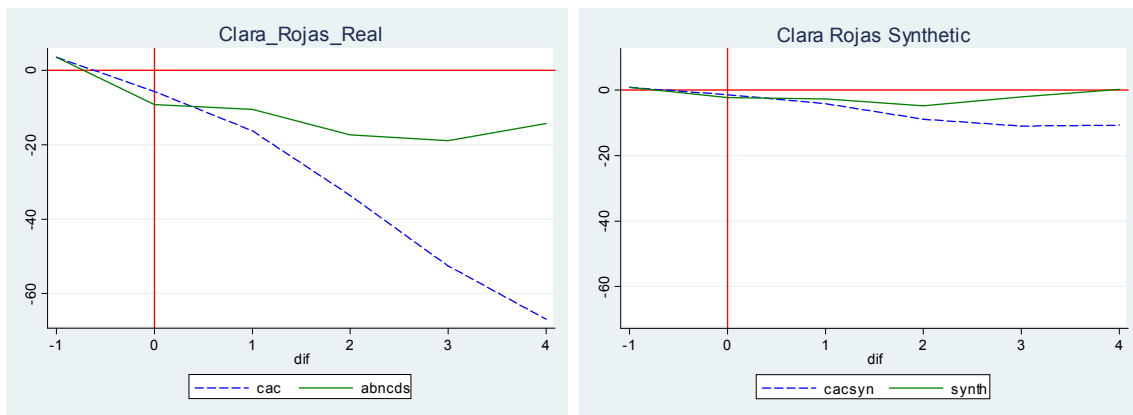
Reyes was bombed to death on Saturday, March 1 2008. Since the market of financial derivatives does not trade during the weekends, we plot on the picture vertical lines both on the last transaction day before the event (Friday, February 29th–dashed vertical line) and on the first transaction day afterwards (Monday, March 3–solid vertical line). The picture shows how the abnormal CDS rises sharply from one transaction day to the next (the event taking place in the middle). While this pattern may seem counterintuitive because it conveys a higher risk perception, it suggests that the “good news” to the market of an important military achievement was offset by a set of “bad news”: On the one hand, the event constituted hard evidence of previous speculations regarding the presence of illegal Colombian armed groups in foreign territory. On the other, during the event itself Colombia violated Ecuador sovereignty by entering and bombing its territory. The picture suggest that the net long-term effect of the event on the foreign perception of risk was negligible, as the Colombian abnormal CDS quickly converges back to the SCG and stays within the confidence bounds.

3.2 Cumulative abnormal Credit Default Swap

This section digs deeper into the analysis of the cumulative impact of the conflict events on the CDS market during the days following the events. Recall that the cumulative abnormal CDS are the

recursive sum of abnormal CDS over the event window [see equation (2)]. For each of the conflict events in consideration we present a picture of the evolution of both the Colombian abnormal CDS (as well as its cumulative value) and the two equivalent SCG series.¹⁸ Again, we draw a vertical line on the event day across across the x-axis (representing time), which spans four days after the event. The solid line in each figure shows the evolution of the abnormal CDS and the dotted line its cumulative counterpart. We show the results obtained from regressions carried out over an estimation window from 45 days to 5 days before event.¹⁹

3.2.1 Release of Clara Rojas

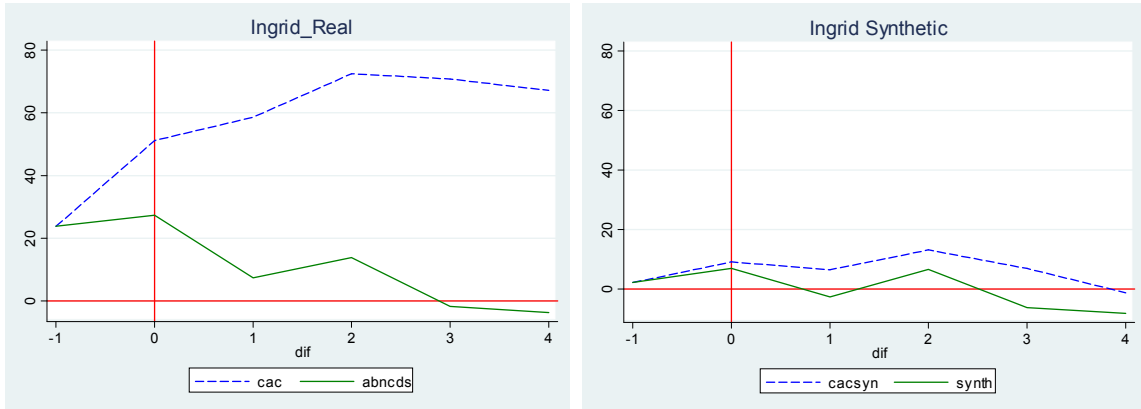


Starting around zero, while the actual abnormal CDS has negative values consistently after the event (solid line, left-hand side), the synthetic one stays around and very close to its expected zero value (solid line, right-hand side). Indeed, at the end of the four-day period the Colombian *cumulative* abnormal CDS is significantly negative and its value is about seven times larger (or \$70) than the cumulative abnormal CDS of the SCG, which remains close to zero. This is strong evidence that Rojas' release had a positive impact on the markets, reducing the risk perception of Colombia and lowering the price of the country's sovereign bonds CDS.

¹⁸The Colombia (actual) series appear on left-hand-side panel and the SCG series are on the right-hand side.

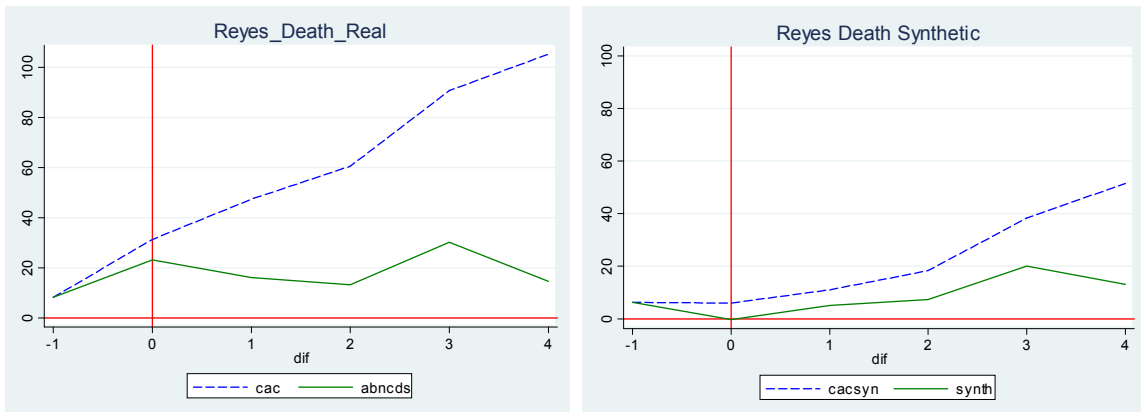
¹⁹In the appendix we present the results obtained with other lengths of the estimation window. Results are robust to the choice of length.

3.2.2 Rescue of Ingrid Betancourt



As explained in the previous section, the analysis of the effect of the rescue of Ingrid Betancourt is confounded by the fact that, just a week before this event, Colombia and Ecuador entered a diplomatic impasse, affecting negatively the credit risk perception of international investors. This is confirmed in the analysis of the cumulative impact: In contrast to the case of Clara Rojas, the left hand side picture shows that the abnormal CDS starts *above* its expected value of zero before the rescue took place. It however bounces back after the event so that the line of the cumulative abnormal CDS of the Colombian bonds decreases its slope and it turns negative after the second post-event day, when it starts to offset the previous pattern. Again the evolution of the SCG on the right hand side suggest that none of this happened to the control group that complies with the expected fluctuation around zero and no significant cumulative effect.

3.2.3 Killing of Raúl Reyes



In the case of the Reyes' killing a consistently positive abnormal CDS results in a large and positive cumulative abnormal CDS at the end of the fourth day. While one would be tempted to interpret this as evidence that this event had a negative impact on foreign risk perception, the analysis of the SCG on the right hand side prevents this interpretation. Indeed, while half as large in terms of magnitude, the synthetic series do follow the same pattern as the actual (treated) Colombia ones. This suggests that there were probably other simultaneous forces affecting the risk rankings of the whole region during those days, and hence that part of the increasing risk found for Colombia was actually a regional Latin American-wide phenomenon. This is confirmed by looking back at the Reyes figure of the previous section, in which the days around the event coincide with an upward shift of both the actual and the synthetic series.

3.3 Robustness

We report in the Appendix result figures obtained from using different length estimation windows. This exercise corroborates that the main results are robust to using different time-spans to estimate the structural parameters of CDS determinants used to compute the abnormal CDS. In particular, we report results coming from estimation windows 50 to 10 days before the event and 55 to 15. There are not substantial changes in the main results.

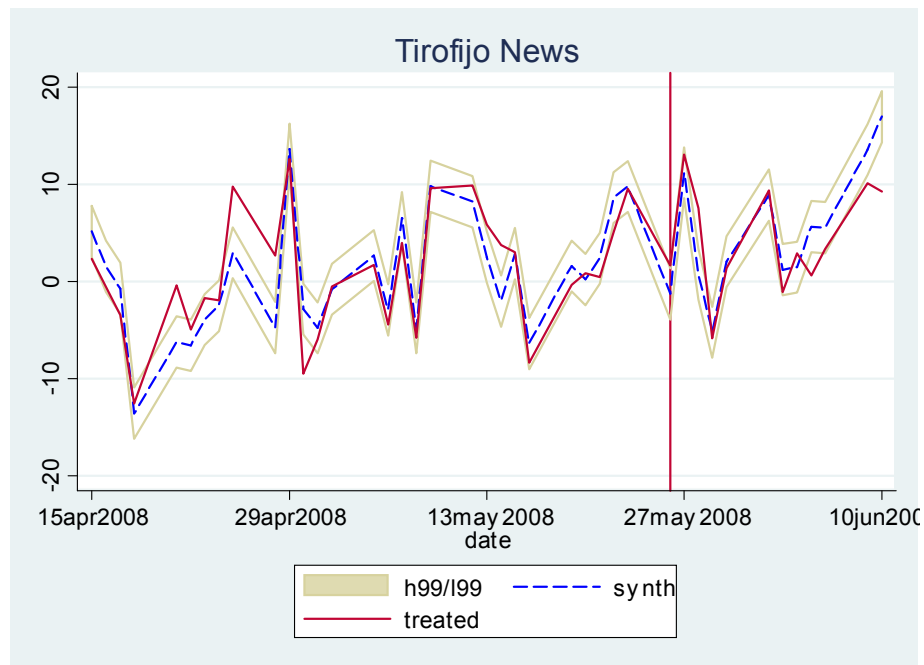
4 The role of the international media

We have hypothesized that only the events that make a widespread appearance in the international newswire affect the foreign perception of sovereign risk. This is regardless of the media coverage that the events receive in the local news. Indeed, international investors' preferences should be shaped by the global news, not by local papers. We test this idea by looking at one particular event that, while constituted a milestone in the Colombian conflict, featured only very little media and press coverage internationally. Specifically, we look at changes in the foreign perception of sovereign risk following the announcement that Manuel Marulanda (a.k.a. *Tirofijo* or "Sure-shot"), FARC's founder and chief commander, was dead.

Marulanda was reported dead on FARC's website on May 24 2008, two days after his actual death which was kept in secret by the group. In contrast to the events studied in the paper the number of hits in Google News finder on the event day and the days following the announcement is

extremely low. There are only 27 hits on the same day, and just 34 and 50 on the days that follow respectively. Surprisingly, this represents only 11% of the news covering Clara Rojas' release and 2.3% of the news on Ingrid Betancourt!

The historical importance of the death of the FARC's leader, combined with the lack of information about it in the international press constitutes a rare 'experiment' that can be used to test the assumption that conflict events shape the perception of international markets through the international mass media. This has potentially interesting policy consequences. Consistent with the fact that this event had no large echo in the international press, we see very little deviation in the Colombian abnormal CDS relative to the SCG we use as counterfactual. This is true even after the event took place. For the whole period, the Colombian abnormal CDS rarely moves outside the confidence bounds of the SCG. After the event takes place the Colombian CDS lies at the bottom of the confidence interval but there is no significant wedge between the two series, indicating that the market if anything reacted very little to the death of the founder of FARC.



5 Conclusion

This paper uses recent techniques from the financial and impact evaluation literature to study the *causal* effect of different types of conflict events on the foreign perception of sovereign risk for

Colombia. Risk perception is measured with the price of the Credit Default Swap for the Colombian bonds traded in foreign markets. We find that, depending on the specific political context of each event, the market may react positively, negatively, or both in the aftermath of the event. One conclusion of this research is in fact that market responses to specific political events are very idiosyncratic. This limits the scope of policy conclusions that could be driven from our paper. However, we also show that whether the market reacts at all, in turn depends on whether events have sufficiently widespread international media coverage. The role of the press is indeed pivotal in shaping the attitudes of international investors towards politically unstable countries.

While the inference shown in this paper is mainly visual, it heavily depends on the control group used as counterfactual. This paper uses the SCG methodology developed by Abadie and Gardeazabal (2003) and Abadie et al. (2010) to construct such control group and we show that it does match the pre-shock series well and thus we are confident interpreting our results as causal.

In terms of specific findings, the release of Clara Rojas seems to have had a positive impact on credit markets, lowering the risk perception and hence the price of the country's CDS. A military intelligence operation resulting in the rescue of Ingrid Betancourt also had a positive effect, offsetting a previous upward trend of the CDS prices, driven by diplomatic and trade issues with Ecuador. However, while similar to Betancourt rescue in terms of military skills and results achieved, the killing of Raul Reyes is shown not to have such positive results. This is arguably because of the offsetting fact that the military initiative actually took place on a foreign country, with no previous official clearance of Ecuador.

This paper is part of the recent academic literature on the economic impact of armed conflict from a sub-national perspective. This approach is promising and the research agenda ahead is vibrant, since it facilitates the use of methodologies for causal inference as the one used here, which in turns helps shaping evidence-based policy advice, for which the ultimate goal should be to reduce the incidence of conflict and minimize the negative consequences.

We would be thrilled if this paper could help spur similar investigations that would help advance our knowledge of the consequences of armed conflict. The methodology used here, for instance, could go beyond country-wide effects and be extended to study investment patterns in sub-national regions.

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Appendix

Tables

- Results of the OLS estimation of equation (1):

Table A1: Model Estimates for Colombia

Event:	Rojas	Betancourt	Reyes
<i>Dep. variable: CDS_t</i>			
CDS _{t-1}	0.998*** (0.079)	0.656*** (0.107)	0.769*** (0.089)
Exchange rate _{t-1}	-0.172** (0.059)	-0.062* (0.024)	0.061 (0.042)
Embi _{t-1}	-0.130 (0.163)	0.039 (0.099)	0.127 (0.156)
R-squared	0.85	0.76	0.79

Notes: Robust standard errors are shown in parentheses. Regressions include dummies to control for non-conflict political events. Namely: i) Announcement of the CPI by the statistical office; ii) News regarding the appreciation of the Colombian Peso; iii) Announcement that Senator Cordoba is serving as mediator in negotiations with guerrillas for the release of hostages; iv) Discovery of a new gold mine of important scale; v) Colombia agree to let Venezuela mediate in the negotiations for the release of hostages; vi) Ecuador breaks trade relations with Colombia. *** is significance at the 1% level, ** is significant at the 5% level, * is significant at the 10% level.

- Optimal weights of the synthetic CDS for each events:

Table A2: Optimal weights of each country for each event

	Rojas	Betancourt	Reyes	Marulanda
Argentina	0.084	0.005	0	0
Brazil	0.322	0.995	0	0
Chile	0.161	0	0	0.923
Mexico	0.156	0	0.055	0
Peru	0.153	0	0.945	0
Venezuela	0.124	0	0	0.077

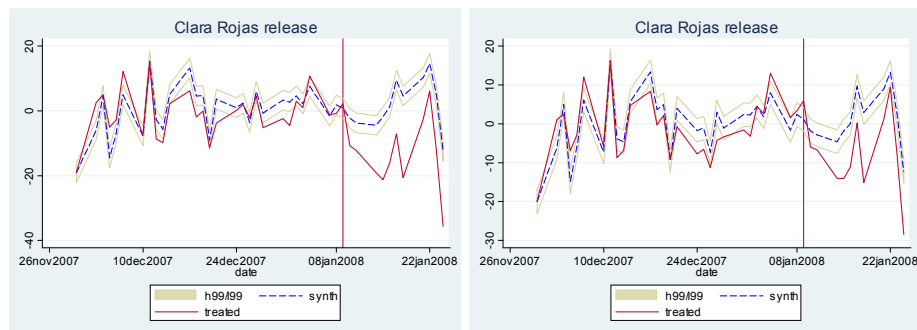
Additional figures

The robustness checks below use different lengths of the estimation windows to estimate the structural CDS parameters from regression model (1), used in turn to compute the abnormal CDS required by the analysis.

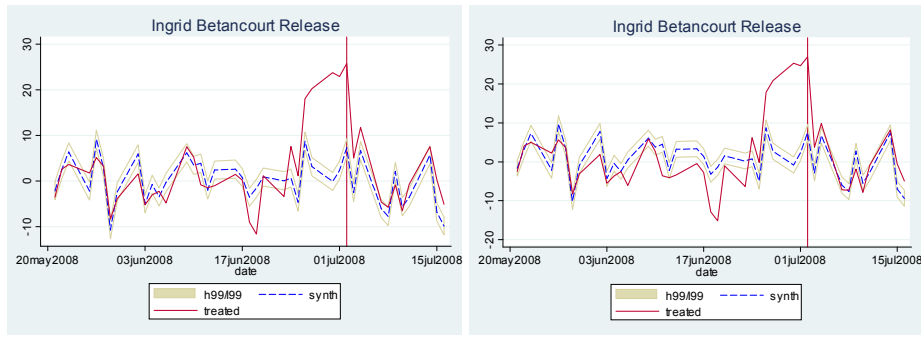
Abnormal CDS

For each event the graph on the left hand side corresponds to the results obtained using an estimation window 50 to 10 days before the event date. The one on the right hand side corresponds to the results using an estimation window 55 to 15 days before the event date. The substantive results explained in the main paper remain largely unchanged.

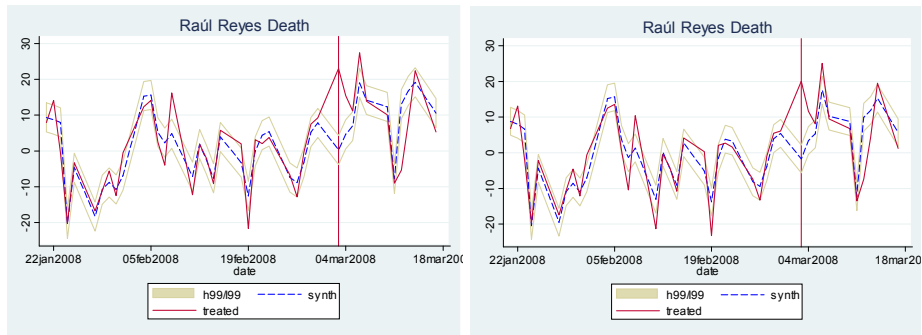
- Clara Rojas



- Ingrid Betancourt



- Raul Reyes

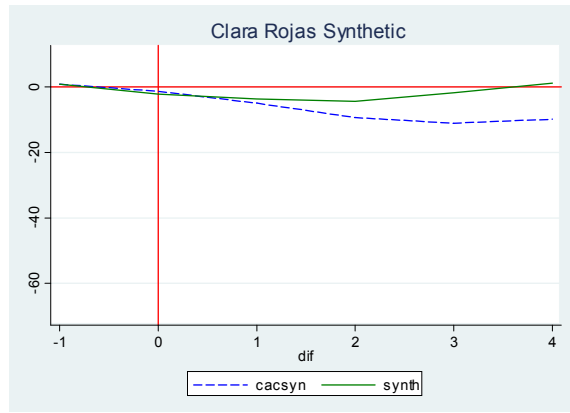
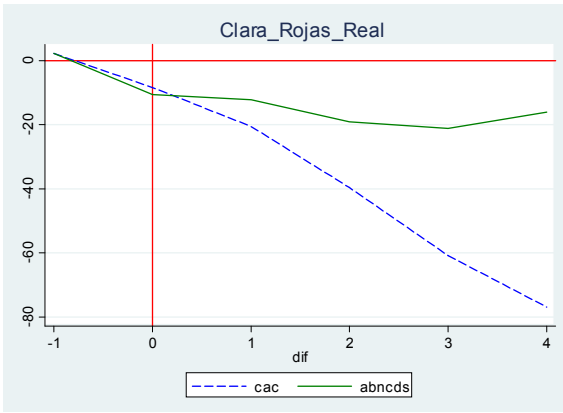


Cumulative Abnormal CDS

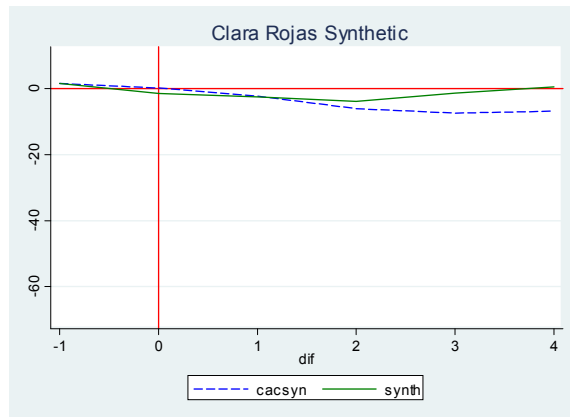
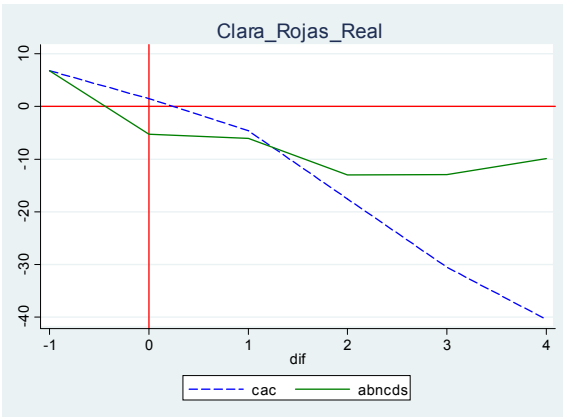
As in section 4.2, the picture on the left hand side shows the behavior of the actual abnormal CDS and cumulative abnormal CDS. The one on the right hand side shows the behavior of the synthetic abnormal CDS and the synthetic cumulative abnormal CDS. Again, for each event the first set of pictures correspond to the results based on an estimation window covering 50 to 10 days before the event date, and the second set corresponds to the results based on a window covering 55 to 15 days before the event date. As in the previous case, results are largely unchanged.

- Clara Rojas

- 50 to 10 day before the event

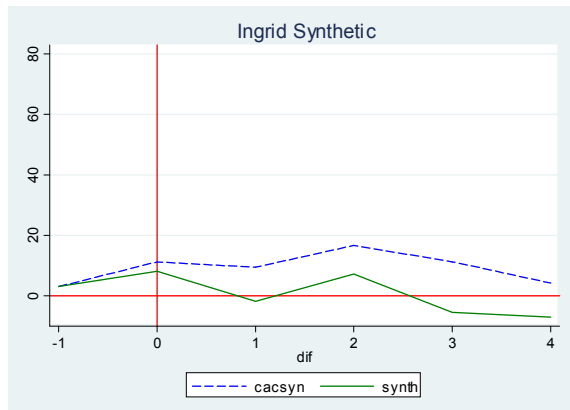
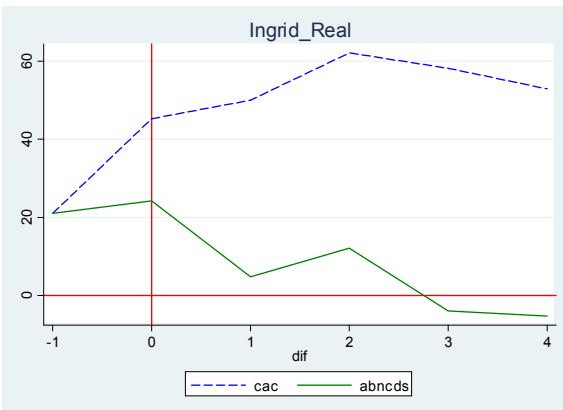


- 55 to 15 day before the event

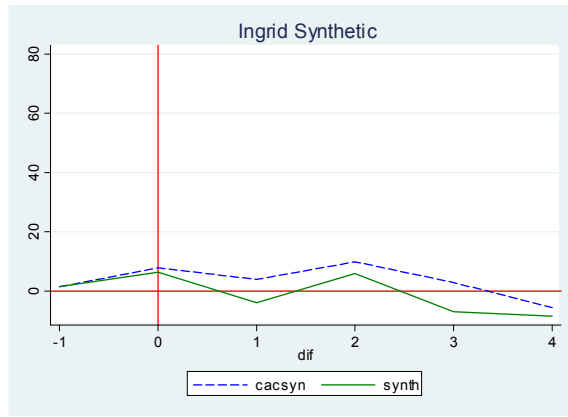
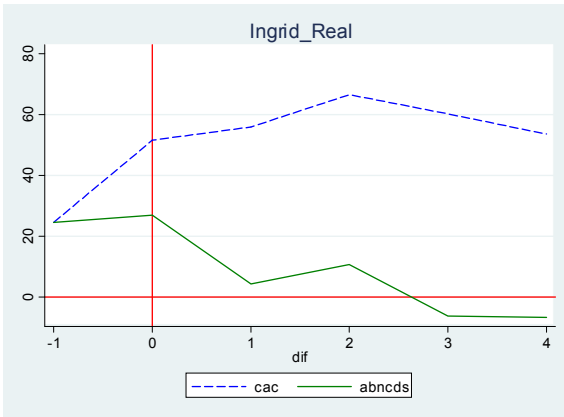


• Ingrid Betancourt

- 50 to 10 day before the event

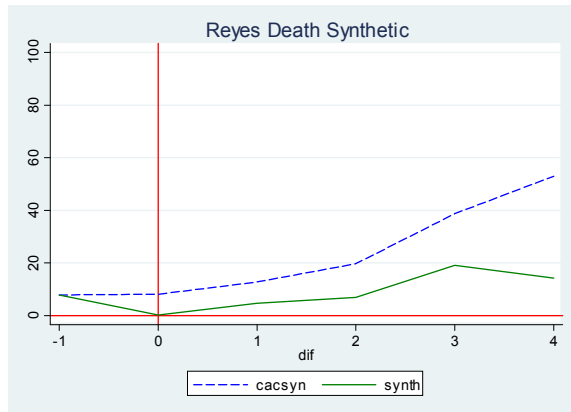
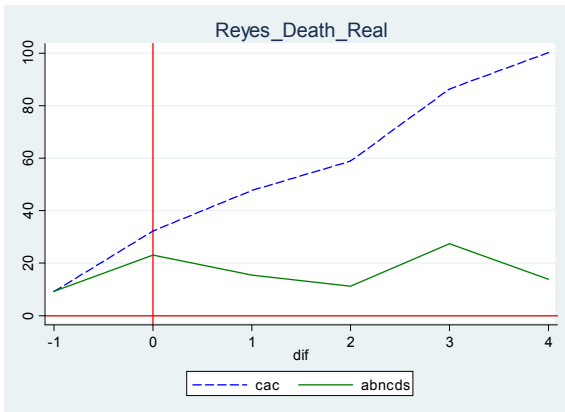


- 55 to 15 day before the event



• Raúl Reyes

- 50 to 10 day before the event



- 55 to 15 day before the event

