PAPER

Title:
The impact of terrorism at the municipality level in Colombia: A difference-in-differences approach

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Abstract: *(maximum 300 words)*
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Keywords: *(maximum 6 words)*
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JEL codes:
C21, J10, N46, R12.

The impact of terrorism at the municipality level in Colombia: A difference-in-differences approach*

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Abstract

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1 Introduction

The consequences of violence, in general, and terrorism, in particular, tend to prolong over time. At the urban level, there is a related strand of the literature that analyzes the persistence of the effects that violence exerts on city size. The interest on this topic is mainly motivated by the fact that the degree of persistence of the shocks experienced by cities permits to assess the relative importance of the two main theoretical explanations for the spatial distribution of economic activity: locational fundamentals and increasing returns (Braun et al. 2021). The main conclusion drawn by those studies about the consequences of wars is that their strong and temporary demographic shocks have transitory effects on the relative city size distribution, see Davis and Weinstein (2002) and Brakman, Garretsen, and Schramm (2004) for the World War II, and Sanso-Navarro, Sanz-Gracia, and Vera-Cabello (2015) for the American Civil War. These papers adopted an empirical framework based on an instrumental variable estimation. As an alternative, Sanso-Navarro, Sanz-Gracia, and Vera-Cabello (2019) applied difference-in-differences (DiD) methods to analyze the demographic impact of terrorism at the regional level in Spain. Proceeding this way, and in line with the studies cited above, they find that terrorism had a negative and transitory effect on population growth.

Colombia is the third largest economy of Latin America and is strongly linked to the United States (US). Although Colombia has a long-lasting and solid democracy, it has suffered a severe, complex, and multidimensional conflict during seven decades, see Fernández and Pazzona (2019). This explains that this country displayed the highest level of terrorist activity worldwide during 1970-2004 (Feldmann and Hinojosa 2009). Actually, the length and scale of the Colombian conflict has made it a testing ground to study the economic and social consequences of violence[1]. Lemus (2014) shows that it increased poverty in rural areas. Moya and Carter (2019) conclude that violence significantly lessens beliefs about socioeconomic mobility and increases the expected likelihood of extreme poverty. Castañeda and Vargas (2012) and Moya (2018) analyze the effects of the Colombian conflict on the perception of economic and financial risks. In this line, Kutan and Yaya (2016) study the impact of large-scale terrorist attacks on the stock market and industrial production.

[1]Sanso-Navarro, Sanz-Gracia, and Vera-Cabello (2021) study the determinants of terrorism at the subnational level in Colombia during 2001-2014.

Camacho and Rodríguez (2013) find a positive influence of the number of guerrilla and paramilitary attacks on the probability of plant exit at the municipality level. Rozo (2018) shows that firms more exposed to conflict display lower levels of output and input prices.

There has also been interest in studying the influence of the Colombian conflict on labor market outcomes, especially through internal forced migration. Bozzoli, Brück, and Wald (2013) conclude that there is a positive relationship between net displacement and self-employment rates in the services sector. Similarly, Calderón-Mejía and Ibáñez (2016), Morales (2018) and Giménez-Nadal, Molina, and Silva-Quintero (2019) show that forced migration reduces wages. Depetris-Chauvin and Santos (2018) conclude that internally displaced people not only affect real wages in the construction sector of recipient cities, but also alter the housing market and increase homicide rates. Fernández and Pazzona (2019) analyze violence spillovers from Colombia to Ecuador, without finding any influence of the arrival of asylum seekers and of the presence of armed groups in bordering provinces on, respectively, violent crime and homicide rates. Martínez (2017) documents that the intensity of FARC operations increased in municipalities at the border with Venezuela after Hugo Chávez was appointed as its president.

Besides these studies on the Colombian conflict, we try to contribute to the literature about the consequences of terrorism at the urban level; see Hazam and Felsenstein (2007), Savitch (2007), Abadie and Dermisi (2008), Arbel et al. (2010), Besley and Mueller (2012), which mainly focus on housing and labor markets, investment rates, and tourism. In line with Sanso-Navarro, Sanz-Gracia, and Vera-Cabello (2019), we analyze the impact of terrorist attacks on municipality size. These authors implemented the dynamic DiD approach proposed by Wolfers (2006) which consists of a response function constructed with dummy variables that permits to distinguish between permanent and transitory effects; see Amarasinghe et al. (2020) and Heblich, Redding, and Sturm (2020) for similar applications. Nonetheless, there are some recent concerns about the interpretation of the estimation results obtained from this empirical framework as reliable measures of dynamic causal effects (Sun and Abraham 2021). This is especially the case when there are differences in treatment timing and heterogeneous effects; see the reviews by Chaisemartin and D'Haultfoeuille (2022) and Roth et al. (2022). For this reason, we propose to embrace newly developed heterogeneity-robust DiD estimators to study the persistent character of the demographic effects of terrorist attacks on Colombian municipalities. With this aim, it is of special interest the DiD framework proposed by Callaway and Sant'Anna (2021) as long as it adapts to multiple time periods and variation in treatment timing.

The rest of the paper is organized as follows. Section 2 provides a brief history of the Colombian conflict, and describes the main mechanisms behind the demographic effects of terrorism. Section 3 presents the data sources and the variables that have been analyzed in our empirical analysis, and Section 4 explains the methods that have been implemented. The results obtained in our empirical analysis are discussed in Section 5 and, finally, Section 6 concludes.

2 Background

2.1 The Colombian conflict

The origin of the Colombian conflict is considered to date back to a period of a strong rivalry between the Liberal and the Conservative political parties known as *La Violencia* (1948-1958). These two opposing organizations signed an agreement on 1957 (*Pacto de Sitges*) to constitute a National Front and arbitrarily alternate the presidency of the nation during almost two decades. Meanwhile, left-wing guerrillas emerged in rural areas, being the two more important the National Liberation Army (ELN) and the Revolutionary Armed Forces of Colombia (FARC). Drug traffickers became involved in the conflict between the state and the guerrillas during the 1980s. Although guerrillas had initially a low impact, and restricted to their areas of influence, these groups intensified their violent activity during the 1990s. This was as a consequence of the FARC coming into play in the illicit drug trade, on the one hand, and of the emergence of right-wing paramilitary groups defending rural landowners and dealers against the extortion of guerrillas, on the other. For these reasons, it can be claimed that the Colombian conflict has been characterized by the successive appearance of new contenders with changeable motivations and behavior.

Presidents Andrés Pastrana (1998-2002) and Bill Clinton signed the so-called *Plan Colombia* (2000), which came with financial and military aid from the US. Also with the support of this country, President Álvaro Uribe (2002-2010) set up *Plan Patriota* (2003) to fight against ELN and FARC. Juan Manuel Santos (2010-2018) – awarded with the Nobel

Peace Prize in 2016 – signed an agreement with the FARC that, although it lessened the intensity of violence, was not enough to led the conflict to an end. Under the presidency of Iván Duque (2018-nowadays), paramilitary groups and new criminal organizations have taken control of the territory and drug trafficking after FARC disarmament. Negotiations between the government and the ELN have failed, making dissidents of this organization to fight again with those of the FARC at the beginning of 2022. Therefore, there is still a way to go for a complete cessation of violence in Colombia.

2.2 Theoretical underpinnings

Terrorism has been one specific strategy within all the observed manifestations of violence in Colombia. In reality, non-state armed groups adopted terrorism as a pivotal element of their ways of action (Feldmann and Hinojosa 2009). This type of violence directly affects individuals by reducing their physical and human capital. Terrorism also has indirect consequences – in terms of uncertainty, stress, and risk – that are more difficult to quantify and evaluate (Frey, Luechinger, and Stutzer 2007). According to the 'fear hypothesis' (Becker and Rubinstein 2011), the intense and prolonged exposition to fright changes the psychology of individuals as well as their choices. This hypothesis is related to the 'terror management theory' (Greenberg, Pyszczynski, and Solomon 1986) which assumes that the prioritary target of human beings is survival, and that death-related anxiety increases with the publicity of terrorist attacks (Das et al. 2009). These emotional consequences of terrorism influence the private and social life of individuals (Fischer et al. 2007), as well as their consumption, savings, and investment decisions (Frey, Luechinger, and Stutzer 2007). Terrorism also generates non-economic effects by influencing political participation (Vasilopoulos 2018) or demographic change (Sanso-Navarro, Sanz-Gracia, and Vera-Cabello 2019).

Urban population is determined by its natural increase (births minus deaths) and net migration. Therefore, terrorism may affect city size through fertility, deaths, and/or migration. Even if both low birth rates and negative net migration decrease urban population, the dynamic implications of these factors are different. While migration is a short-run phenomenon that can be reversed in time, fertility affects population in the long-run. From a theoretical point of view, and on the one hand, terrorism might exert a positive influence on fertility as children can be considered as a long-run investment that insures against future adverse income shocks. On the other hand, terror can negatively affect fertility through the stress and uncertainty created. Empirical studies suggest that terror reduces fertility (Berrebi and Ostwald 2015), and that generates migratory movements of people trying to escape from it; see Lozano-Gracia et al. (2010) for the case of Colombia.

3 Data and variables

The main aim of the present paper is to study the persistence of the shocks derived from terrorist attacks on Colombian municipalities. The information about their size has been extracted from *Departamento Administrativo Nacional de Estadística* (DANE), which reports yearly population projections based on census data for $1,122$ municipalities starting in 1985. This determines the period covered in our final sample that ends in 2020. The shapefile containing the geospatial information of Colombian municipalities has been extracted from the GADM database (version 4.0; `https://gadm.org/`).

The information about terrorist incidents in Colombia comes from the Global Terrorism Database (GTD), maintained by the National Consortium for the Study of Terrorism and Responses to Terrorism (LaFree and Dugan 2007). This data set defines terrorism as *"the threatened or actual use of illegal force and violence by non-state actors to attain a political, economic, religious, or social goal through fear, coercion, or intimidation"*. For the period 1985-2020, the GTD reports $5,832$ terrorist attacks, which caused the death of $10,017$ persons. These data have been grouped at municipality level on a yearly basis using the details about the date and the location of each incident. In this regard, Figure 1 displays the spatial distribution of the municipalities that have suffered, at least, one terrorist attack during our sample period. A visual inspection of this map allows us to conclude that there is no geographical pattern in the distribution of terrorist incidents across space in Colombia

[Insert Figure 1 here]

4 Methodology

One of the most commonly applied methods to assess the effects of a policy or a shock ('treatment') on a given outcome consists of comparing the evolution of the variable under scrutiny in the affected ('treated') group with that in the non-affected ('control') one. As a general rule, and in a panel data framework, this idea is implemented using two-way fixed effects (TWFE) regressions which, in a static context, can be formulated as:

$$Y_{it} = \alpha_i + \alpha_t + \beta D_{it} + \epsilon_{it} \tag{1}$$

where Y_{it} is the outcome in unit i at time t, and α_i and α_t are, respectively, unit and time fixed effects. D_{it} is an indicator variable that takes a value of one if unit i has been treated in period t (zero, otherwise), and ϵ_{it} is the error term.

Although these regressions have been considered to be equivalent to DiD estimations, the coefficient for β does not necessarily have a causal interpretation, see Chaisemartin and D'Haultfoeuille (2020), Borusyak, Jaravel, and Spiess (2021), and Goodman-Bacon (2021). Similar arguments apply to the dynamic version of expression (1), also referred to as 'event-study' regressions (Sun and Abraham 2021):

$$Y_{it} = \alpha_i + \alpha_t + \beta D_{it} + \sum_{l=-K, l \neq -1}^{L} \beta_l D_{it}^{l} + \varepsilon_{it} \tag{2}$$

with D_{it}^{l} being an indicator that takes a value of one if the unit was exposed to the policy/shock l periods ago; zero, otherwise.

The main problem with TWFE regressions is that, when there are differences in the date of the treatment, the ordinary least squares (OLS) estimator compares all 'cohorts' with each other, as long as there is variation in the treatment status. That is to say, OLS does not care about the treatment and the control group, just about minimizing the mean square error. However, carrying out causal inference implies exploiting the variation that fulfills the assumptions.

With the aim of improving the estimation and inference procedures in these contexts, Callaway and Sant'Anna (2021) develop semi-parametric DiD estimators in setups with multiple time periods and variation in treatment timing. For a panel data context, let us consider the random sample $\{(Y_{i1}, Y_{i2}, \ldots, Y_{i\tau}, D_{i1}, D_{i2}, \ldots, D_{i\tau}, X_i)\}_{i=1}^{n}$, with X_i being a vector of regressors for unit i. Adopting a staggered treatment scheme, $D_{it} = 1$ implies that $D_{it+1} = 1$ for $t = 1, 2, \ldots, \tau$. Further, the treatment starting time is modelled using cohort dummies G_{ig} that take a value of one if unit i is first treated at time g, zero otherwise.

Assuming that there is no treatment anticipation, the generalized propensity score is uniformly bounded away from one. The main parameter of interest is the average treatment effect (ATE) for the group of units first treated at period g in calendar time t:

$$ATE(g,t) = \mathbb{E}[Y_t(g) - Y_t(0)|G_g = 1], \text{ for } t \geqslant g \tag{3}$$

Considering the units that have never been treated as the comparison group ($C = 1$), the conditional parallel trends assumption establishes that, for each $t \in \{2, \dots, \tau\}$, and $g \in \mathbb{G}$ such that $t \geqslant g$,

$$\mathbb{E}[Y_t(0) - Y_{t-1}(0)|X, G_g = 1] = \mathbb{E}[Y_t(0) - Y_{t-1}(0)|X, C = 1] \tag{4}$$

almost surely.

If covariates do not play a major role for DiD identification, i.e., the identifying assumptions hold unconditionally, the ATEs can be recovered as:

$$ATE^{unc}(g,t) = \mathbb{E}[Y_t(0) - Y_{t-1}(0)|G_g = 1] - \mathbb{E}[Y_t(0) - Y_{t-1}(0)|C = 1] \tag{5}$$

Therefore, their estimation is based on the analogy principle, and inference entails a large number of mean comparisons.

When covariates are important for identification, Callaway and Sant'Anna (2021) propose three alternative estimation methods. Among them, and building on Heckman, Ichimura, and Todd (1997), we are using the outcome regression estimands to recover the ATEs:

$$ATE^{or}(g,t) = \mathbb{E}\left\{\frac{G_g}{\mathbb{E}[G_g]}[Y_t - Y_{g-1} - m_{gt}(X)]\right\} \tag{6}$$

with $m_{gt}(X) = \mathbb{E}[Y_t - Y_{g-1}|X, C = 1]$ being a population regression outcome for the never-treated group.

Given that ATEs are obtained using data subsets, causal effects must be aggregated in dynamic setups with multiple cohorts. To do so, weighted averages of the ATEs $\sum_{g=2}^{\tau}\sum_{t=2}^{\tau} 1\{g \geqslant t\} w_{gt} ATE(g,t)$ can be calculated, what requires to choose weights that permit to interpret the aggregated effects. In our empirical application, we focus on the average effect of being treated (attacked) for the group of units (municipalities) that have been exposed to the treatment (terrorism) during e time periods:

$$\theta(e) = \sum_{g=1}^{\tau} 1\{g + e \geqslant \tau\} ATE(g, g + e) P(G = g | G + e \geqslant \tau, C \neq 1) \tag{7}$$

5 Results

Figure 2 displays the ATEs calculated from a dynamic event study framework. The graphs in the upper panel correspond to the effects on municipality size, while those in the lower panel show ATEs on population growth. The two plots on the left panel built identification upon the unconditional parallel trends assumption, while those on the right panel adopt a conditional specification using regional dummies and lagged local population levels and growth rates as covariates. The comparison group comprises those municipalities that did not suffer a terrorist incident during the whole sample period.

[Insert Figure 2 here]

Regarding the dynamic effects of terror on municipality size, the graphs in the upper panel of Figure 2 show that the results from the conditional specification are more reliable than those from the unconditional one. The reason is that the latter leads to significant pre-treatment effects, on the one hand, and positive dynamic effects of terrorism on urban population, on the other. As expected, the conditional framework suggests that terrorism exerts a negative influence on municipality size that stabilizes after six years are elapsed. The graphs in the lower panel suggest that, due to the variability of population growth, it is much more difficult to capture significant dynamic ATEs for this demographic indicator, regardless an unconditional or a conditional parallel trends assumption is adopted to achieve identification.

[Insert Figure 3 here]

In the context of studying the economic consequences of mass shootings, but in a TWFE estimation framework, Brodeur (2018) and Brodeur and Yousaf (2019) propose to use the units that have experienced failed attacks as the comparison group. For the case of Colombian municipalities, their geographical distribution is plotted in Figure 3. Again, it can be observed that successful and failed attacks do not seem to follow any spatial pattern. The dynamic ATEs from the conditional event studies and the specification of two alternative comparison groups are displayed in Table 1. Corroborating the results described before, and supporting the adoption of a conditional framework, ATEs before the treatment are not significant. Independently of the comparison group, terror exerts a transitory effect on municipality size in the medium term. Moreover, attacked units also experience lower population growth rates in the short run.

[Insert Table 1 here]

As an alternative approach, as well as a complementary analysis, Figure 4 plots ATEs grouped by year. The graphs in the upper panel show that terrorism had a more important effect on municipality size in the early 1990s and, especially, in the 21st century. In line with the estimation results included in Table 1, using failed attacks as the comparison group is crucial to obtain significant ATEs on population growth. In this case, they seem to be especially important in the late 1990s.

[Insert Figure 4 here]

6 Concluding remarks

This paper proposes to use recent developments in difference-in-difference causal inference methods to study the persistent character of the effects that terrorism exert at the urban level. These techniques have been applied to data of Colombian municipalities covering the period from 1985 to 2000. Our results suggest that violence has had an adverse and transitory effect on municipality size, that is statistically significant in the medium term. Although it is important to adopt a conditional parallel assumption to achieve identification, these findings are robust to the specification of the comparison group. Distinguishing between municipalities that suffered successful and failed attacks also leads us to conclude that terror had negative effects on population growth. In line with the related literature, they are especially relevant in the short term. These results provide support for the locational fundamentals theory, according to which long term geographical conditions determine the spatial distribution of population and economic activity.

References

Abadie, Alberto, and Sofia Dermisi. 2008. "Is terrorism eroding agglomeration economies in central business districts? Lessons from the office real estate market in downtown Chicago". *Journal of Urban Economics* 64 (2): 451–463. doi:10.1016/j.jue.2008.04.002.

Amarasinghe, Ashani, Paul A. Raschky, Yves Zenou, and Junjie Zhou. 2020. *Conflicts in spatial networks.* CEPR Discussion Paper No 14300.

Arbel, Yuval, Danny Ben-Shahar, Stuart Gabriel, and Yossef Tobol. 2010. "The local cost of terror: Effects of the second Palestinian Intifada on Jerusalem house prices". *Regional Science and Urban Economics* 40 (6): 415–426. doi:10.1016/j.regsciurbeco.2010.05.005.

Becker, Gary, and Yona Rubinstein. 2011. *Fear and the response to terrorism: An economic analysis.* Centre for Economic Performance Discussion Paper No 1079. London School of Economics.

Berrebi, Claude, and Jordan Ostwald. 2015. "Terrorism and fertility: Evidence for a causal influence of terrorism on fertility". *Oxford Economic Papers* 67 (1): 63–82. doi:10.1093/oep/gpu042.

Besley, Timothy, and Hannes Mueller. 2012. "Estimating the peace dividend: The impact of violence on house prices in Northern Ireland". *American Economic Review* 102 (2): 810–833. doi:10.1257/aer.102.2.810.

Borusyak, Kirill, Xavier Jaravel, and Jann Spiess. 2021. *Revisiting event study designs: Robust and efficient estimation.* arXiv: 2108.12419 [econ.EM].

Bozzoli, Carlos, Tilman Brück, and Nina Wald. 2013. "Self-employment and conflict in Colombia". *Journal of Conflict Resolution* 57 (1): 117–142. doi:10.1177/0022002712464849.

Brakman, Steven, Harry Garretsen, and Marc Schramm. 2004. "The strategic bombing of German cities during World War II and its impact on city growth". *Journal of Economic Geography* 4 (2): 201–218. doi:10.1093/jeg/4.2.201.

Braun, Sebastian T., Anica Kramer, Michael Kvasnicka, and Philipp Meier. 2021. "Local labor markets and the persistence of population shocks: Evidence from West Germany, 1939 – 1970". *Journal of Economic Geography* 21 (2): 231–260. doi:10.1093/jeg/lbaa013.

Brodeur, Abel. 2018. "The effect of terrorism on employment and consumer sentiment: Evidence from successful and failed terror attacks". *American Economic Journal: Applied Economics* 10 (4): 246–282. doi:10.1257/app.20160556.

Brodeur, Abel, and Hasin Yousaf. 2019. *The economics of mass shootings.* IZA Discussion Paper No 12728.

Calderón-Mejía, Valentina, and Ana María Ibáñez. 2016. "Labour market effects of migration-related supply shocks: Evidence from internal refugees in Colombia". *Journal of Economic Geography* 16 (3): 695–713. doi:10.1093/jeg/lbv030.

Callaway, Brantly, and Pedro H.C. Sant'Anna. 2021. "Difference-in-differences with multiple time periods". *Journal of Econometrics* 225 (2): 200–230. doi:10.1016/j.jeconom.2020.12.001.

Camacho, Adriana, and Catherine Rodríguez. 2013. "Firm exit and armed conflict in Colombia". *Journal of Conflict Resolution* 57 (1): 89–116. doi:10.1177/0022002712464848.

Castañeda, Andrés, and Juan F. Vargas. 2012. "Sovereign risk and armed conflict: An event-study for Colombia". *Defence and Peace Economics* 23 (2): 185–201. doi:10.1080/10242694.2011.597233.

Chaisemartin, Clément de, and Xavier D'Haultfoeuille. 2020. "Two-way fixed effects estimators with heterogeneous treatment effects". *American Economic Review* 110 (9): 2964–96. doi:10.1257/aer.20181169.

— . 2022. *Two-way fixed effects and differences-in-differences with heterogeneous treatment effects: A survey.* NBER Working Paper No 29691. doi:10.3386/w29691.

Das, Enny, Brad J. Bushman, Marieke D. Bezemer, Peter Kerkhof, and Ivar E. Vermeulen. 2009. "How terrorism news reports increase prejudice against outgroups: A terror management account". *Journal of Experimental Social Psychology* 45 (3): 453–459. doi:10.1016/j.jesp.2008.12.001.

Davis, Donald R., and David E. Weinstein. 2002. “Bones, bombs, and break points: The geography of economic activity”. *American Economic Review* 92 (5): 1269–1289. doi:10.1257/000282802762024502.

Depetris-Chauvin, Emilio, and Rafael J. Santos. 2018. “Unexpected guests: The impact of internal displacement inflows on rental prices in Colombian host cities”. *Journal of Development Economics* 134:289–309. doi:10.1016/j.jdeveco.2018.05.006.

Feldmann, Andreas E., and Victor J. Hinojosa. 2009. “Terrorism in Colombia: Logic and sources of a multidimensional and ubiquitous phenomenon”. *Terrorism and Political Violence* 21 (1): 42–61. doi:10.1080/09546550802544656.

Fernández, José M., and Matteo Pazzona. 2019. “Evaluating the spillover effects of the Colombian conflict in Ecuador”. *Defence and Peace Economics* 30 (3): 324–348. doi:10.1080/10242694.2017.1328562.

Fischer, Peter, Tobias Greitemeyer, Andreas Kastenmüller, Dieter Frey, and Silvia Oßwald. 2007. “Terror salience and punishment: Does terror salience induce threat to social order?” *Journal of Experimental Social Psychology* 43 (6): 964–971. doi:10.1016/j.jesp.2006.10.004.

Frey, Bruno S., Simon Luechinger, and Alois Stutzer. 2007. “Calculating tragedy: Assessing the costs of terrorism”. *Journal of Economic Surveys* 21 (1): 1–24. doi:10.1111/j.1467-6419.2007.00505.x.

Giménez-Nadal, José I., José A. Molina, and Edgar Silva-Quintero. 2019. “On the relationship between violent conflict and wages in Colombia”. *Journal of Development Studies* 55 (4): 473–489. doi:10.1080/00220388.2018.1425393.

Goodman-Bacon, Andrew. 2021. “Difference-in-differences with variation in treatment timing”. *Journal of Econometrics* 225 (2): 254–277. doi:10.1016/j.jeconom.2021.03.014.

Greenberg, Jeff, Tom Pyszczynski, and Sheldon Solomon. 1986. “The causes and consequences of a need for self-esteem: A terror management theory”. In *Public self and private self*, ed. by Roy F. Baumeister, 189–212. New York, NY: Springer.

Hazam, Shlomie, and Daniel Felsenstein. 2007. “Terror, fear and behaviour in the Jerusalem housing market”. *Urban Studies* 44 (13): 2529–2546. doi:10.2307/43197600.

Heblich, Stephan, Stephen J. Redding, and Daniel M. Sturm. 2020. "The making of the modern metropolis: Evidence from London". *Quarterly Journal of Economics* 135 (4): 2059–2133. doi:10.1093/qje/qjaa014.

Heckman, James J., Hidehiko Ichimura, and Petra E. Todd. 1997. "Matching as an econometric evaluation estimator: Evidence from evaluating a job training programme". *Review of Economic Studies* 64 (4): 605–654. doi:10.2307/2971733.

Kutan, Ali M., and Mehmet E. Yaya. 2016. "Armed conflict and financial and economic risk: Evidence from Colombia". *Risk Management* 18 (2): 159–187. doi:10.1057/s41283-016-0003-7.

LaFree, Gary, and Laura Dugan. 2007. "Introducing the Global Terrorism Database". *Terrorism and Political Violence* 19 (2): 181–204. doi:10.1080/09546550701246817.

Lemus, Natalia. 2014. "Conflict-induced poverty: Evidence from Colombia". *Peace Economics, Peace Science and Public Policy* 20 (1): 113–142. doi:10.1515/peps-2013-0056.

Lozano-Gracia, Nancy, Gianfranco Piras, Ana Maria Ibáñez, and Geoffrey J. D. Hewings. 2010. "The journey to safety: Conflict-driven migration flows in Colombia". *International Regional Science Review* 33 (2): 157–180. doi:10.1177/0160017609336998.

Martínez, Luis R. 2017. "Transnational insurgents: Evidence from Colombia's FARC at the border with Chávez's Venezuela". *Journal of Development Economics* 126:138–153. doi:10.1016/j.jdeveco.2017.01.003.

Morales, Juan S. 2018. "The impact of internal displacement on destination communities: Evidence from the Colombian conflict". *Journal of Development Economics* 131:132–150. doi:10.1016/j.jdeveco.2017.10.003.

Moya, Andrés. 2018. "Violence, psychological trauma, and risk attitudes: Evidence from victims of violence in Colombia". *Journal of Development Economics* 131:15–27. doi:10.1016/j.jdeveco.2017.11.001.

Moya, Andrés, and Michael R. Carter. 2019. "Violence and the formation of hopelessness: Evidence from internally displaced persons in Colombia". *World Development* 113:100–115. doi:10.1016/j.worlddev.2018.08.015.

Roth, Jonathan, Pedro H. C. Sant'Anna, Alyssa Bilinski, and John Poe. 2022. *What's trending in difference-in-differences? A synthesis of the recent econometrics literature.* arXiv: 2201.01194 [econ.EM].

Rozo, Sandra V. 2018. "Is murder bad for business? Evidence from Colombia". *Review of Economics and Statistics* 100 (5): 769–782. doi:10.1162/rest_a_00735.

Sanso-Navarro, Marcos, Fernando Sanz-Gracia, and María Vera-Cabello. 2015. "The impact of the American Civil War on city growth". *Urban Studies* 52 (16): 3070–3085. doi:10.2307/26146215.

— . 2019. "The demographic impact of terrorism: Evidence from municipalities in the Basque Country and Navarre". *Regional Studies* 53 (6): 838–848. doi:10.1080/00343404.2018.1490010.

— . 2021. "Terrorism determinants, model uncertainty and space in Colombia". *Defence and Peace Economics* 0 (0): 1–20. doi:10.1080/10242694.2021.1880721.

Savitch, Hank V. 2007. *Cities in a time of terror: Space, territory, and local resilience.* Armonk, NY: M. E. Sharpe, Inc. ISBN: 9780765616838.

Sun, Liyang, and Sarah Abraham. 2021. "Estimating dynamic treatment effects in event studies with heterogeneous treatment effects". *Journal of Econometrics* 225 (2): 175–199. doi:10.1016/j.jeconom.2020.09.006.

Vasilopoulos, Pavlos. 2018. "Terrorist events, emotional reactions, and political participation: The 2015 Paris attacks". *West European Politics* 41 (1): 102–127. doi:10.1080/01402382.2017.1346901.

Wolfers, Justin. 2006. "Did unilateral divorce laws raise divorce rates? A reconciliation and new results". *American Economic Review* 96 (5): 1802–1820. doi:10.1257/aer.96.5.1802.

Figures and tables

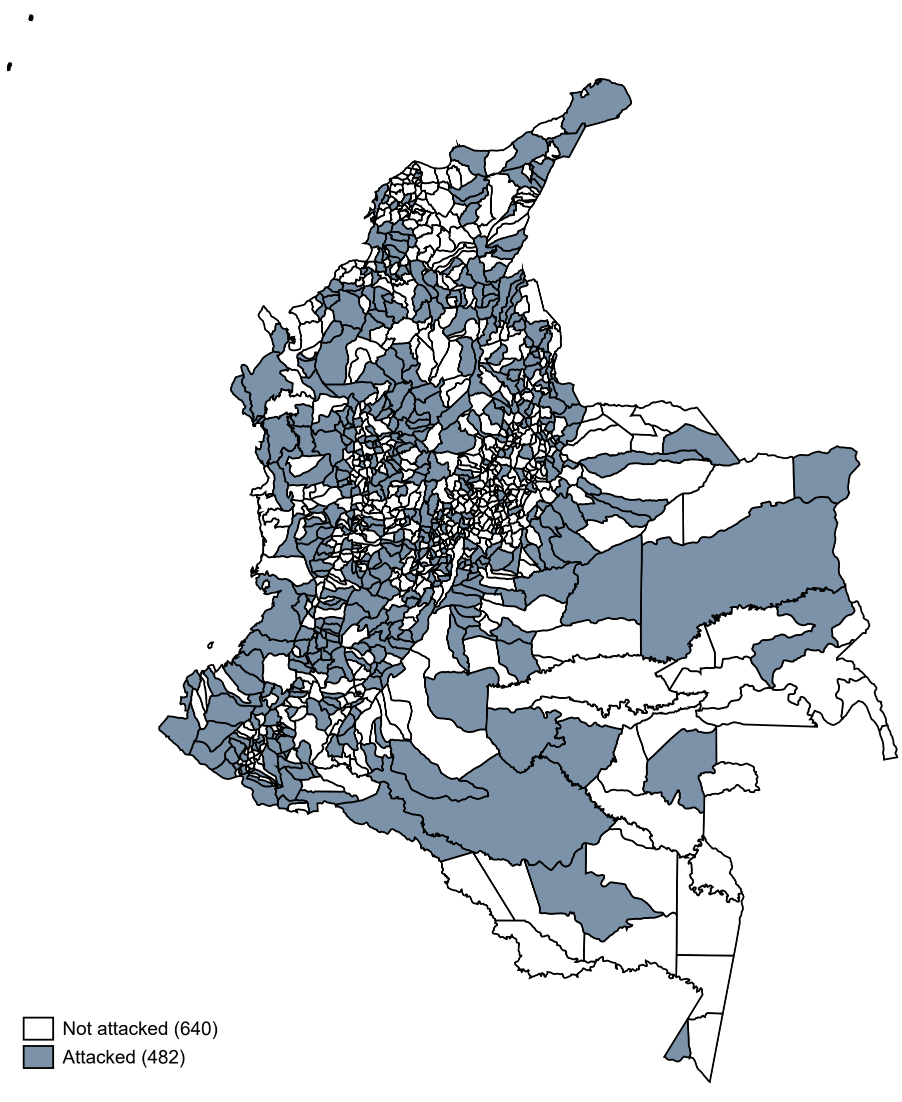

Figure 1: Colombian municipalities that suffered terrorist attacks, 1985-2020.

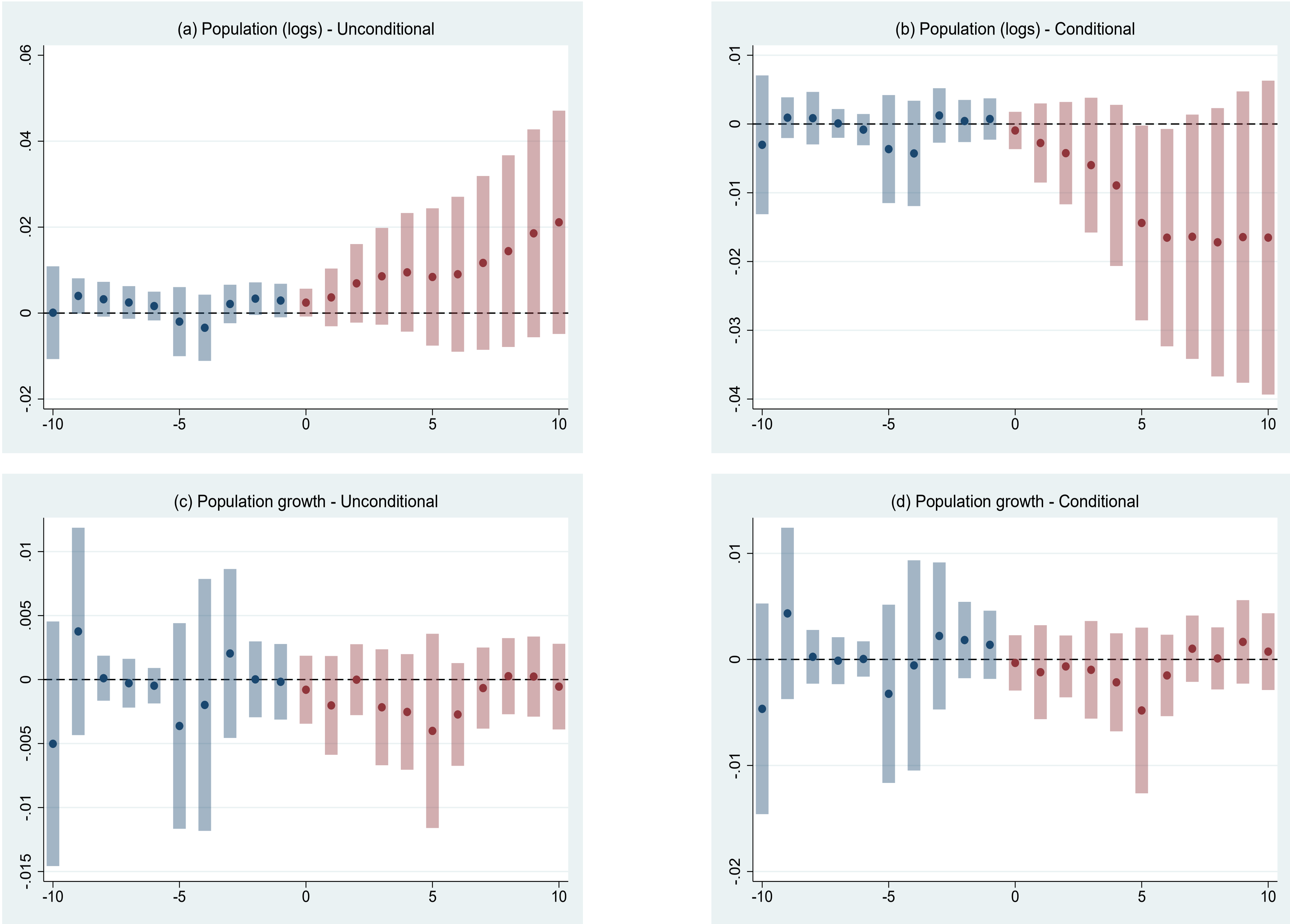

Figure 2: Average treatment effects: Dynamic event studies.

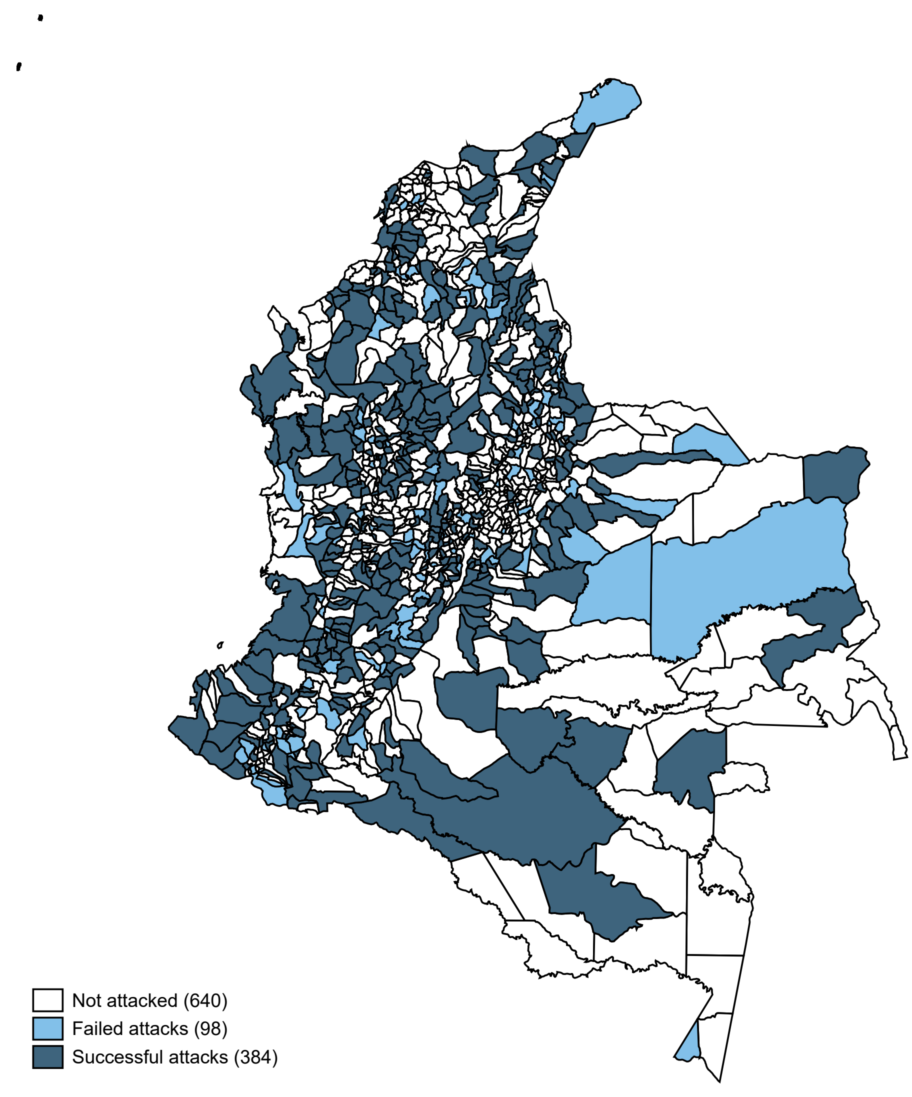

Figure 3: Colombian municipalities: Successful and failed attacks, 1985-2020.

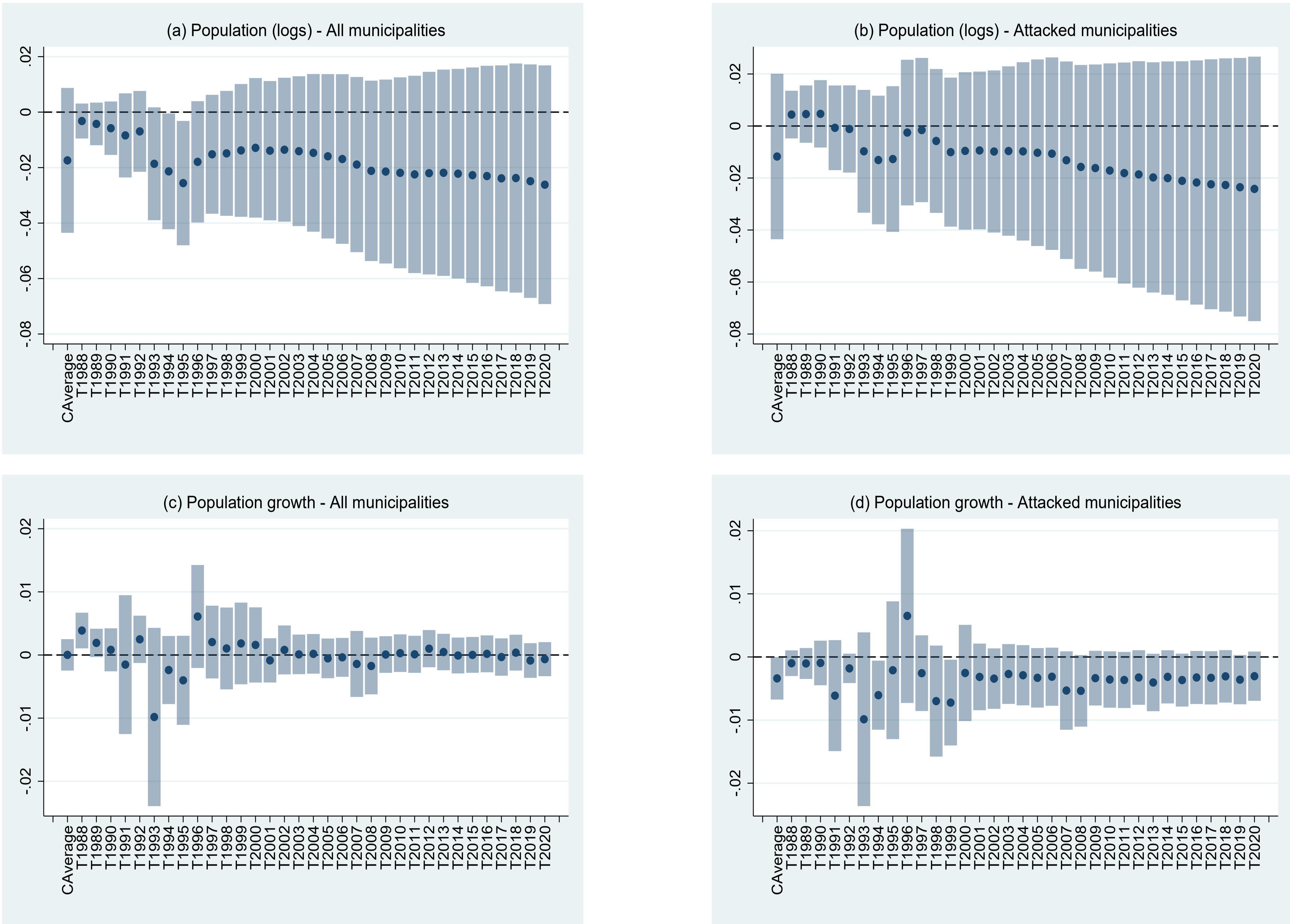

Figure 4: Average treatment effects by year.

Table 1: Average treatment effects: Dynamic event study. Conditional analysis.

	All municipalities		Attacked municipalities	
	Population	Growth rate	Population	Growth rate
Before first attack				
Average	-0.001	0.000	-0.001	-0.000
	(0.001)	(0.000)	(0.001)	(0.000)
Periods after first attack				
0	-0.001	-0.000	-0.000	-0.003
	(0.001)	(0.001)	(0.001)	(0.002)
1	-0.003	-0.001	-0.003	-0.005*
	(0.003)	(0.002)	(0.003)	(0.003)
2	-0.004	-0.001	-0.004	-0.003*
	(0.004)	(0.001)	(0.004)	(0.002)
3	-0.006	-0.001	-0.006	-0.005*
	(0.005)	(0.002)	(0.005)	(0.003)
4	-0.009	-0.002	-0.010	-0.006**
	(0.006)	(0.002)	(0.006)	(0.003)
5	-0.014**	-0.005	-0.015*	-0.008*
	(0.007)	(0.004)	(0.008)	(0.004)
6	-0.017**	-0.002	-0.018**	0.005
	(0.008)	(0.002)	(0.009)	(0.003)
7	-0.016**	0.001	-0.015	-0.000
	(0.009)	(0.002)	(0.010)	(0.002)
8	-0.017*	0.000	-0.015	-0.002
	(0.010)	(0.001)	(0.012)	(0.002)
9	-0.016	0.002	-0.016	-0.003
	(0.011)	(0.002)	(0.012)	(0.002)
10	-0.016	0.001	-0.018	-0.005
	(0.011)	(0.002)	(0.013)	(0.002)
Average	-0.011*	-0.001	-0.011	-0.004**
	(0.007)	(0.001)	0.007	(0.002)

Note: Never treated units (failed attacks) as the comparison group in the sample including all (attacked) municipalities. These conditional analyses implement the outcome regression DiD estimator based on OLS (Callaway and Sant'Anna 2021; Heckman, Ichimura, and Todd 1997), using regional dummies and local population levels and growth rates as covariates. Standard errors in parentheses. $^{*}p < 0.10$, $^{**}< 0.05$, and $^{***}p < 0.01$.