

Online Appendix

The Contagion of Drug Violence. Spatio-temporal Dynamics of the Mexican War on Drugs

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January 2015

The Online Appendix of the manuscript “The Contagion of Drug Violence. Spatio-temporal Dynamics of the Mexican War on Drugs” is structured in four sections. The first part indicates the coding rules used for developing the Organized Crime Violence Event Data (OCVED) data set. This section also reports the information sources consulted in the data collection process, discusses possible concerns of bias from the information sources and mentions the actor and verb categories used for event coding using Eventus ID. The second section presents the time series and reports the descriptive statistics of the event data contained in OCVED. It also shows the summary statistics of other covariates. In addition, this section indicates the information source for each covariate and reports the original unit of analysis of each variable before being imputed at the municipal-weekly basis in this study. The third section reports the correlation between OCVED and other databases of violence in Mexico. Results show that the measure of violence among DTOs analyzed in this study is highly correlated with homicide data reported by alternative sources. Finally, the fourth section replicates the regression results reported in the manuscript and offers several robustness tests considering alternative lags of law enforcement data.

1 OCVED coding protocol

1.1 Coding rules

To select the appropriate news reports, research assistants were trained to apply the following criteria for inclusion and exclusion of news reports:

Inclusion criteria: The main objective of the selection criteria is to select reports providing information about events of organized criminal violence. The instructions for selection were:

1. Include reports of events associated with violent actions such as armed clashes, murders, killings, shootings, ambushes, attacks, assassination attempts, wounding, kidnapping, torture or mutilation that involve the participation of presumed members of criminal organizations as perpetrators or victims.

2. Some reports of violent actions may not explicitly mention the participation of organized criminals as perpetrators or victims, but these events should be included if their *modus operandi* involves one or more of the following characteristics:

- Use of assault weapons.
- Two or more victims.
- Signs of mutilation or torture in the victims.
- Execution-style killings (*coup de grâce*, known in Spanish as “*tiro de gracia*”).
- Participation of at least one group of armed men (commandos or death squads).
- Participants traveling in convoys of vehicles (usually SUVs, pick-up trucks or luxury vehicles).
- Signs, marks or messages (“*narcomensajes*”) associated with organized crime.
- Bodies discovered in clandestine mass graves, wrapped in blankets (“*ensarapados*”), found in the trunk of abandoned vehicles (“*encajuelados*”) or in containers (“*entambados*”).

This set of characteristics is based on the criteria used by the Mexican government for classifying a homicide as being presumed to be associated with organized crime. See Sistema Nacional de Seguridad Pública (2011).

3. Include reports of events associated with kidnapping, extortion or money laundering even though organized crime or drug trafficking organizations are not explicitly mentioned in the report.
4. Include reports of events associated with law enforcement actions by state security forces when conducting operations against criminal organizations. Law enforcement actions can be violent or non-violent:
 - Violent law enforcement refers to events in which the state’s coercive apparatus uses force to deliberately inflict physical damage on suspected members of criminal organizations. These actions may include events in which the state attacked suspected organized criminals or repelled a criminal act of aggression, or events in which security forces wounded or killed one or more suspected organized criminals.
 - Non-violent law enforcement refers to state actions that resulted in the arrest of suspected members of criminal organizations or the confiscation of drugs, weapons or assets (e.g. money, real estate, vehicles, items) used for their illegal activities.

The elements of the inclusion criteria provided the main guidelines for selecting relevant reports associated with drug violence. However, the exclusion criteria was equally important to guarantee the quality of information included in the database.

Exclusion criteria: This research is exclusively focused on *events* associated with organized crime violence. In consequence, the process of information gathering should exclude reports containing the following kind of information:

1. Exclude reports about speeches, declarations, discourses, opinions, newspaper editorials or public statements made about events associated with organized crime violence.

- This criterion is crucial. Drug violence receives considerable media attention and lots of people talk about it. However, this research is strictly focused on events (facts and episodes), not on what people say about those events.
2. Exclude reports associated with deaths, injuries or material damage caused by any of the following:
 - Attacks by insurgent groups (e.g. Ejército Zapatista de Liberación Nacional, EZLN, or Ejército Popular Revolucionario, EPR) or any other radical group with political motivations.
 - Accidents, natural disasters, diseases or attacks by animals.
 - Crimes of passion.
 - Street level crime and minor offenses (e.g. burglary, theft, simple assault, robbery).
 - Violent criminal behavior that does not have the characteristics mentioned in the inclusion criteria (e.g. a police officer shot during a robbery of a convenience store).
 - Events of organized crime violence occurring outside Mexico (e.g. clashes between Zetas and local drug dealers in Guatemala).
 - Violence associated with protests, riots or contentious tactics undertaken by groups with social, political, economic or environmental demands against the government.
 3. Exclude government reports summarizing the activities conducted or results achieved over aggregated periods of time (e.g. monthly or annual reports).

The systematic application of the inclusion and exclusion criteria helped identifying valid events of organized criminal violence.

1.2 Information sources

Table 1 indicates the number of news reports collected by type of source. Table 2 shows the list of information sources used to build OCVED.

Table 1: Number of news reports gathered by source

Information source	Num. of news reports	Percentage by type
Police	1,572	3.76%
Navy	421	1.01%
Attorney General	3,328	7.95%
State Attorney General	12,728	30.42%
Army	3,026	7.23%
National press	10,849	25.93%
Local press	9,914	23.7%
Total	41,838	100%

Table 2: List of information sources

Federal government agencies: 4	
Secretaría de la Defensa Nacional, Secretaría de Seguridad Pública, Secretaría de Marina Armada de México, Procuraduría General de la República	
Local government agencies: 32	
State Attorney Generals for all states: Procuradurías Estatales	
National level newspapers and magazines: 11	
Servicio Universal de Noticias, El Economista, El Financiero, Excélsior, Notimex - Nacional, Reforma, La Jornada, El Sol de México, Milenio Diario, Revista Proceso, La Crónica de Hoy	
Local level newspapers: 58	
Aguascalientes	El Sol - Regional Newspapers
Baja California	El Mexicano, El Sol - Regional Newspapers, La Voz de la Frontera
Baja California Sur	El Sudcaliforniano
Campeche	Diario de Yucatán - Campeche
Chiapas	Notimex - Estados
Chihuahua	Diario de Juárez, El Diario de Chihuahua, El Diario de Delicias, El Diario de Nuevo Casas Grandes, El Diario de Parral, El Sol - Regional Newspapers
Coahuila	La Opinión, Milenio de Torreón, El Sol - Regional Newspapers
Colima	Notimex - Estados
Distrito Federal	El Sol - Regional Newspapers
Durango	El Sol - Regional Newspapers
Estado de México	Milenio Estado de México
Guanajuato	Periódico A.M. Celaya, Periódico A.M. Guanajuato, Periódico A.M. Irapuato, Periódico A.M. La Piedad, Periódico A.M. León, Periódico A.M. San Francisco del Rincón, Milenio - León, El Sol - Regional Newspapers
Guerrero	El Sol - Regional Newspapers
Hidalgo	Milenio Pachuca, El Sol - Regional Newspapers
Jalisco	Mural - Newspaper, Milenio Guadalajara
Michoacán	El Sol - Regional Newspapers
Morelos	Ecos de Morelos - La Unión de Morelos, El Sol - Regional Newspapers
Nayarit	Notimex - Estados
Nuevo León	Milenio Diario de Monterrey, El Norte - Newspaper
Oaxaca	Notimex - Estados
Puebla	Milenio Puebla , El Sol - Regional Newspapers
Querétaro	Diario de Querétaro, El Occidental, El Sol - Regional Newspapers
Quintana Roo	Notimex - Estados
San Luis Potosí	El Sol de San Luis, El Sol - Regional Newspapers
Sinaloa	El Sol - Regional Newspapers
Sonora	Notimex - Estados
Tabasco	Milenio Villahermosa
Tamaulipas	Milenio Diario de Tampico , El Sol - Regional Newspapers
Tlaxcala	El Sol - Regional Newspapers
Veracruz	Milenio Xalapa, El Sol - Regional Newspapers
Yucatán	Diario de Yucatán
Zacatecas	El Sol - Regional Newspapers

1.3 Concerns of bias from information sources

As indicated in Tables 2 and 1, the sources of information considered in this research are highly fragmented. Even those types of sources that seem to contribute a substantial proportion of news reports—such as the State Attorney General with 30.42%, national newspapers with 25.93% or local press with 23.7% of reports—comprise dozens of uncoordinated and independent reporting agencies—there are 32 autonomous State Attorney offices, 11 national newspapers and 58 state newspapers. In this way, the variety of information sources reduces concerns of systematic bias induced by a predominant source.

As suggested by Andreas (2010), competition between government agencies for budgetary allocations provides incentives for different law enforcement branches to report their activities as a way of signaling good performance. This incentive reduces concerns for systematic underreporting of drug related events by the government.

Scholars such as Hallin (2000) warn about the high levels of media control imposed by the government during the dominance era of the Institutional Revolutionary Party (PRI). During this period, journalists were mostly passive and self-censored. In consequence, news reports were generally aligned with the official discourse. As indicated by Lawson (2002), the process of democratic transition deeply redefined the relationships between media and the government. The gradual process of political opening initiated in the 1980s at the subnational level and culminating with the Presidential alternation in 2000 favored the emergence and consolidation of a proactive and independent free media sector. The extent of media freedom in Mexico after the democratic transition and the plurality of national and local newspapers considered in this study reduce concerns of effective and systematic media control by the government.

1.4 Coding event data using Eventus ID

The development of OCVED relies on Eventus ID, a novel software for automated event coding from text written in Spanish (Osorio and Reyes, 2014). Eventus ID uses a set of actors and verbs dictionaries to recognize specific words in news reports, thus identifying the key components of event data. In a basic level, an event can be defined as a set of elements providing information about someone doing something to someone else. Events are composed of three key elements:

Source: Refers to the actor or perpetrator of the action. Eventus ID uses proper nouns to identify the actors mentioned in the text.

Action: Indicates the specific action carried out by the source. Actions are identified by the system as verb phrases in the text.

Target: Refers to the actor towards or upon whom the perpetrator carried out an action. Eventus ID uses the list of actors to identify the target of the event.

The coding protocol implemented in this research considers the following actor categories:

- Federal government: refers to a variety of government agencies in the Executive, Congress and Judicial branches, as well as the name of key individuals occupying those positions at the federal level.

- Coercive apparatus: relates to a broad range of institutions, individuals and special groups in the Army, Navy, Air Force and different Police forces at the federal, state and municipal levels.
- Local government: refers to the Governor, Mayor and representatives at the local government.
- Individuals: includes a broad range of proper nouns referring to civilians or individuals.
- Victims: indicates civilians who were victims of violence, either perpetrated by criminal organizations or by government security forces.
- Criminal organizations: includes an exhaustive list of names of criminal organizations and their most prominent leaders.
- Criminal assets: refers to a broad list of aerial, maritime and terrestrial vehicles, as well as properties and real estate presumably belonging to criminal organizations.
- Drugs: relates to a detailed list of illegal drugs.
- Weapons: refers to a variety of weapons of different types and calibers (e.g pistols, shotguns or rifles), as well as other military, tactic or communication equipment.

In addition to the list of actors, the automated coding protocol relies on a list of verb phrases to identify the actions being conducted. These are the verb categories considered in this research: “attack,” “detect,” “shoot,” “seize,” “clash,” “eradicate,” “arrest,” “kidnap,” “raid,” “burn,” “wound,” “torture,” “mutilate,” and “kill.”

Based on the previous definitions, OCVED aggregates event data to conform the following categories:

- Violence between DTOs: Considers episodes where the source and the target are members of criminal organizations, individuals or victims and the event is associated with the following kinds of actions: “attack,” “shoot,” “clash,” “kidnap,” “burn,” “wound,” “torture,” “mutilate,” and “kill.”
 - For example, the sentence “members of the Sinaloa cartel clashed with a group hitmen of the Zetas organization” would lead to this kind of event.
- Violent law enforcement: Considers episodes where the source of the action are members of the coercive apparatus, federal government or local government and the target are individuals or members of criminal organizations and the event is associated with the following kinds of actions: “attack,” “shoot,” “clash,” “arrest,” “raid,” “burn,” “wound,” and “kill.”
 - For example, the sentence “troops of the 2nd infantry battalion shot down a presumed member of a criminal group” would lead to this kind of event.
- Arrests: Considers episodes where the source of the action are members of the coercive apparatus, federal government or local government, the target are individuals or members of criminal organizations and the event is associated with the action: “arrest.”
 - For example, the sentence “elements of the federal police arrested a drug dealer” would lead to this kind of event.

- Seizures of assets: Considers episodes where the source is a member of the state's coercive apparatus, the federal or local government, the target is a criminal asset and the event is associated with the action: "seize."
 - For example, the sentence "the Navy confiscated the speedboat" would lead to this kind of event.
- Seizures of drugs: Considers episodes where the source of the action are members of the coercive apparatus, federal government or local government and the target are individuals or members of criminal organizations and the event is associated with the following kinds of actions: "detect," "seize," "eradicate," and "burn."
 - For example, the sentence "members of the state police force seized a package with 25 kgs of cocaine" would lead to this kind of event.
- Seizures of weapons: Considers episodes where the source is a member of the state's coercive apparatus, the federal or local government, the target is weapon and the event is associated with the action: "seize."
 - For example, the sentence "members of special forces confiscated an arsenal of assault weapons" would lead to this kind of event.
- Violent retaliation: Considers episodes where the source is a member of a criminal organizations or an individual, the target is a member of the coercive apparatus, federal government or local government and the event is associated with the following kinds of actions: "attack," "shoot," "clash," "kidnap," "burn," "wound," "torture," "mutilate," and "kill." This variable is not included in this study but is part of OCVED event data.
 - For example, the sentence "a group of heavily armed attacked a military convoy" would lead to this kind of event.

2 Descriptive statistics and additional variable information

Figure 1 shows the temporal trends of the different types of event data used in this research. Table 3 presents the descriptive statistics of the event data variables included in OCVED; the data is reported at the municipal-week level. Table 4 shows the descriptive statistics of different law enforcement variables when interacted with different measures of criminal groups presence and road density. In addition, Table 5 reports the descriptive statistics of all other covariates considered in this study. Finally, Table 6 indicates the sources of information of the covariates as well as their original level of aggregation before being interpolated at the municipal-weekly level.

The different plots in Figure 1 present the time series of violence between DTOs, violent enforcement, arrests, and seizures of drugs, assets, and weapons. For illustrative purposes, data in this figure is aggregated at the national-monthly level, but the statistical analysis is conducted at the municipality-week unit of analysis. Panel (a) shows a dramatic and sustained increase of violence between DTOs in the second half of the decade. Panels (b) through (f) also show a consistent increase in the tactics deployed by the state to fight crime after President Calderón launched the war on drugs in December 2006. Although violence is not frequently employed by government authorities, the use of this tactic rose sharply after 2007, as illustrated in Panel (b). The data shows that authorities primarily rely on arrests and drug seizures to fight DTOs. As indicated in Panels (c) and (d) respectively, despite some fluctuations in the first half of the decade, both tactics rose dramatically from 2007 on. Confiscation of criminal assets, shown in Panel (e), and seizure of weapons, Panel (f), are used less than detentions and drug interdiction, but the trends show increasing government efforts to confiscate assets and to disarm criminals.

Figure 2 reports the number of municipalities with DTO activity. Panel (a) reports the number of locations in which the news reported the presence of at least one drug trafficking organization. This panel shows a dramatic territorial expansion of criminal groups starting in 2006. In addition, Panel (b) disaggregates the information by distinguishing between *main DTOs* and *secondary DTOs*. The trends indicate a substantial increase of territorial presence of main DTOs around 2006 and a sharp increase of secondary DTOs towards the end of the decade.

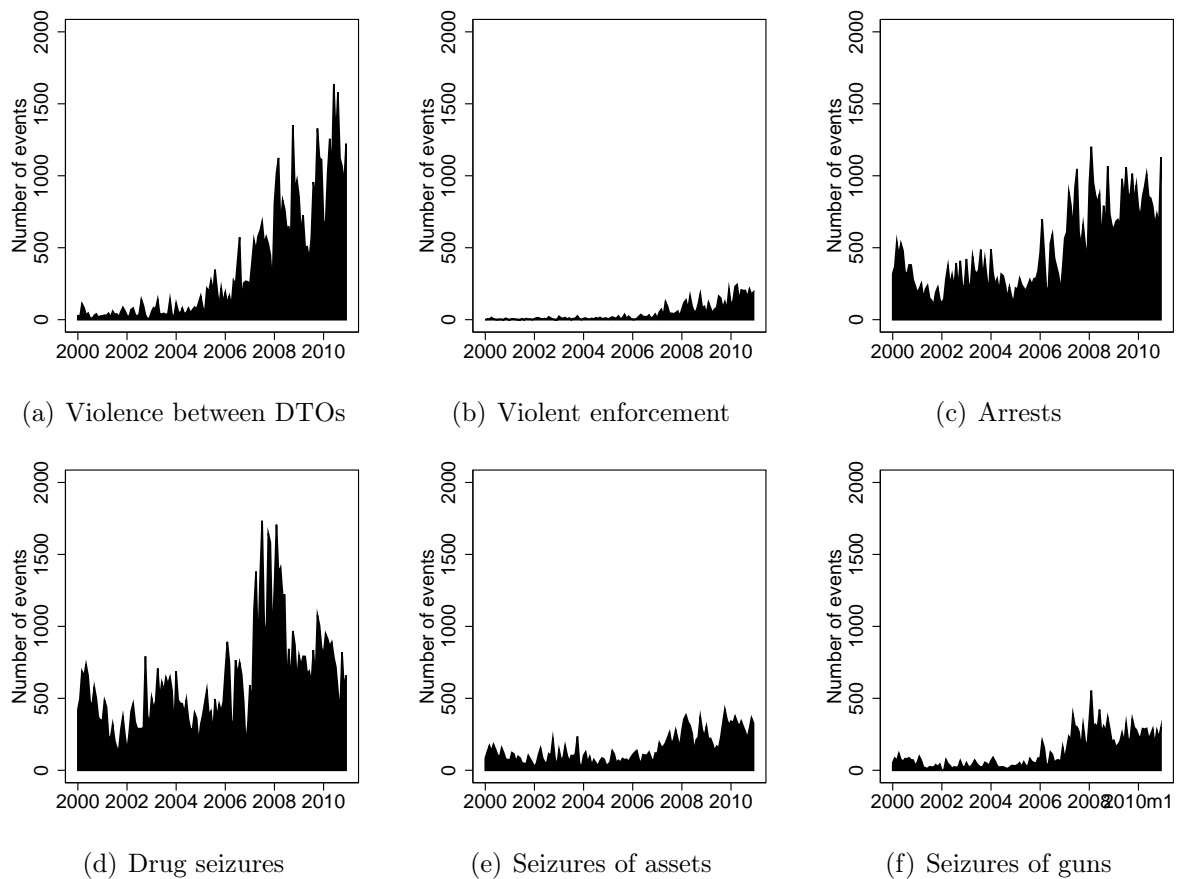


Figure 1: Time series of event data 2000–2010 (national monthly data)

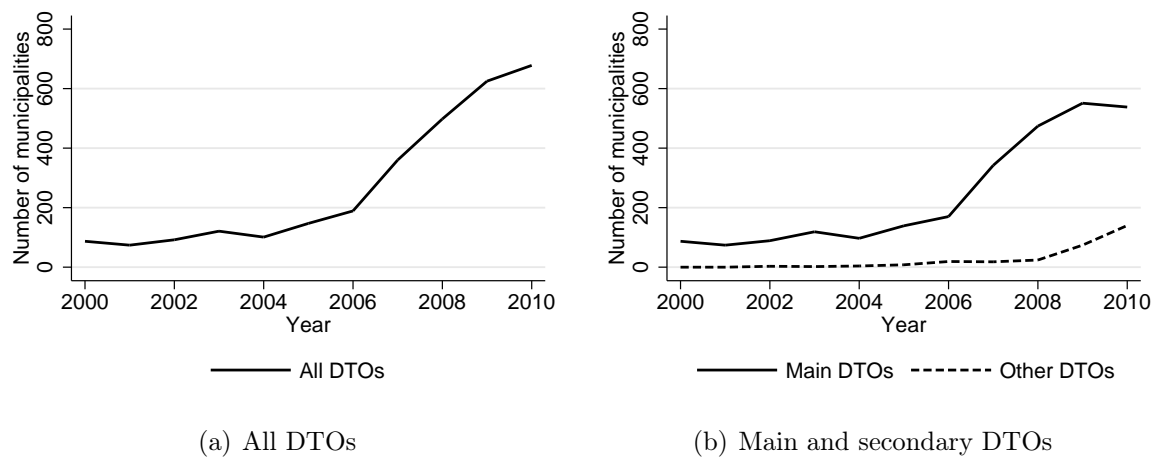


Figure 2: Number of municipalities with activity of DTOs 2000–2010

Table 3: Descriptive Statistics OCVED (weekly data)

Variable	Observations	Mean	Std. Dev.	Min	Max
Violence between DTOs	1,667,624	0.028	0.379	0	48
Logged	1,667,624	0.013	0.126	0	3.89182
Lagged 1	1,665,168	0.028	0.378	0	48
Lagged 2	1,662,712	0.028	0.378	0	48
Rate (lag 1 - lag 2)	1,662,712	0.000	0.398	-48	48
Violent enforcement	1,667,624	0.004	0.100	0	34
Lagged 2 logged	1,662,712	0.002	0.044	0	3.555348
Lagged 4 logged	1,657,800	0.002	0.044	0	3.555348
Lagged 8 logged	1,647,976	0.002	0.044	0	3.555348
Arrests	1,667,624	0.038	0.448	0	207
Lagged 2 logged	1,662,712	0.020	0.143	0	5.337538
Lagged 4 logged	1,657,800	0.020	0.143	0	5.337538
Lagged 8 logged	1,647,976	0.020	0.143	0	5.337538
Seizures of assets	1,667,624	0.012	0.155	0	20
Lagged 2 logged	1,662,712	0.007	0.081	0	3.044523
Lagged 4 logged	1,657,800	0.007	0.080	0	3.044523
Lagged 8 logged	1,647,976	0.007	0.080	0	3.044523
Seizures of drugs	1,667,624	0.049	0.448	0	84
Lagged 2 logged	1,662,712	0.024	0.166	0	4.442651
Lagged 4 logged	1,657,800	0.024	0.166	0	4.442651
Lagged 8 logged	1,647,976	0.024	0.166	0	4.442651
Seizures of guns	1,667,624	0.010	0.182	0	69
Lagged 2 logged	1,662,712	0.006	0.075	0	4.248495
Lagged 4 logged	1,657,800	0.006	0.075	0	4.248495
Lagged 8 logged	1,647,976	0.006	0.074	0	4.248495

Table 4: Descriptive Statistics of Interaction Terms (weekly data)

Variable	Observations	Mean	Std. Dev.	Min	Max
Interaction of violent enforcement and					
All DTOs Lagged 2 logged	1,662,712	0.006	0.170	0	20.723
All DTOs Lagged 4 logged	1,657,800	0.006	0.169	0	20.723
All DTOs Lagged 8 logged	1,647,976	0.005	0.168	0	20.723
Main DTOs Lagged 4 logged	1,657,800	0.005	0.135	0	13.816
Secondary DTOs Lagged 4 logged	1,657,800	0.001	0.048	0	8.318
Road density Lagged 2 logged	1,662,712	0.000	0.000	0	0.003
Road density Lagged 4 logged	1,657,800	0.000	0.000	0	0.003
Road density Lagged 8 logged	1,647,976	0.000	0.000	0	0.003
Interaction of arrests and					
All DTOs Lagged 2 logged	1,662,712	0.036	0.471	0	26.688
All DTOs Lagged 4 logged	1,657,800	0.035	0.469	0	28.970
All DTOs Lagged 8 logged	1,647,976	0.035	0.469	0	28.970
Main DTOs Lagged 4 logged	1,657,800	0.031	0.385	0	21.350
Secondary DTOs Lagged 4 logged	1,657,800	0.005	0.123	0	10.556
Road density Lagged 2 logged	1,662,712	0.000	0.000	0	0.004
Road density Lagged 4 logged	1,657,800	0.000	0.000	0	0.004
Road density Lagged 8 logged	1,647,976	0.000	0.000	0	0.004
Interaction of seizures of assets and					
All DTOs Lagged 2 logged	1,662,712	0.014	0.262	0	22.364
All DTOs Lagged 4 logged	1,657,800	0.014	0.261	0	22.364
All DTOs Lagged 8 logged	1,647,976	0.014	0.260	0	22.364
Main DTOs Lagged 4 logged	1,657,800	0.012	0.212	0	15.390
Secondary DTOs Lagged 4 logged	1,657,800	0.002	0.069	0	9.940
Road density Lagged 2 logged	1,662,712	0.000	0.000	0	0.004
Road density Lagged 4 logged	1,657,800	0.000	0.000	0	0.004
Road density Lagged 8 logged	1,647,976	0.000	0.000	0	0.004
Interaction of seizures of drugs and					
All DTOs Lagged 2 logged	1,662,712	0.036	0.467	0	26.962
All DTOs Lagged 4 logged	1,657,800	0.036	0.467	0	26.962
All DTOs Lagged 8 logged	1,647,976	0.036	0.469	0	26.962
Main DTOs Lagged 4 logged	1,657,800	0.031	0.391	0	19.068
Secondary DTOs Lagged 4 logged	1,657,800	0.004	0.114	0	11.983
Road density Lagged 2 logged	1,662,712	0.000	0.000	0	0.008
Road density Lagged 4 logged	1,657,800	0.000	0.000	0	0.008
Road density Lagged 8 logged	1,647,976	0.000	0.000	0	0.008
Interaction of seizures of guns and					
All DTOs Lagged 2 logged	1,662,712	0.013	0.269	0	21.242
All DTOs Lagged 4 logged	1,657,800	0.013	0.269	0	21.242
All DTOs Lagged 8 logged	1,647,976	0.013	0.270	0	21.242
Main DTOs Lagged 4 logged	1,657,800	0.011	0.221	0	16.994
Secondary DTOs Lagged 4 logged	1,657,800	0.002	0.069	0	8.318
Road density Lagged 2 logged	1,662,712	0.000	0.000	0	0.003
Road density Lagged 4 logged	1,657,800	0.000	0.000	0	0.003
Road density Lagged 8 logged	1,647,976	0.000	0.000	0	0.003

Table 5: Descriptive Statistics of Covariates (weekly data)

Variable	Observations	Mean	Std. Dev.	Min	Max
All DTOs	1,667,624	0.111	0.545	0	10
Cocaine price	1,667,624	163.853	29.192	128.32	231.97
Corruption	1,667,624	22.669	12.316	0	56.9
Distance	1,667,624	457.298	375.028	1.30	2281.28
Drug production area	1,667,624	0.417	0.766	0	3
Elevation	1,667,624	1265.798	1002.616	0	4600
Gulf area	1,667,624	0.114	0.317	0	1
Illiterate 15+	1,662,694	16.404	10.983	0.56	75.47
Local drug market	1,667,624	1.241	16.612	0	740
Main DTOs	1,667,624	0.100	0.478	0	6
North area	1,667,624	0.055	0.227	0	1
Pacific area	1,667,624	0.145	0.352	0	1
Polupation (log)	1,667,624	9.364	1.527	4.53	14.41
Potential cocain production	1,667,624	565.507	107.877	350	695
Poverty	1,667,624	0.000	0.996	-2.38	4.50
Retention high school	1,667,624	75.852	33.357	0	152.9
Retention primary	1,667,624	96.609	2.819	0	102.4
Rifles (log)	1,667,624	14.268	0.152	14.07	14.63
Road density	1,667,624	0.001	0.000	0.00004	0.004
Secondary DTOs	1,667,624	0.011	0.133	0	4
Schooling	1,667,624	6.044	1.597	0.8	13.5
State GDP (log)	1,667,624	19.101	0.757	17.09	21.49
Students per teacher	1,667,624	19.848	4.549	-19.5	228.54
Unemployment	1,667,624	2.913	1.562	0.2	9.7

Table 6: Information sources and original level of aggregation

Variable	Information source	Original aggregation	
		Spaital	Temporal
Violence between DTOs	OCVED (Osorio, 2013)	Municipal	Daily
Violent enforcement	OCVED (Osorio, 2013)	Municipal	Daily
Arrests	OCVED (Osorio, 2013)	Municipal	Daily
Seizures of assets	OCVED (Osorio, 2013)	Municipal	Daily
Seizures of drugs	OCVED (Osorio, 2013)	Municipal	Daily
Seizures of guns	OCVED (Osorio, 2013)	Municipal	Daily
All DTOs	OCVED (Osorio, 2013)	Municipal	Yearly
Main DTOs	OCVED (Osorio, 2013)	Municipal	Yearly
Secondary DTOs	OCVED (Osorio, 2013)	Municipal	Yearly
North	Made by the author based on Instituto Nacional de Estadística y Geografía (2011 <i>a</i>)	Municipal	Constant
Gulf	Made by the author based on Instituto Nacional de Estadística y Geografía (2011 <i>a</i>)	Municipal	Constant
Pacific	Made by the author based on Instituto Nacional de Estadística y Geografía (2011 <i>a</i>)	Municipal	Constant
Drug production area	Made by the author based on Secretaría de la Defensa Nacional (2011)	Municipal	Yearly
Local drug markets	Secretaría de Salud (2012)	Municipal	Yearly
Cocaine price per pure gram	United Nations Office on Drugs and Crime (2014) and Office of National Drug Control Policy (2004)	National	Yearly
Potential cocaine production Colombia	United Nations Office on Drugs and Crime (2006, 2013)	National	Yearly
Corruption	Transparencia Mexicana (2012)	State	Yearly
Rifles (logged)	Bureau of Alcohol, Tobacco and Explosives (2012)	National	Yearly
Distance to capital	Made by the author based on Instituto Nacional de Estadística y Geografía (2014)	Municipal	Constant
Elevation	Made by the author based on Instituto Nacional de Estadística y Geografía (2014)	Municipal	Constant
Road density	Made by the author based on Instituto Nacional de Estadística y Geografía (2014)	Municipal	Constant
Poverty	Consejo Nacional de Evaluación de la Política de Desarrollo Social (2010)	Municipal	Yearly
Schooling	Instituto Nacional de Estadística y Geografía (2011 <i>b</i>)	Municipal	Yearly
Unemployment	Instituto Nacional de Estadística y Geografía (2011 <i>b</i>)	Municipal	Quarterly
Population (logged)	Instituto Nacional de Estadística y Geografía (2011 <i>b</i>)	Municipal	Yearly

3 Correlation of OCVED with other databases

Table 7 reports the correlation between the number of violent events between DTOs recorded by OCVED and homicide data reported by INEGI and SNSP (Instituto Nacional de Estadística y Geografía, 2013; Presidencia de la República, 2011) and two national newspapers, Reforma (2014) and Milenio (2014). To facilitate comparisons, the unit of analysis for the different databaes is at the national monthly level. The time frame for comparison is between January 2007 to December 2010 as this is the only period all databases coincide. The Table shows that violence among criminals is highly correlated with homicide data. The correlation factor ranges from $r=0.69$ to $r=0.73$ depending on the database.

Notice that violence between DTOs is not a body-count as it comprises information on a wide range of violent events among criminals beyond the number of homicides. In addition to murders, this variable includes shootings, kidnappings, confrontations, ambushes, attacks, discovery of bodies, mutilation, beheading, and torture in which the victim or the perpetrator appears to be a member of a criminal organization. In addition, it is important to clarify that OCVED counts the number of events that occurred in a municipality, yet it does not count specific quantities derived from such events. In this case, an event of violence in which a person got killed is counted as a single event. If more than one individuals got killed in the event, OCVED still considers the event as a single episode. In this way, OCVED provides a conservative measure of violence. In consequence, the metric of drug related violence in OCVED and homicide data from different sources are not entirely comparable as they measure different objects. Despite the differences in the type of behaviors being measured, the correlation shows that the number of violent events among DTOs is highly correlated with other databases on drug related homicides.

Table 7: Correlation of OCVED with homicide databases

	INEGI	SNSP	Reforma	Milenio	Violence between DTOs
INEGI	1				
SNSP	0.97	1			
Reforma	0.93	0.96	1		
Milenio	0.97	0.99	0.95	1	
Violence between DTOs	0.72	0.72	0.69	0.73	1

The positive association between the number of events of violence among DTOs reported in OCVED and other databases on drug related homicides is confirmed with the visual inspection of the correlation matrix plots presented in Figure 3.

Table 8 reports the correlation between the number of detention events , seizures of dugs, criminal assets and weapons recorded in OCVED and comparable data reported by government authorites. Due to the limited availability of government information on public security, the data used in this table is aggregated at the national year level. OCVED data on arrests is compared with drug related detentions reported by government authoriteis and the correlation factor ($r=0.58$) indicates a high degree of congruence between the two metrics. Due to the lack of avaiable official data on drug interdiction, the number of drug seizures recorded in OCVED is contrasted againsts the annual number of metric tons of

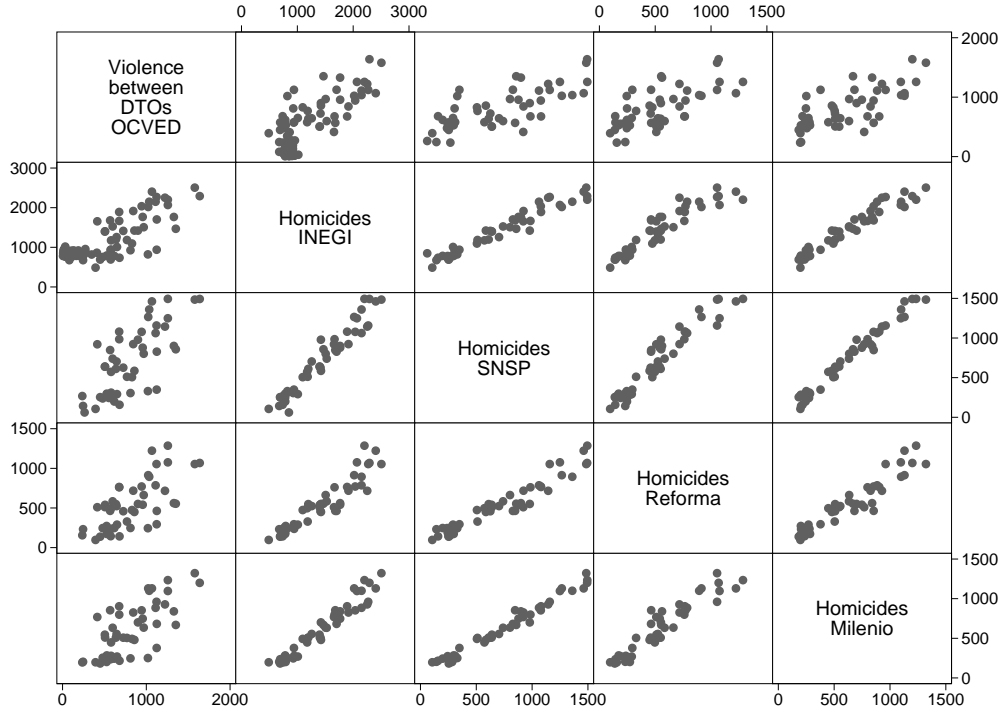
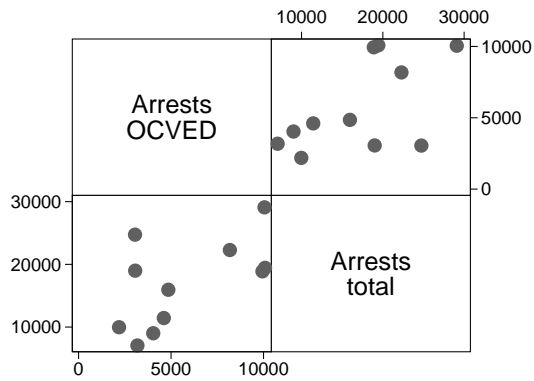


Figure 3: Scatter plot of violence among DTOs and homicide data

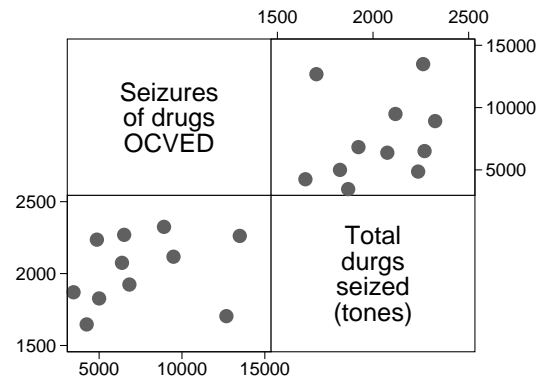
illicit drugs seized by government authorities. Unfortunately these two units of analysis are not comparable and the correlation factor suggests a weak association ($r=0.24$). The data on seizures of criminal assets recorded in OCVED includes confiscation of aerial, terrestrial and maritime vehicles as well as real estate. In contrast, government reports only include seizures of these three types of vehicles but there is not data about real estate confiscation from organized criminal groups. Despite these differences, the data on seizures of criminal assets is highly correlated ($r=0.92$). Finally, the data on seizures of weapons recorded by OCVED and registered by government authorities is also highly correlated ($r=0.77$). Despite the methodological differences, the correlation analysis provides a high degree of confidence about the validity of the event data comprised in OCVED when compared to official reports. To facilitate the interpretation of these relationships, the correlation factors are illustrated in Figure 4.

Table 8: Correlation of non-violent event data in OCVED and comparable government data

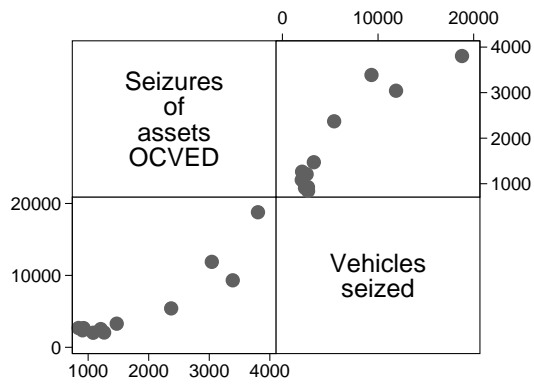
Government data	Event data in COVED			
	Arrests	Drug seizures	Seizures of assets	Seizures of guns
Arrests	0.5816			
Drug seizures		0.2399		
Vehicles seized			0.9243	
Weapons seized				0.7729



(a) Arrests



(b) Drug seizures



(c) Seizures of assets



(d) Seizures of guns

Figure 4: Correlation of non-violent event data in OCVED and comparable government data

4 Regression Analysis Robustness Check

This section replicates the regression analysis presented in the manuscript and reports a variety of additional robustness checks. Table 9 summarizes the different model specifications considered in the study. Tables 10 and 11 in the Appendix correspond to Tables 2 and 3 in the article. Tables 12-15 offer alternative specifications using different lags for the law enforcement tactics. Due to the multiple interaction terms, some model specifications could not handle the full list of control variables without generating problems of overidentification. In those cases, some covariates were excluded. In general, the results provide strong support for the main hypotheses advanced in this research.

Table 9: Summary of model specifications for robustness tests

	Enforcement data	Interaction terms
Table 10	Lagged 4 weeks	Enforcement tactic \times All DTOs Enforcement tactic \times Road density
Table 11	Lagged 4 weeks	Enforcement tactic \times Main DTOs Enforcement tactic \times Secondary DTOs Enforcement tactic \times Road density
Table 12	Lagged 2 weeks	Enforcement tactic \times All DTOs Enforcement tactic \times Road density
Table 13	Lagged 2 weeks	Enforcement tactic \times Main DTOs Enforcement tactic \times Secondary DTOs Enforcement tactic \times Road density
Table 14	Lagged 8 weeks	Enforcement tactic \times All DTOs Enforcement tactic \times Road density
Table 15	Lagged 8 weeks	Enforcement tactic \times Main DTOs Enforcement tactic \times Secondary DTOs Enforcement tactic \times Road density

Table 10: Effect of law enforcement (lagged 4 weeks), all DTOs, and road density on violence between DTOs

Model	1	2	3	4	5
Lambda	0.172*** (0.004)	0.172*** (0.004)	0.182*** (0.004)	0.175*** (0.004)	0.177*** (0.004)
Violent enforcement (L4L) \times All DTOs	0.063*** (0.001)				
Arrests (L4L) \times All DTOs		0.039*** (0.000)			
Seizures of drugs (L4L) \times All DTOs			0.034*** (0.000)		
Seizures of assets (L4L) \times All DTOs				0.055*** (0.000)	
Seizures of guns (L4L) \times All DTOs					0.047*** (0.001)
Violent enforcement (L4L) \times Road density	-49.222*** (9.015)				
Arrests (L4L) \times Road density		-12.226*** (2.797)			
Seizures of drugs (L4L) \times Road density			20.278*** (2.250)		
Seizures of assets (L4L) \times Road density				2.587 (5.050)	
Seizures of guns (L4L) \times Road density					-85.494*** (5.427)
Violent enforcement (L4L)	0.008 [†] (0.004)				
Arrests (L4L)		-0.014*** (0.001)			
Seizures of drugs (L4L)			-0.025*** (0.001)		
Seizures of assets (L4L)				-0.031*** (0.002)	
Seizures of guns (L4L)					0.017*** (0.002)
All DTOs	0.077*** (0.000)	0.065*** (0.000)	0.069*** (0.000)	0.073*** (0.000)	0.073*** (0.000)
Road density	-3.844*** (0.847)	-4.231*** (1.031)	-4.092*** (1.045)	-4.395*** (0.935)	-4.214*** (0.966)

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Table 10 – continued from previous page

Model	1	2	3	4	5
Drug production area	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Gulf	-0.004*** (0.001)	-0.004** (0.001)	-0.004** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)
North	0.017*** (0.001)	0.019*** (0.002)	0.019*** (0.002)	0.018*** (0.002)	0.017*** (0.002)
Pacific	0.003** (0.001)	0.003* (0.001)	0.002* (0.001)	0.002† (0.001)	0.002* (0.001)
Local drug market	0.000** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Rifles	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)
Potential cocaine production	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Corruption	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Schooling	0.005*** (0.000)	0.006*** (0.000)	0.006*** (0.000)	0.006*** (0.000)	0.006*** (0.000)
Cocaine price	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Poverty	0.009*** (0.000)	0.010*** (0.000)	0.010*** (0.000)	0.010*** (0.000)	0.010*** (0.000)
Population	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
Rate of violence among DTOs (lagged)	0.011*** (0.000)	0.011*** (0.000)	0.011*** (0.000)	0.011*** (0.000)	0.011*** (0.000)
Constant	0.007 (0.012)	-0.003 (0.012)	0.004 (0.012)	-0.010 (0.012)	-0.003 (0.012)
Rho	-0.117	-0.108	-0.120	-0.117	-0.120
Observations	1,657,800	1,657,800	1,657,800	1,657,800	1,657,800
“L4L” refers to event data lagged four weeks and logged. *** p < 0.001, ** p < 0.01, * p < 0.05, † p < 0.1					

Table 11: Effect of law enforcement (lagged 4 weeks), main and secondary DTOs, and road density on violence between DTOs

Model	6	7	8	9	10
Lambda	0.167*** (0.004)	0.169*** (0.004)	0.177*** (0.004)	0.171*** (0.004)	0.172*** (0.004)
Violent enforcement (L4L) \times Main DTOs	0.096*** (0.001)				
Arrests (L4L) \times Main DTOs		0.041*** (0.000)			
Seizures of drugs (L4L) \times Main DTOs			0.033*** (0.000)		
Seizures of assets (L4L) \times Main DTOs				0.057*** (0.001)	
Seizures of guns (L4L) \times Main DTOs					0.054*** (0.001)
Violent enforcement (L4L) \times Secondary DTOs	-0.048*** (0.002)				
Arrests (L4L) \times Secondary DTOs		0.017*** (0.001)			
Seizures of drugs (L4L) \times Secondary DTOs			0.028*** (0.001)		
Seizures of assets (L4L) \times Secondary DTOs				0.033*** (0.002)	
Seizures of guns (L4L) \times Secondary DTOs					0.007*** (0.002)
Violent enforcement (L4L) \times Road density	-45.224*** (9.006)				
Arrests (L4L) \times Road density		-13.290*** (2.799)			
Seizures of drugs (L4L) \times Road density			18.239*** (2.251)		
Seizures of assets (L4L) \times Road density				1.425 (5.049)	
Seizures of guns (L4L) \times Road density					-86.003*** (5.430)
Violent enforcement (L4L)	-0.021*** (0.004)				
Arrests (L4L)		-0.013*** (0.001)			

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Table 11 – continued from previous page

Model	6	7	8	9	10
Seizures of drugs (L4L)			-0.022*** (0.001)		
Seizures of assets (L4L)				-0.028*** (0.002)	
Seizures of guns (L4L)					0.016*** (0.002)
Main DTOs	0.067*** (0.000)	0.058*** (0.000)	0.061*** (0.000)	0.065*** (0.000)	0.064*** (0.000)
Secondary DTOs	0.129*** (0.001)	0.109*** (0.001)	0.113*** (0.001)	0.117*** (0.001)	0.123*** (0.001)
Road density	-3.374*** (0.826)	-3.459*** (1.015)	-3.400*** (1.036)	-3.414*** (0.933)	-3.223*** (0.939)
Drug production area	0.000 (0.000)	0.000 [†] (0.000)	0.000* (0.000)	0.000 [†] (0.000)	0.000 (0.000)
Gulf	-0.005*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.005*** (0.001)
North	0.018*** (0.001)	0.019*** (0.002)	0.019*** (0.002)	0.019*** (0.002)	0.018*** (0.002)
Pacific	0.003** (0.001)	0.003* (0.001)	0.003* (0.001)	0.002* (0.001)	0.003* (0.001)
Poverty	0.008*** (0.000)	0.010*** (0.000)	0.010*** (0.000)	0.009*** (0.000)	0.009*** (0.000)
Population	0.002*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
Rifles	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)
Potential cocaine production	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Schooling	0.005*** (0.000)	0.006*** (0.000)	0.006*** (0.000)	0.006*** (0.000)	0.006*** (0.000)
Rate of violence among DTOs (lagged)	0.011*** (0.000)	0.011*** (0.000)	0.011*** (0.000)	0.011*** (0.000)	0.011*** (0.000)
Constant	-0.055*** (0.012)	-0.061*** (0.012)	-0.056*** (0.012)	-0.054*** (0.012)	-0.048*** (0.012)
Rho	-0.0747	-0.0722	-0.0759	-0.0747	-0.0769
Observations	1,657,800	1,657,800	1,657,800	1,657,800	1,657,800
“L4L” refers to event data lagged four weeks and logged. *** p < 0.001, ** p < 0.01, * p < 0.05, [†] p < 0.1					

Table 12: Effect of law enforcement (lagged 2 weeks), all DTOs, and road density on violence between DTOs

Model	11	12	13	14	15
Lambda	0.177*** (0.004)	0.170*** (0.004)	0.181*** (0.004)	0.174*** (0.004)	0.173*** (0.004)
Violent enforcement (L2L) \times All DTOs	0.054*** (0.001)				
Arrests (L2L) \times All DTOs		0.041*** (0.000)			
Seizures of drugs (L2L) \times All DTOs			0.033*** (0.000)		
Seizures of assets (L2L) \times All DTOs				0.055*** (0.000)	
Seizures of guns (L2L) \times All DTOs					0.049*** (0.001)
Violent enforcement (L2L) \times Road density	-128.830*** (8.862)				
Arrests (L2L) \times Road density		-7.409** (2.784)			
Seizures of drugs (L2L) \times Road density			17.080*** (2.247)		
Seizures of assets (L2L) \times Road density				-14.453** (5.002)	
Seizures of guns (L2L) \times Road density					-50.821*** (5.418)
Violent enforcement (L2L)	0.077*** (0.004)				
Arrests (L2L)		-0.018*** (0.001)			
Seizures of drugs (L2L)			-0.026*** (0.001)		
Seizures of assets (L2L)				-0.027*** (0.002)	
Seizures of guns (L2L)					0.003 (0.002)
All DTOs	0.077*** (0.000)	0.064*** (0.000)	0.069*** (0.000)	0.073*** (0.000)	0.073*** (0.000)

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Table 12 – continued from previous page

Model	11	12	13	14	15
Road density	-4.129*** (0.837) 0.000	-4.804*** (1.040) 0.000	-4.489*** (1.050) 0.000	-4.380*** (0.928) 0.000	-4.307*** (0.979) 0.000
Drug production area					
Gulf	-0.004*** (0.001)	-0.004** (0.001)	-0.004** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)
North	0.016*** (0.001)	0.019*** (0.002)	0.019*** (0.002)	0.018*** (0.002)	0.018*** (0.002)
Pacific	0.002* (0.001)	0.002* (0.001)	0.002† (0.001)	0.002† (0.001)	0.002* (0.001)
Poverty	0.009*** (0.000)	0.011*** (0.000)	0.011*** (0.000)	0.010*** (0.000)	0.010*** (0.000)
Population	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
Corruption	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Local drug markets	0.000** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Rifles	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)
Potential cocaine production	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Schooling	0.006*** (0.000)	0.007*** (0.000)	0.006*** (0.000)	0.006*** (0.000)	0.006*** (0.000)
Rate of violence among DTOs (lagged)	0.014*** (0.000)	0.014*** (0.000)	0.013*** (0.000)	0.013*** (0.000)	0.013*** (0.000)
Constant	-0.008 (0.011)	-0.023† (0.012)	-0.011 (0.012)	-0.011 (0.012)	-0.006 (0.012)
Rho	-0.124	-0.104	-0.117	-0.115	-0.113
Observations	1,662,712	1,662,712	1,662,712	1,662,712	1,662,712

“L2L” refers to event data lagged two weeks and logged. *** p < 0.001, ** p < 0.01, * p < 0.05, † p < 0.1

Table 13: Effect of law enforcement (lagged 2 weeks), main and secondary DTOs, and road density on violence between DTOs

Model	16	17	18	19	20
Lambda	0.170*** (0.004)	0.166*** (0.004)	0.176*** (0.004)	0.169*** (0.004)	0.167*** (0.004)
Violent enforcement (L2L) \times Main DTOs	0.085*** (0.001)				
Arrests (L2L) \times Main DTOs		0.046*** (0.000)			
Seizures of drugs (L2L) \times Main DTOs			0.032*** (0.000)		
Seizures of assets (L2L) \times Main DTOs				0.058*** (0.001)	
Seizures of guns (L2L) \times Main DTOs					0.057*** (0.001)
Violent enforcement (L2L) \times Secondary DTOs	-0.050*** (0.002)				
Arrests (L2L) \times Secondary DTOs		0.008*** (0.001)			
Seizures of drugs (L2L) \times Secondary DTOs			0.026*** (0.001)		
Seizures of assets (L2L) \times Secondary DTOs				0.028*** (0.002)	
Seizures of guns (L2L) \times Secondary DTOs					0.007*** (0.002)
Violent enforcement (L2L) \times Road density	-125.880*** (8.854)				
Arrests (L2L) \times Road density		-7.122* (2.785)			
Seizures of drugs (L2L) \times Road density			15.199*** (2.248)		
Seizures of assets (L2L) \times Road density				-15.306** (5.001)	
Seizures of guns (L2L) \times Road density					-50.804*** (5.420)
Violent enforcement (L2L)	0.051*** (0.004)				
Arrests (L2L)		-0.019*** (0.001)			

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Table 13 – continued from previous page

Model	16	17	18	19	20
Seizures of drugs (L2L)			-0.023*** (0.001)		
Seizures of assets (L2L)				-0.026*** (0.002)	
Seizures of guns (L2L)					0.001 (0.002)
Main DTOs	0.067*** (0.000)	0.056*** (0.000)	0.061*** (0.000)	0.065*** (0.000)	0.064*** (0.000)
Secondary DTOs	0.129*** (0.001)	0.112*** (0.001)	0.114*** (0.001)	0.118*** (0.001)	0.123*** (0.001)
Road density	-3.261*** (0.821)	-3.522*** (1.030)	-3.367*** (1.045)	-3.397*** (0.926)	-3.287*** (0.952)
Drug production area	0.000 (0.000)	0.000† (0.000)	0.000* (0.000)	0.000† (0.000)	0.000 (0.000)
Gulf	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)
North	0.017*** (0.001)	0.019*** (0.002)	0.019*** (0.002)	0.019*** (0.002)	0.018*** (0.002)
Pacific	0.003** (0.001)	0.003* (0.001)	0.003* (0.001)	0.002* (0.001)	0.003* (0.001)
Poverty	0.008*** (0.000)	0.010*** (0.000)	0.010*** (0.000)	0.009*** (0.000)	0.009*** (0.000)
Population	0.002*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
Rifles	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)
Potential cocaine production	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Schooling	0.005*** (0.000)	0.006*** (0.000)	0.006*** (0.000)	0.006*** (0.000)	0.006*** (0.000)
Rate of violence among DTOs (lagged)	0.014*** (0.000)	0.014*** (0.000)	0.013*** (0.000)	0.013*** (0.000)	0.013*** (0.000)
Constant	-0.054*** (0.011)	-0.064*** (0.012)	-0.057*** (0.012)	-0.055*** (0.012)	-0.052*** (0.012)
Rho	-0.117	-0.100	-0.110	-0.109	-0.107
Observations	1,662,712	1,662,712	1,662,712	1,662,712	1,662,712
“L2L” refers to event data lagged two weeks and logged. *** p < 0.001, ** p < 0.01, * p < 0.05, † p < 0.1					

Table 14: Effect of law enforcement (lagged 8 weeks), all DTOs, and road density on violence between DTOs

Model	21	22	23	24	25
Lambda	0.174*** (0.004)	0.174*** (0.004)	0.187*** (0.004)	0.178*** (0.004)	0.170*** (0.004)
Violent enforcement (L8L) \times All DTOs	0.053*** (0.001)				
Arrests (L8L) \times All DTOs		0.038*** (0.000)			
Seizures of drugs (L8L) \times All DTOs			0.032*** (0.000)		
Seizures of assets (L8L) \times All DTOs				0.054*** (0.000)	
Seizures of guns (L8L) \times All DTOs					0.048*** (0.001)
Violent enforcement (L8L) \times Road density	-138.870*** (9.079)				
Arrests (L8L) \times Road density		-5.866* (2.820)			
Seizures of drugs (L8L) \times Road density			21.265*** (2.261)		
Seizures of assets (L8L) \times Road density				10.864* (5.087)	
Seizures of guns (L8L) \times Road density					-45.202*** (5.468)
Violent enforcement (L8L)	0.054*** (0.004)				
Arrests (L8L)		-0.028*** (0.001)			
Seizures of drugs (L8L)			-0.033*** (0.001)		
Seizures of assets (L8L)				-0.042*** (0.002)	
Seizures of guns (L8L)					-0.002 (0.002)
All DTOS	0.077*** (0.000)	0.066*** (0.000)	0.069*** (0.000)	0.073*** (0.000)	0.073*** (0.000)

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Table 14 – continued from previous page

Model	21	22	23	24	25
Road density	-3.739*** (0.842) 0.000	-4.270*** (1.056) 0.000	-4.110*** (1.063) 0.000	-4.371*** (0.949) 0.000	-4.364*** (0.986) 0.000
Drug production area					
Gulf	-0.004*** (0.001)	-0.004** (0.001)	-0.004** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)
North	0.017*** (0.001)	0.020*** (0.002)	0.020*** (0.002)	0.018*** (0.002)	0.018*** (0.002)
Pacific	0.003** (0.001)	0.003* (0.001)	0.003* (0.001)	0.002† (0.001)	0.002* (0.001)
Poverty	0.008*** (0.000)	0.010*** (0.000)	0.010*** (0.000)	0.010*** (0.000)	0.010*** (0.000)
Population	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
Corruption	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Local drug markets	0.000** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Rifles	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003** (0.001)	-0.003*** (0.001)
Cocaine price	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Potential cocaine production	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Schooling	0.005*** (0.000)	0.006*** (0.000)	0.006*** (0.000)	0.006*** (0.000)	0.006*** (0.000)
Rate of violence among DTOs (lagged)	0.012*** (0.000)	0.012*** (0.000)	0.012*** (0.000)	0.012*** (0.000)	0.012*** (0.000)
Constant	0.009 (0.012)	-0.007 (0.012)	0.001 (0.012)	-0.011 (0.012)	-0.007 (0.012)
Rho	-0.121	-0.109	-0.124	-0.120	-0.110
Observations	1,647,976	1,647,976	1,647,976	1,647,976	1,647,976
“L8L” refers to event data lagged eight weeks and logged. *** p < 0.001, ** p < 0.01, * p < 0.05, † p < 0.1					

Table 15: Effect of law enforcement (lagged 8 weeks), main and secondary DTOs, and road density on violence between DTOs

Model	26	27	28	29	30
Lambda	0.167*** (0.004)	0.171*** (0.004)	0.181*** (0.004)	0.174*** (0.004)	0.166*** (0.004)
Violent enforcement (L8L) \times Main DTOs	0.061*** (0.001)				
Arrests (L8L) \times Main DTOs		0.038*** (0.000)			
Seizures of drugs (L8L) \times Main DTOs			0.032*** (0.000)		
Seizures of assets (L8L) \times Main DTOs				0.055*** (0.001)	0.054*** (0.001)
Seizures of guns (L8L) \times Main DTOs					
Violent enforcement (L8L) \times Secondary DTOs	0.008*** (0.002)				
Arrests (L8L) \times Secondary DTOs		0.024*** (0.001)			
Seizures of drugs (L8L) \times Secondary DTOs			0.021*** (0.001)		
Seizures of assets (L8L) \times Secondary DTOs				0.033*** (0.002)	0.013*** (0.002)
Seizures of guns (L8L) \times Secondary DTOs					
Violent enforcement (L8L) \times Road density	-141.030*** (9.074)				
Arrests (L8L) \times Road density		-7.831** (2.821)			
Seizures of drugs (L8L) \times Road density			19.740*** (2.263)		
Seizures of assets (L8L) \times Road density				9.599. (5.086)	
Seizures of guns (L8L) \times Road density					-46.311*** (5.470)
Violent enforcement (L8L)	0.053*** (0.004)				
Arrests (L8L)		-0.025*** (0.001)			

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Table 15 – continued from previous page

Model	26	27	28	29	30
Seizures of drugs (L8L)			-0.030*** (0.001)		
Seizures of assets (L8L)				-0.039*** (0.002)	
Seizures of guns (L8L)					-0.001 (0.002)
Main DTOs	0.069*** (0.000)	0.059*** (0.000)	0.061*** (0.000)	0.065*** (0.000)	0.064*** (0.000)
Secondary DTOs	0.125*** (0.001)	0.107*** (0.001)	0.116*** (0.001)	0.118*** (0.001)	0.121*** (0.001)
Road density	-3.312*** (0.820)	-3.495*** (1.040)	-3.481*** (1.053)	-3.395*** (0.946)	-3.339*** (0.962)
Drug production area	0.000 (0.000)	0.000† (0.000)	0.000* (0.000)	0.000† (0.000)	0.000 (0.000)
Gulf	-0.005*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)
North	0.017*** (0.001)	0.020*** (0.002)	0.020*** (0.002)	0.019*** (0.002)	0.018*** (0.002)
Pacific	0.003** (0.001)	0.003* (0.001)	0.003* (0.001)	0.002* (0.001)	0.003* (0.001)
Poverty	0.008*** (0.000)	0.010*** (0.000)	0.010*** (0.000)	0.009*** (0.000)	0.009*** (0.000)
Population	0.002*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
Rifles					
Potential cocaine production					
Schooling	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Rate of violence among DTOs (lagged)	0.005*** (0.000)	0.006*** (0.000)	0.006*** (0.000)	0.006*** (0.000)	0.006*** (0.000)
Constant	0.012*** (0.000)	0.012*** (0.000)	0.012*** (0.000)	0.012*** (0.000)	0.012*** (0.000)
	-0.045*** (0.002)	-0.066*** (0.012)	-0.051*** (0.003)	-0.055*** (0.012)	-0.052*** (0.012)
Rho	-0.113	-0.105	-0.118	-0.114	-0.104
Observations	1,647,976	1,647,976	1,647,976	1,647,976	1,647,976
“L8L” refers to event data lagged eight weeks and logged. *** p < 0.001, ** p < 0.01, * p < 0.05, † p < 0.1					

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