

HOBBS ON DRUGS
UNDERSTANDING DRUG VIOLENCE IN MEXICO

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by

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Abstract

by

Javier Osorio

This dissertation analyzes the unprecedented eruption of organized criminal violence in Mexico. To understand the dynamics of drug violence, this dissertation addresses three questions. What explains the onset of the war on drugs in Mexico? Once the conflict starts, why does drug violence escalate so rapidly? And lastly, why is there subnational variation in the concentration of violence?

Based on a game theoretic model, the central argument indicates that democratization erodes the peaceful configurations between the state and criminal organizations and motivates authorities to fight crime, thus triggering a wave of violence between the state and organized criminals and among rival criminal groups fighting to control strategic territories. In this account, state action is not neutral: law enforcement against a criminal group generates the opportunity for a rival criminal organization to invade its territory, thus leading to violent interactions among rival criminal groups. These dynamics of violence tend to concentrate in territories favorable for the reception, production and distribution of drugs. In this way, the disrupting effect of law enforcement unleashes a massive wave of violence of all-against-all resembling a Hobbesian state of war.

To test the observable implications of the theory, the empirical assessment relies on a novel database of geo-referenced daily event data at municipal level providing

detailed information on who did what to whom, when and where in the Mexican war on drugs. This database covers all municipalities of the country between 2000 and 2010, thus comprising about 9.8 million observations. The creation of this fine-grained database required the development of *Eventus ID*, a novel software for automated coding of event data from text in Spanish. The statistical assessment relies on quasi-experimental identification strategies and time-series analysis to overcome problems of causal inference associated with analyzing the distinct - yet overlapping - processes of violence between government authorities and organized criminals and among rival criminal groups. In addition, the statistical analysis is complemented with insights from fieldwork and historical process tracing. Results provide strong support for the empirical implications derived from the theoretical model.

A mamá y papá,
quienes me enseñaron el valor del trabajo
y la responsabilidad de no ser indiferente.

CONTENTS

FIGURES	vii
TABLES	x
ACKNOWLEDGMENTS	xii
CHAPTER 1: INTRODUCTION	1
1.1 The Main Argument	3
1.1.1 The Mechanisms	6
1.1.2 Methodological Strategy	8
1.1.3 Contributions	9
1.2 Redefining the Role of Organized Criminal Violence in Conflict Research	13
1.3 Key Conceptual Definitions	20
1.4 The Road Map	26
CHAPTER 2: AN INTEGRATIVE THEORY OF ORGANIZED CRIMINAL VIOLENCE	31
2.1 Introduction	31
2.2 A Fragmented Set of Alternative Explanations	33
2.3 An Integrative Theory of Organized Crime Violence	50
2.3.1 Players and Actions	51
2.3.2 Fighting Crime in New Democracies	55
2.3.3 Shifting Military Capabilities	58
2.3.4 Payoffs	65
2.3.5 Equilibrium Conditions	70
2.3.5.1 Conditions for the Target to Fight the Challenger . .	70
2.3.5.2 Conditions for the Challenger to Invade the Target .	73
2.3.5.3 Conditions for the Target to Retaliate Against the State	74
2.3.5.4 Conditions for the State to Enforce the Law	75
2.3.5.5 Summary of Equilibrium Conditions	76
2.4 Empirical Implications	76
2.4.1 War of All Against All	81
2.5 Conclusion	87

CHAPTER 3: AUTOMATED CODING OF EVENT DATA USING EVENTUS ID	89
3.1 Introduction	89
3.2 Historical and Technological Developments of Automated Coding	91
3.2.1 A Brief History of Event Data	91
3.2.2 Trade-offs Between Manual and Machine Generated Event Data	97
3.3 Coding Event Data Using Eventus ID	104
3.3.1 Eventus ID coding process	106
3.4 Stage 1. Input Files	107
3.4.1 Step 1.a. Information Sources, Coverage and Selection Criteria	107
3.4.1.1 Manual gathering and selection criteria	111
3.4.2 Step 1.b. Collecting Individual Input Files	115
3.4.3 Step 1.c. Eventus ID Input Format	116
3.4.4 Step 1.d. Corpus of Text	120
3.5 Stage 2. Event Coding	120
3.5.1 Step 2.a. Actor Dictionary	121
3.5.2 Step 2.b. Verb Dictionary	123
3.5.3 Step 2.c. Event Coding Using Eventus ID	127
3.5.3.1 General sequence algorithm	129
3.5.3.2 Partial sequence algorithm	131
3.5.4 Step 2.d. Event Database	133
3.6 Stage 3. Event Location	134
3.6.1 Step 3.a. Location Dictionaries	135
3.6.2 Step 3.b. Event Location Using Eventus ID	136
3.6.3 Step 3.c. Georeferenced Event Data	139
3.7 Stage 4. Validation and Recoding	139
3.7.1 Step 4.a. Validation	141
3.7.2 Step 4.b. Recoding	142
3.7.3 Duplicates	151
3.8 Stage 5. Validated Event Database	153
3.9 Conclusion	154
CHAPTER 4: MAIN TRENDS OF ORGANIZED CRIMINAL VIOLENCE	156
4.1 Introduction	156
4.2 Limitations of Body Counts	158
4.3 Main Trends of Organized Criminal Violence	167
4.3.1 General Description of Event Data	167
4.3.2 Temporal Trends of Organized Criminal Violence	173
4.3.3 Disaggregating the Trends of Violence at State Level	179
4.3.4 Main Trends of Violence at Municipal Level on a Daily Basis	186
4.3.5 Spatial Trends of Violence Between Criminal Organizations	187

CHAPTER 5: THE EMERGENCE, CONSOLIDATION AND COLLAPSE OF ORDER	191
5.1 Introduction	191
5.2 Explicit Assumptions about Democratization and Law Enforcement	195
5.3 The Emergence of Order out of the Mexican Revolution	198
5.3.1 Early Days of Drug Traffic in Mexico	200
5.3.2 The Post Revolutionary Era	205
5.4 The Consolidation of Order Under Authoritarianism	210
5.4.1 Cold War Politics and its Repressive Instrumentation	212
5.4.2 Political Threats and Authoritarian Reaction	217
5.4.3 Counter Narcotic Efforts During the Dirty War	221
5.4.4 Maintaining Peace in Drug Markets	225
5.5 The Erosion of the Preexisting Order in a Democratic Context	232
5.5.1 Increasing Strength of Drug Trafficking Organizations	233
5.5.2 Dismantling the Political Security Apparatus	240
5.5.3 The Process of Democratization in Mexico	244
5.5.4 Not All Good Things Come Together	258
5.5.5 The Collapse of Order	267
 CHAPTER 6: UNDERSTANDING DRUG VIOLENCE IN MEXICO	 281
6.1 Introduction	281
6.2 Structural Factors	283
6.2.1 Hypotheses and Operationalization	283
6.2.2 Model Specification	296
6.2.3 Statistical Results of the Structural Model	297
6.2.4 Overall Model Fit	307
6.3 Interactive Model of Drug Violence	308
6.3.1 Hypotheses to Evaluate	310
6.3.2 Data	311
6.3.3 Model Specification	315
6.3.4 Effect of Violent Enforcement on Violence Among DTOs	320
6.3.5 Effect of Violent and Non-Violent Enforcement on Violence Among DTOs	332
6.3.6 Overall Model Fit	342
6.4 Conclusions	344
 CHAPTER 7: DYNAMICS OF VIOLENCE IN THE MEXICAN WAR ON DRUGS	 348
7.1 Introduction	348
7.2 Hypotheses and Research Design	351
7.3 Time Series of Organized Criminal Violence	353
7.3.1 Time Series Identification	353
7.3.2 Time Series Estimation and Diagnosis	357

7.3.3	Model Specification of Time Series Processes	360
7.4	Dynamic Analysis of Drug-Related Violence	363
7.4.1	Base-Line Vector Autoregressive Model for the Dynamics of Drug Violence	363
7.4.2	Full Specification of the Vector Autoregressive Model for the Dynamic Analysis of Drug Violence	376
7.5	Discussion of Results	390
CHAPTER 8: CONCLUSION		399
8.1	Why do Politicians Decide to Fight Criminal Organizations After Hav- ing Peacefully Coexisted With Them?	400
8.2	Why Does Drug-Related Violence Escalate so Rapidly?	406
8.3	Why is Violence More Concentrated in Some Areas Than in Others?	412
8.4	Contributions	415
8.5	Looking Ahead	417
APPENDIX A		420
A.1	Infolatina Query	421
A.2	Number of Information Sources by Year	422
A.3	List of Information Sources	423
A.4	List of Mexican States	427
A.5	Map of Mexican States	428
A.6	Descriptive Statistics of Data at Municipal Level on a Daily Basis	429
A.7	Descriptive Statistics of Data at the National Level on a Daily Basis	431
A.8	Hospitalizations by Drug Intoxication	432
BIBLIOGRAPHY		433

FIGURES

1.1	Types of organized violence	15
2.1	The Game of Drug Violence	52
2.2	Shifting military capabilities	62
2.3	Military damage and recovery capabilities in $\gamma^{1-\sigma}$	63
2.4	Military damage and recovery capabilities in $\gamma^{2-2\sigma}$	65
2.5	Military damage and recovery capabilities in $\gamma^{1-\sigma}$ and $\gamma^{2-2\sigma}$	66
2.6	Military capabilities recovered or gained through fighting	71
2.7	War of all against all	83
3.1	Continuum of Textual Annotation Methods	98
3.2	Eventus ID process	107
4.1	Frequency of events associated with drug-related violence by type of event	170
4.2	Frequency plots of the main variables of drug-related violence	173
4.3	Main trends of drug-related violence in Mexico	175
4.4	Violent and non-violent law enforcement	176
4.5	Violent competition among criminal organizations at state level on a monthly basis	181
4.6	Criminal retaliation against government authorities at state level on a monthly basis	183
4.7	Violent law enforcement at state level on a monthly basis	185
4.8	Main trends of violence at municipal level on a daily basis	186
4.9	Spatial trends of violence among criminal organizations	189
5.1	Number of seats in Congress by type of electoral rule	247
5.2	Percentage of votes for Congressional elections	248
5.3	Percentage of votes for Presidential elections	251
5.4	Effective number of parties (ENP) at the federal level	257
5.5	Effective number of parties (ENP) at the local level	258

5.6	Annual number of homicides in Mexico 1938-2011	266
5.7	Annual budget for security agencies in Mexico 2000-2010	275
6.1	Drug markets in Mexico: hospital discharges diagnosed with intoxication by narcotics	289
6.2	Drug valuable territories	293
6.3	Annual production of assault weapons in the U.S.	295
6.4	National average of unemployment rate on a quarterly basis	296
6.5	Price per pure gram of cocaine in the U.S.	304
6.6	Goodness of fit of the structural model	309
6.7	Effect of political competition on violent enforcement	323
6.8	Effect of divided government on violent enforcement	324
6.9	Effect of political strain on violent enforcement	325
6.10	Effect of violent enforcement on violent competition among DTOs	328
6.11	Effect of violent law enforcement on different territories	330
6.12	Effect of political competition on violent and non-violent enforcement	335
6.13	Effect of divided government on violent and non-violent enforcement	336
6.14	Effect of political strain on violent and non-violent enforcement	337
6.15	Effect of violent and non-violent enforcement on violent competition among DTOs	339
6.16	Goodness of fit of the interactive model	343
6.17	Comparative model fit between structural and dynamic models	344
7.1	Daily time series of violent competition among DTOs at the national level	355
7.2	Autocorrelation (AC) and Partial Autocorrelation (PAC) of violent competition among DTOs	356
7.3	Autocorrelation (AC) and Partial Autocorrelation (PAC) functions of residuals from the ARIMA AR(37) model	359
7.4	General intuition of Vector Autoregressive (VAR) models	365
7.5	Orthogonal Impulse Response Functions (OIRF) of violence in the Mexican war on drugs	371
7.6	Cumulative Orthogonal Impulse Response Functions (COIRF) of violence in the Mexican war on drugs	375
7.7	Cumulative Orthogonal Impulse Response Functions (COIRF) for the effect of violent and non-violent enforcement on competition among DTOs	383

7.8	Cumulative Orthogonal Impulse Response Functions (COIRF) for the effect of violent and non-violent enforcement on criminal retaliation	385
7.9	Cumulative Orthogonal Impulse Response Functions (COIRF) for the effect of competition among DTOs on violent and non-violent enforcement	387
7.10	Cumulative Orthogonal Impulse Response Functions (COIRF) for the effect of criminal retaliation on violent and non-violent enforcement	388
7.11	Cumulative Orthogonal Impulse Response Functions (COIRF) of sustained campaigns of violence during six months	389
A.1	Number of information sources by year	422
A.2	Map of Mexican states	428
A.3	Hospitalizations by drug intoxication at state level	432

TABLES

2.1	ALTERNATIVE EXPLANATIONS	34
2.2	SEVERITY OF MILITARY DAMAGE AND RECOVERY CAPABILITY	61
2.3	EQUILIBRIUM CONDITIONS FOR THE USE OF VIOLENCE	77
2.4	SUMMARY OF EMPIRICAL IMPLICATIONS	82
3.1	COMPARATIVE ADVANTAGES OF MANUAL AND SUPERVISED ANNOTATION METHODS	101
3.2	NUMBER OF INFORMATION SOURCES	109
3.3	AVAILABILITY OF INFORMATION SOURCES	110
3.4	NUMBER OF NEWS REPORTS	115
3.5	CORPUS OF TEXT FILES BY INFORMATION SOURCE	120
3.6	ACTORS CATEGORIES	122
3.7	VERB CATEGORIES	123
3.8	VERB TENSES IN ENGLISH AND SPANISH	126
3.9	EVENTUS ID CODING ALGORITHMS	128
3.10	EVENTUS ID LOCATION ALGORITHM	138
3.11	DIRECT CRITERIA FOR DEFAULT ACTOR ASSIGNMENT	146
3.12	CONDITIONAL CRITERIA FOR DEFAULT ACTOR ASSIGNMENT	148
4.1	DATABASES OF DRUG-RELATED VIOLENCE IN MEXICO	161
4.2	DESCRIPTIVE STATISTICS OF THE MAIN VARIABLES OF ORGANIZED CRIMINAL VIOLENCE AT THE MUNICIPAL LEVEL ON A DAILY BASIS	171
5.1	MILITARY COUNTER-NARCOTIC OPERATIONS CONDUCTED BY THE MEXICAN ARMY BETWEEN DECEMBER 2006 AND DECEMBER 2010	274
6.1	STRUCTURAL DETERMINANTS OF VIOLENT COMPETITION AMONG DTOs	300

6.2	FIRST STAGE: BASE-LINE AND FULL MODEL OF VIOLENT ENFORCEMENT	321
6.3	SECOND STAGE: BASE-LINE AND FULL MODEL OF VIOLENT COMPETITION AMONG DOTs	326
6.4	FIRST STAGE: POLITICAL DETERMINANTS OF VIOLENT AND NON-VIOLENT ENFORCEMENT	333
6.5	SECOND STAGE: VIOLENT COMPETITION AMONG DTOs	338
7.1	AUGMENTED DICKEY-FULLER TEST FOR DIFFERENT PROCESSES OF VIOLENCE	357
7.2	PORTMANTEAU TEST FOR WHITE NOISE IN DIFFERENT PROCESSES OF VIOLENCE	360
7.3	EXPLANATORY POWER OF VAR MODEL 1	367
7.4	GRANGER CAUSALITY TEST FOR VAR MODEL 1	369
7.5	EXPLANATORY POWER FOR VAR MODEL 2	380
7.6	GRANGER CAUSALITY TEST FOR VAR MODEL 2	382
A.1	LIST OF INFORMATION SOURCES	423
A.2	LIST OF MEXICAN STATES	427
A.3	DESCRIPTIVE STATISTICS OF DATA AT MUNICIPAL LEVEL ON A DAILY BASIS	429
A.4	DESCRIPTIVE STATISTICS OF DATA AT NATIONAL LEVEL ON A DAILY BASIS	431

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CHAPTER 1

INTRODUCTION

By the early years of the twenty-first century, the pattern of political violence that had marked a lengthy part of Mexican history in the previous century had dissipated. The long revolutionary war was settled in the 1920s, the repression of social movements and guerrillas in the 1960s and 1970s had calmed and, in the early 1990s, the resonating words of the Zapatista movement shook the country more than its rifle-shaped sticks. The old *México bronco* (untamed Mexico) seemed a figure of the past. However, since the turn of the century, Mexico has begun to experience a massive escalation of violence of unprecedented characteristics. Instead of agrarian revolutionaries and politically motivated protesters or insurgents, the central actors of this wave of violence are ruthless criminals fighting for drug-related turf. Reversing a downward trend of homicides, the dramatic eruption of violence associated with organized crime generated more than 50,000 casualties between 2006 and 2011 (Sistema Nacional de Seguridad Pública, 2011*a*). The lethality of this surge of criminal violence is comparable to the onset of 50 civil wars in only six years (Osorio, 2012). The drama not only relates the increasing number of homicides, but also on their nature. Numerous times, convoys of heavily armed *sicarios* (hitmen) carrying high-

caliber weapons battled members of rival criminal groups or government authorities in the midst of crowded public areas. Bodies were dumped on the streets showing signs of horrific brutality that often included torture and mutilation. Authorities began discovering mass graves, and criminals arranged the bodies of their victims in public places in lurid tableaux: decapitated bodies appeared hanging from bridges and severed heads were left at the doors of government buildings, tossed into bars, or placed openly in public squares. What caused this unprecedented wave of violence?

The recent escalation of organized criminal violence in Mexico is puzzling for several reasons. Criminal organizations in Mexico have existed since at least the late nineteenth century (Astorga, 2005). For several decades they conducted their activities of drug cultivation and trafficking into the U.S. without relying primarily on the use of violence. During this period, criminals enjoyed protection – or at least lack of law enforcement – from corrupt government authorities. Of course there were some isolated and incidental events of violence. However, this illegal sector was largely characterized by a long absence of overt and sustained hostilities. The relations between criminals and the state as well as among criminal groups were characterized by order and peace. Then, why did criminal organizations suddenly become so violent? Moreover, why were they not violent before and what explains their current aggressiveness? In addition, why and how did state officials coexist peacefully with criminal groups for such a long time? Why are government authorities now waging battles against criminal organizations?

Paradoxically, the eruption of organized criminal violence is occurring at a time when the Mexican political system is consolidating its recently-won democracy. Towards the end of the twentieth century, Mexico underwent a gradual process of democratization that generated a competitive party system, effective division of powers, and several other characteristics associated with a well functioning – although not fully consolidated – democracy (Coppedge, 2012; Held, 2006). Based on the theo-

retical foundations of this domestic democratic peace, we could expect democratic regimes to be associated with low levels of intra-state violence (Davenport, 2009*b*). Then why has such a dramatic outbreak of violence occurred in a recent, yet solid democratic system?

To address the puzzling escalation of organized criminal violence, this research focuses on analyzing three different aspects of the ongoing wave organized criminal violence in Mexico. First, this study examines the onset of violence by asking why politicians have decided to fight criminal organizations after having peacefully coexisted with them for several decades? Second, the research aims to understand the temporal dynamics of violence by asking why drug-related violence has escalated so rapidly? The third aspect of interest refers to the spatial variation of violence, asking why violence is concentrated more in some areas than in others? These three research questions guide a comprehensive inquiry which seeks to understand the onset, escalation, and geographic concentration of organized criminal violence.

1.1 The Main Argument

At its core, the endurance of a political community depends on the ability of institutions and mechanisms to maintain order by coping with internal tensions and adapting to external pressures. As indicated by Huntington (1968), the relative power of the various elements of a community tends to change over time, and in order to maintain its cohesiveness, power must be exercised and channeled through institutions so as to make force compatible with the elements of the community. The more complex and heterogeneous the community, the more it will require an effective system for maintaining order. Since Hobbes (1651), the central role of the state is to impose order. The survival of the state as a cohesive community depends on

the ability of its institutions to impose and maintain order among its constituent elements.

Historically, the process of state formation has been inherently connected to violence as states try to draw to themselves the means of coercion until they prevail in holding the legitimate monopoly of the use of force (Tilly, 1985, 1992; Weber, 1978). However, not all states succeed in securing the monopoly on violence by neutralizing all other actors with the capability and willingness to conduct organized violence. Weak states usually have limited presence and domain over the entire territory contained within their borders, and often lack absolute control of the means of coercion (Bates, Greif and Singh, 2002; Bates, 2008; O'Donnell, 1993; Scott, 2009). In these contexts, state authorities usually coexist with a myriad of non-state actors actively exercising active on parts of the territory and capable of resorting to violence to impose, maintain, and defend their position of power. The concurrence of government authorities and non-state actors makes weak states particularly prone to violence. This propensity for conflict increases as the relative power of non-state actors increases with respect to the government authorities and as the state lacks the institutions or the means to temper their threat.

However, the failure to monopolize coercive means in the hands of the state and the coexistence of government authorities with other non-state actors capable of conducting violence does not necessarily mean the absence of order and the presence of violence. Peace and order can exist between government authorities and non-state actors based on a system of institutions and mechanisms capable of forcing the compatibility of their interests in a regularized, stable, sustained manner. In this context, order emerges as the behavioral manifestation of the mutual interests of the members of the community in not using their means of violence on one another. The stability of order and the prospects of peace depend on the strength and scope

of political institutions capable of implementing an effective system of incentives, procedures and organizational devices for resolving tensions within the community.

As illustrated by the Mexican case, government authorities at the federal and local levels have coexisted peacefully with criminal organizations for decades. Order was the defining characteristic of the relations between the state and criminals as well as among different criminal organizations operating within the country. Peaceful co-existence was possible thanks to the enduring political hegemony of the Institutional Revolutionary Party (PRI) that held power for more than 70 years without interruption. During this period, government authorities maintained order partly because of a combination of corruption and selective enforcement, but most importantly thanks to a system of political incentives that instilled discipline throughout the government structure without the need to rely on violence. Why did this order fall apart? Why did violence emerge?

The central argument of this research is that democratization erodes the peaceful configurations between the state and criminal organizations and motivates politicians to fight crime, thus triggering a wave of violence between the state and organized criminals and among rival criminal groups fighting to control valuable territories. This explanation is rooted in the Hobbesian tradition of conflict and argues that violence emerges as the consequence of the collapse of order. The gradual process of democratization undermines the strength and scope of authoritarian institutions, relations and mechanisms that induce order between the state and criminal groups as well as among criminal organization through a system of political incentives. Increasing political competition in a democratic regime motivates government authorities to enforce the law against criminals, thus setting in motion a chain of actions and reactions that generate an aggregated escalation of violence. In the absence of authoritarian institutions capable of regulating tensions through political means, the use of law enforcement to fight crime motivates a violent reaction from criminal organizations

against the state. In addition, law enforcement against a criminal group generates the opportunity for a rival criminal organization to invade its territory, thus leading to violent interactions between rival criminal groups. These different, but overlapping dynamics of violence tend to concentrate in strategic territories favorable for conducting criminal activities. In short, in the absence of regulation mechanisms, the disrupting effect of law enforcement unleashes a massive wave of violence of all-against-all resembling a Hobbesian state of war.

In this account, violence is endogenous. Considered in general terms, violence is the cause as well as the consequence. However, in order to explain the “bulk” of violence it is necessary to understand its external factors as well as its internal dynamics. As indicated by Kalyvas (2006), only by disentangling the different components of violence it is possible to appreciate its transformative force. In this respect, *state violence* motivates criminals to conduct *violent retaliation* against authorities and generates opportunities for criminal organizations to engage in *violent competition* against their rivals. This research is thus located within the research agenda studying the microdynamics of conflict. Studying violence from this perspective requires a considerable effort of theoretical development capable of identifying the various components of violence as well as defining its causal mechanisms. In addition, the dynamic and interactive characteristics of conflict represent a challenge for empirical identification. This demands the use of fine-grained data capable of revealing distinct behavioral manifestations of violence and the design of adequate identification strategies to test the theoretical implications against the empirical evidence.

1.1.1 The Mechanisms

The theoretical explanation relies on the analytic leverage of a formal model to elucidate the different dynamics operating behind the onset, escalation and the geographic concentration of violence. The model departs from a set of explicit assump-

tions and propositions about the different actors operating within structural factors. In addition, the analytical framework integrates these elements into a coherent set of systematic mechanisms that allow understanding the strategic interactions between the state and organized criminals, as well as among rival criminal groups.

To explain the onset of the war on drugs, the theoretical model claims that democratization disrupts the peaceful configurations that enable coexistence between corrupt government authorities and criminal organizations in contexts of authoritarian rule. By increasing the number of relevant political actors at different levels of government and by favoring the effective circulation of political elites, democratization erodes the political structures that enable the existence of non-aggressive agreements between authorities and criminals. Increased democratization thus alters the system of political incentives for enforcing the law, motivating government authorities to fight crime. In addition, the model argues that government authorities obtain political benefits from implementing harsh security policies when their legitimacy is threatened by periods of political strain, thus reinforcing their incentives to fight crime.

To explain the escalation of violence, the theory relies on a contest success model for territorial competition. According to the argument, increased levels of law enforcement are likely to trigger an escalation of conflict between the state and criminal organizations, and violence among rival criminal groups. In this way, the action of the state is non-neutral and has a highly disruptive effect on the relative military balance of criminal organizations. Law enforcement weakens the capability of a criminal group to protect its territory, thus motivating an invasion from a competing criminal group that now faces a weaker rival. The equilibrium conditions of the model indicate that violence committed by criminal organizations—either against the state or their rivals—is a function of the severity of military damage inflicted on them, their capability of recovering from it, and the value of the territory. This implies that

organized criminals are likely to use violence if the net military strength recovered through fighting back after being attacked is larger than the cost of fighting, given the value of a territory.

Finally, to explain the geographic distribution and concentration of violence, the model explicitly incorporates the importance of territorial value as a key determinant of conflict. Departing from the assumption that criminals are primarily motivated by economic gains, the model indicates that criminal organizations are willing to engage in violent confrontations to capture or defend strategic territory that give them access to profitable illicit activities. In consequence, violence tends to concentrate around valuable territories.

1.1.2 Methodological Strategy

The central object of analysis in this research is the variation in levels of violent competition among rival criminal organizations across time and space. Based on the theoretical framework, an understanding of violence among criminal groups requires analyzing this phenomenon in relation to violence conducted by the state and violence perpetrated by criminals against government authorities. In consequence, when analyzing violent competition among criminal organizations the related processes of violence between the state and criminals are also relevant. Analyzing the temporal and spatial variation of violence requires an eclectic methodology. This research primarily relies on a quantitative analysis of the external and internal factors determining different manifestations of violent behavior. The empirical basis of the analysis is a large database of events of drug-related violence covering all municipalities in Mexico on a daily basis from 2000 to 2010. Chapters 3 and 4 present the methodology used to build this database and describe the main characteristics of the data. Chapters 6 and 7 present the result of the quantitative analysis.

Besides the quantitative analysis that constitutes the core of this dissertation, the research also benefited enormously from a long stay and several trips to Mexico where I conducted fieldwork for a total of 14 months. The witness accounts and insights gathered during semi-structured interviews conducted in Mexico City, Juárez, Culiacán and Tijuana provided crucial contributions to understanding the causes and processes of violence. Following the methodological recommendations for nested analysis of Lieberman (2005), the combination of quantitative examination of the data and qualitative assessment of interviews and documents constituted an interactive analytical process. Based on the implications of an early theoretical conception of the work, I conducted some preliminary large- N analyses; these initial results were then used to select locations for fieldwork and to inform the structure of the interviews. Qualitative information gathered during fieldwork contributed to redefining the theoretical explanation and to providing more insightful interpretations of the statistical results. These developments served in turn to dig deeper in subsequent qualitative analyses. The result of this theoretical–quantitative–qualitative process proved crucial for generating the theoretical explanation presented in Chapter 2. The insights from the qualitative analysis also influenced the core argument presented in Chapter 5 discussing the onset of the war on drugs. The qualitative analysis further served to suggest variables for inclusion and inform the interpretation of the quantitative results in Chapters 6 and 7.

1.1.3 Contributions

This research presents several theoretical, empirical and substantive contributions to the study of organized criminal violence and more broadly to the understanding of the microdynamics of conflict.

Theoretically, this study redefines our understanding of large-scale organized criminal violence as a phenomenon largely neglected by conflict scholars in political sci-

ence despite the lethality and pervasiveness of this form of violence in the developing world. By analyzing the behavior of the state and criminal organizations, this research bridges ideas from the literature on political violence, criminal sociology, economics of crime and democratization to provide new insights that improve our understanding of this complex and understudied phenomenon. For the reasons explained below, political science mistakenly abandoned an early research agenda initiated by Graham and Gurr (1969) and Gurr (1989) which combined insights from criminal sociology and political science to study riots, protests, crime and assassinations. The present study constitutes an effort to revive this research agenda.

Another theoretical contribution of this research is the development of a formal model to understand different aspects of organized criminal violence contained within an integrative analytical framework. This model is based on a set of explicit assumptions, and develops a simple set of propositions to provide a general explanation for the onset, escalation and geographic concentration of violence. The emphasis on theoretical desegregating makes it possible to specify the conditions of why, when, by whom and where violence emerges as a behavioral manifestation of assorted actors operating within structural factors. The theoretical explanation thus contributes to the research agenda of the microdynamics of conflict. In contrast to the analysis of violence against civilians in civil wars dominating this research agenda (Kalyvas, 2006, 2012), this dissertation directs the focus of the micro-level agenda of conflict towards a study the dynamics of organized criminal violence.

The analytical leverage of the formal model is used to derive a set of empirical implications which are then subject to empirical scrutiny. The analysis tests the observational extensions of the model by focusing on Mexico and conducting comparative analyses of all its sub-national units for a time span of eleven years. Evaluating the scope conditions, explanatory power, and external validity of the theory outside the Mexican case is a pending task for future work. If this theoretical explanation

contributes to an understanding of organized criminal violence or other processes of violence in other latitudes, a major – as yet undeserved – compliment will be served to this research.

Empirically, this research presents a novel data base of event data on organized criminal violence called “Organized Criminal Violence Event Data in Mexico 2000–2010” (OCVED). The data provide information on the violent and non-violent law enforcement actions conducted by government authorities against criminal groups, as well as events of violence perpetrated by criminals against the state, and violent confrontations between rival criminal organizations. OCVED include information from all Mexican municipalities on a daily basis from January 1, 2000, to December 31, 2010, comprising more than 9.8 million observations. This database of georeferenced daily event data at the municipal level provides detailed information on who did what to whom, when and where in the Mexican war on drugs. The empirical support in this research also joins a recent trend in political science relying on “big data” to conduct large-data set analysis of conflict (Leetaru and Schrod, 2013).

The use of micro-level data enables claims about the relevance of macro-structural factors often used to explain political violence and criminal behavior to be evaluated. As discussed in the empirical chapters of this dissertation, the empirical results based on fine-grained data challenge the explanatory power of structural factors and reveal the highly dynamic and interactive character of violence at the micro level.

Extant methodological strategies for collecting and systematizing data on violence proved prohibitively expensive or largely inaccurate for coding information from original sources that was necessary to generate the type of data required to test the theory. To overcome this limitation, this study developed *Eventus ID*, a novel software for automated coding of event data from text written in Spanish. The components of an event are defined as someone (*the source*), doing something (*the action*), to someone else (*the target*). By bringing together cutting-edge advances in computer science

with recent methodological developments in conflict research, this software will also serve as a public good for other scholars to make advances in the creation of new event data sets in their own fields and topics. In addition, the ability of this software to code text written in Spanish enables researchers to analyze timely, detailed information written in this language that often is not translated into English.

Substantively, the results of this research question the international paradigm encouraging the implementation of punitive strategies to fight drugs. In particular, the contribution of this study helps reinforce the outcry by victims, public opinion, activists, analysts and scholars denouncing the escalation of the war on drugs in Mexico. Beyond the astonishing scarcity of rigorous, evidence-based analysis that rarely rises above well-intentioned opinion-making, this research offers a sound explanation and solid evidence about the causes, mechanisms, magnitude, scope and length of the wave of criminal violence generated by the implementation of a massive quasi-military strategy to fight organized crime in Mexico. By focusing on this country, this research is also a response to the imperative need to understand and curb large-scale organized crime violence, an understudied yet pervasive threat to political stability in Latin America (e.g., Colombia, Brazil, El Salvador, Guatemala and Honduras) and in fragile states worldwide (e.g., Afghanistan, Tajikistan, Myanmar and Somalia).

Beginning with the Shanghai Opium Commission in 1909, international efforts led by the United States and held at several conventions of the United Nations (UN) since 1961¹ have adopted a global paradigm largely criminalizing the production, transportation, and consumption of narcotics. The criminalization approach relies on a punitive perspective primarily focused on combating the supply of narcotics. The basic intuition behind this policy is that criminalization is expected to increase

¹These efforts are based on a set of international instruments including the Single Convention on Narcotic Drugs in 1961 (amended by the 1972 Protocol), the Convention on Psychotropic Substances in 1971, the Convention Against Illicit Traffic in Narcotic Drugs in 1988, the Convention Against Transnational Organized Crime in 2003 and the United Nations Convention Against Corruption in 2005 (United Nations, 1961, 1971, 1988, 2000, 2002).

the prices of illicit drugs to the point of making them prohibitively expensive for consumers, thus reducing the demand for drugs. To achieve this goal, the international paradigm encourages the implementation of harsh law enforcement that has evolved over the last few decades into a generalized use of quasi-military strategies to fight drugs. However, after a century of implementation, this approach shows no signs of success. The policy has largely failed to reduce the demand for drugs or to increase drug prices. In 2010, there were about 300 million people worldwide who used an illicit substance at least once in the previous year, among which 38.6 million were drug dependent (United Nations Office on Drugs and Crime, 2013*b*). In addition, the price of all drugs has been continuously declining for several decades while the purity has remained stable or increased (Office of National Drug Control Policy, 2004). Fortunately, a group of world leaders, international civil society organizations, scholars, and the media have denounced the pernicious consequences of this policy in terms of the violence, corruption, public insecurity, health epidemics and poverty traps it has contributed to causing in developing countries (Crook, 2009; Global Commission on Drug Policy, 2012, 2013; Latin American Commission on Drugs and Democracy, 2009; Reuter, 2008; The Vienna Declaration, 2010; Zedillo and Wheeler, 2012). Unfortunately, revisionist efforts have lacked the necessary coordination and analytical rigor to generate solid results. This research contributes to these international efforts by offering a robust explanation supported by rigorous empirical evidence about the deleterious effects of implementing quasi-military strategies to fight drugs.

1.2 Redefining the Role of Organized Criminal Violence in Conflict Research

Despite the pervasiveness of organized criminal violence in developing countries and the lethality of this type of violence, conflict scholars in political science have

largely neglected the study of sustained campaigns of violence perpetrated by criminal organizations against government authorities or against rival criminal associations. This research seeks to fill the gap in conflict literature by attracting the attention of political scientists to the micro-dynamics of organized criminal violence as a relevant type of conflict.

Figure 1.1 helps to elucidate the gap in the literature by presenting a typology of different forms of violence along three dimensions. First, violence can be situated along the horizontal axis according to the degree of *political* motivation held by the perpetrators of violence. The second dimension maps the extent to which violence is motivated by *economic* objectives. The vertical axis represents the *orientation towards the status quo* showing to what extent violence is being employed for changing the status quo or for preserving it. Status quo is here broadly understood as the prevailing power structures defining the political and economic conditions of a polity. This tridimensional space helps to picture the combination of political and economic motivations of violence that aims to challenge or preserve the status quo. The clusters of spheres shown in Figure 1.1 do not represent real cases of conflict; they are mere abstractions for illustrative purposes.

One type of violence referred to here as *political preservation* represents cases where violence is used mainly for political reasons in order to maintain the status quo. This type of violence is represented by the green cluster, and includes instances in which government authorities use the coercive apparatus of the state to stay in power. Different types of coercive behavior fit in this cluster of politically motivated violence for preserving the status quo, including state repression (Davenport, 2009b; Goldstein, 1978; Regan, 2009), covert political surveillance (Cunningham, 2003; Davenport, 2005), protest policing (Schwedler, 2005), counter-insurgency strategies (Berman, Shapiro and Felter, 2011; Petraeus, 2006), death squads (Mason and Krane, 1989) and even genocide (Harff, 2003; Valentino, 2000).

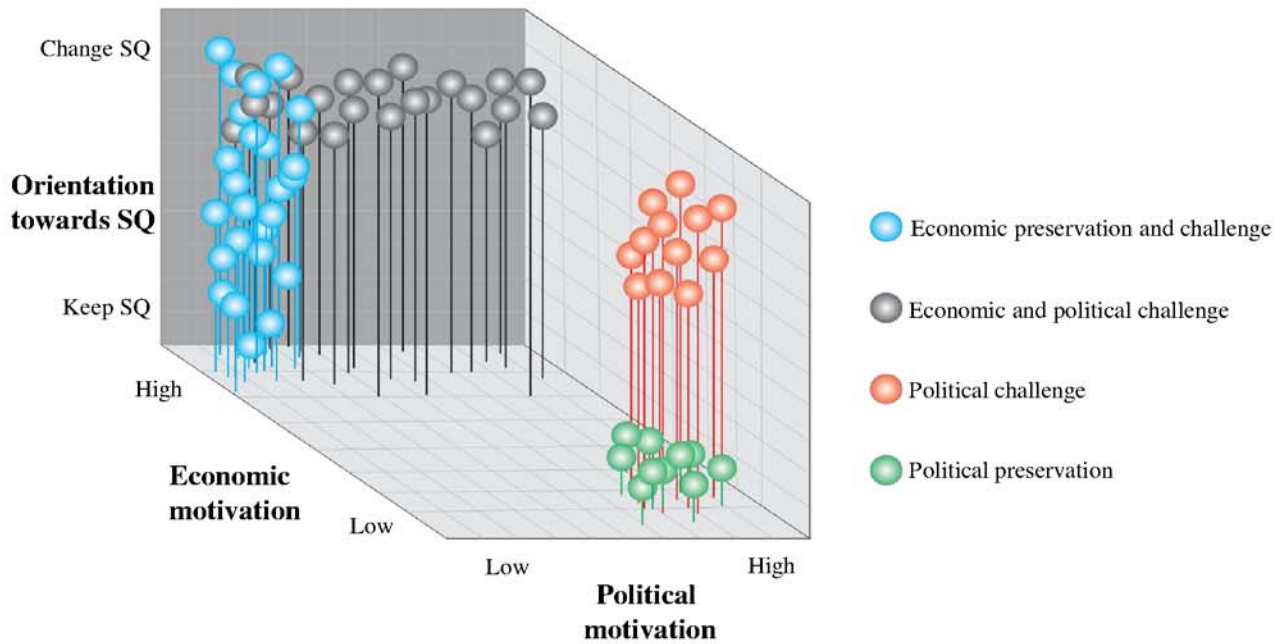


Figure 1.1. Types of organized violence

Conflict scholars have devoted considerable efforts to studying the second category of violence, referred to here as *political challenge*. This set of cases is represented by the red cluster, in which politically motivated challengers use violence to change the status quo. This category includes instances in which actors organize efforts to overthrow government authorities by violent means. The perpetrators of violence are usually depicted as rebels motivated by strong political or ideological commitments, who are trying to address collective grievances, and who enjoy broad support from the population. A vast collection of research on political challenge analyzes different types of political rebellion (Gurr, 1970; Tilly, 1978), social protest (Lichbach, 1998; McAdam, Tarrow and Tilly, 2001; Piven and Cloward, 1977; Tarrow, 1998), nationalist or secessionist conflicts (Hechter, 2001; Snyder, 2000), revolutionary movements

(Skocpol, 1979), insurgencies (Wickham-Crowley, 1992) and terrorism (Enders and Sandler, 2006; Weinberg, Pedahzur and Hirsch-Hoefler, 2004).

The third group, referred to here as *economic and political challenge* and represented by the gray cluster, comprises cases in which rebels use violence to change the status quo for a combination of political and economic reasons. These conflicts are often depicted as predatory conflicts in which insurgents use violent means to attempt to obtain political power and seize economic opportunities for looting. There is a large literature on civil wars arguing that rebels in civil wars are mostly motivated by “greed” (Collier, 2000; Collier and Hoeffler, 1998) and there are several studies linking natural resources such as oil, diamonds and other primary commodity exports with conflict as key determinants (Fearon, 2005; Humphreys, 2005; Ross, 2006).

The fourth group refers to *economic preservation and challenge* and includes cases in which violence is mostly used for economic purposes in an attempt to maintain or disrupt the status quo. This largely overlooked type of violence is the focus of analysis of this study and is represented by the blue cluster. Some cases in the lower part of this cluster could illustrate criminal organizations using violence to resist law enforcement efforts. Violence is used in such cases to maintain the power structures that allow criminals to extract economic rents from illicit markets. The upper part of the blue cluster refers to criminal organizations using violence to disrupt the status quo that allows their rivals to exist and for pressing for a redistribution of power. A central characteristic of the blue cluster is that the actors are not motivated mainly by political ends. A few recent studies explore the types of violence corresponding to this cluster such as warlords, pirates and organized criminals (Bailey and Taylor, 2009; Blattman and Miguel, 2010; Davis, 2009; Koonings and Kruijt, 2004; Skaperdas, 2002; Thomas, Kiser and Casebeer, 2005; Thomson, 1996; Tulchin, Frühling and Golding, 2003). However, this type of violence remains largely underdeveloped in theoretical and empirical terms.

As illustrated in Figure 1.1, there is an area where the blue cluster of violence for *economic preservation and challenge* overlaps with the gray cluster of violence for *economic and political challenge*. These are instances in which rebels in civil wars seem to behave mostly like rent-seeking actors primarily motivated by the opportunity to loot. Predatory behavior by some rebels rests at the core argument of several authors who dismiss grievances and political objectives, claiming that civil wars are largely conducted by kleptocrats (Brito and Intriligator, 1992; Collier, 2000; Collier and Hoeffler, 2004; Grossman, 1999; Hirshleifer, 1991). A clear example is Grossman (1999, 269) arguing that “insurgents are indistinguishable from bandits or pirates.”

There are certainly some aspects of organized criminal violence that are similar to the characteristics of conflict in civil wars. The resemblance is clear when the key elements included in the definition of civil wars are considered. According to Sambanis (2004), there is a broad consensus among conflict scholars that a civil war is defined as a conflict characterized by: (i) reciprocal and sustained armed action (ii) between the state’s armed forces operating within its own territory and (iii) one or many organized armed actors, (iv) capable of mounting effective resistance and (v) generating a toll of at least 1,000 people killed as the product of armed clashes between warring parties. Although this study does *not* claim to define organized criminal violence as a type of civil war, it is useful to draw parallels between these two types of violence.

- **Reciprocal and sustained armed action.** Organized crime violence often includes several armed clashes between criminal groups and the state security forces or violent confrontations between rival criminal groups. These armed encounters are not isolated or sporadic events generated by random circumstances, rather they are part of systematic and sustained campaigns of violence. These violent interactions between state security forces and insurgents are also a central characteristic of civil wars.
- **Use of the armed forces operating within the state’s territory.** Due to the endemic weakness of police forces and the high levels of corruption affecting local security forces in developing countries, anti-criminal strategies often

rely on the deployment of military personnel for conducting policing activities. Armed forces operate within the territorial boundaries of the state to deal with domestic security concerns. The reason for using the army is also justified by the considerable firepower capability of criminal organizations, which can easily outgun a poorly equipped local police forces. Similarly, civil wars involve the direct participation of military personnel to fight rebels within the state's territory.

- **Organized armed actors.** The term “organized” in “organized crime” refers to the ability of individual criminals to overcome dilemmas of collective action and coordinate efforts to conduct violence and engage in criminal activities. As insurgents do in civil wars, criminal groups use a variety of mechanisms to organize collective efforts of violence against state authorities or rival criminal associations. Following Lichbach's (1998) mechanisms for solving dilemmas of collective violence, it is possible to identify how criminal organizations rely strongly on economic incentives from illicit markets to motivate their members (market mechanism) and use hierarchical structures for imposing, monitoring and enforcing agreements on their lower ranks (hierarchical mechanism).
- **Effective resistance.** Due to the substantial financial resources extracted from illicit markets, some criminal organizations are capable of recruiting a large number of members and acquiring the necessary material and military supplies for mounting an effective resistance against state authorities or rival criminal organizations. The availability of resources characteristic of criminal organizations contrasts with the scarcity of financial and material resources often limiting the military capability of insurgent groups for effectively resisting state actions in civil wars.
- **Lethality of violence.** The standard threshold of defining an intra-state conflict as a civil war is at least 1,000 casualties in a year. The death toll of organized crime violence is similar to that of civil wars. For example, the Mexican war on drugs killed about 35,000 people between 2007 and 2010. As noted by Osorio (2012), this death toll comparable to the onset of some 35 civil wars in only four years.

Collier (2000) considers that rebellion is a quasi-criminal activity. According to this author, rebellion and organized crime are largely analogous, although not identical. However, the distinction is based on four “stylized facts” (Collier, 2000, 840). The first difference refers to levels of poverty. Richer societies are far less likely to experience civil wars. However, improved economic conditions do not seem to be associated with less violent crime. Second, income inequality is not related to a higher

risk of civil war. In contrast, increased income inequality does seem to be a related to higher crime rates. Third, natural resources increase the likelihood of rebellion. However, Collier considers that natural resources do not not have such a large impact on criminal behavior. Finally, according to this author, although insurgencies are not caused by identities (ethnic, religious or class), rebels usually adopt the discourse of cleavages as part of the rebellion. In contrast, organised criminal behavior typically does not occur along identity lines.

Unfortunately, Collier misses a crucial distinction that differentiates loot-seeking behavior in civil wars from violence perpetrated by criminal organizations: the orientation of violence towards the status quo. In some civil wars, rebels use violence against the state in order to overthrow government authorities and control economic resources for private benefit. In civil conflict, capturing power is a way of gaining access to economic gain, and the only way to do it is by challenging the status quo. In contrast, organized criminal violence comprises two distinct types of behavior. Organized criminals may use violence against state authorities as an attempt to maintain the power structures that permit them to extract rents from illicit markets. Criminal violence used in this way is a reaction against law enforcement and is used for preserving the status quo. The other type of behaviour in which criminal organizations may engage is to commit violence against other criminal groups in an effort to challenge the status quo in which their rivals enjoy a privileged position for extracting rents from illicit markets. Analyzing the orientation towards the status quo shows clearly that despite the behavioral similarities between rent-seeking rebels and criminals, they are fundamentally different in nature: rebels use violence against the state to challenge the existing power structures, while criminals use violence against the state to preserve the status quo and against other criminals to challenge it.

One of the main reasons why political scientists have paid scant attention to the study of organized criminal violence may be that this type of violence is often disre-

garded as non-political in nature or not politically relevant. However, by neglecting the study of organized criminal violence, political scientists overlook a central problem in political theory: the existence and collapse of order. The central role of the state is to impose order. Since Thomas Hobbes (1651), the foundation of the state and the social condition has depended on the sovereign's control of the means of coercion. The legitimate monopoly of violence is also a distinctive characteristic of the state according to Max Weber (1978). But order is not only a theoretical construct. Historically, the process of state formation has been inherently connected to violence as states try to monopolize the accumulation and concentration of coercive means to impose order (Bates, 2008; Scott, 2009; Tilly, 1985, 1992, 1975). According to Tilly, coercion defines the extent of domination and order: those who apply coercion on others obtain their compliance, and from that compliance draw multiple political and economic advantages not available to those who are less powerful Tilly (1992, 70). However, as noted by Kalyvas, Shapiro and Masoud (2008), violence is not only used by those trying to dominate but also by those who want to overthrow the existing order. The violent confrontations between organized criminals and government authorities, as well as between rival criminal groups fighting each other, thus reflect the efforts of different actors using force for maintaining or contesting the existing order. By focusing on organized criminal violence, this research addresses central concerns of political science on the existence and collapse of order.

1.3 Key Conceptual Definitions

To guide the rest of this study, this section discusses the main conceptualizations of organized crime, drug-trafficking organizations and violence used throughout this dissertation.

Organized crime

There is no consensus among scholars about what constitutes a criminal organization. For example, von Lampe (2013) presents a collection of more than 170 theoretical, legal and operational definitions of organized crime. Their nuances are probably as diverse as the authors and their cases of interest. Despite this diversity, there are four elements that often appear as key components of many different conceptualizations of organized crime: (i) organizational structures; (ii) the use of violence or the threat of violence; (iii) the centrality of territorial control and (iv) the economic benefits derived from illicit markets. Following Reuter (2008), I refer to *organized crime* as a set of stable, hierarchically organized groups of criminals with the ability to use violence – or the threat of it – for acquiring or defending control of illegal markets in order to extract economic benefits from them.

According to this definition, criminals are organized according to hierarchical and stable structures. This organizational characteristic distinguishes organized crime from individuals engaging in criminal behavior in a sporadic and isolated way. The term organization implies the cohesion of the group over a period of time. Criminal organizations conduct their illicit endeavors in a sustained manner rather than simply getting together to commit a few crimes and then disbanding. Organizational characteristics also imply the implementation of structures and mechanisms favoring the resolution of collective action dilemmas, thus allowing criminals to achieve shared economic interests. The solution of collective action may include mechanisms of selective incentives, monitoring, and sanctions to prevent free-riding or defection. Organizations also imply a certain degree of specialization in which different members or groups within the organization have the means and skills to conduct an array of specific activities. One basic distinction is between members specialized in productive activities and others specialized in coercion. This differentiation is often referred as “bread or bullets” in the literature on the economics of crime (Skaperdas and Syropoulos, 1995) and political violence (Bates, Greif and Singh, 2002). Having spe-

cialists in violence is crucial for criminal organizations because, as noted by Reuter (1989), criminals do not have the legal and institutional protection to enforce their agreements that licit markets have. Therefore, the only way to enforce contracts is through a group of members that can use – or threaten to use – violence.

The hierarchical characteristic is also a distinguishing feature of organized crime. Criminal organizations are often led by an individual or small group of leaders who acquire decision-level positions due to their family ties, strategic skills, violent reputation, ethnic base or a combination of any of these factors.² The hierarchical structure allows leaders to impose centralized control over the members of the organization with the objective of coordinating and monitoring their productive or coercive activities. The definition also requires these hierarchical to be stable over time and not the result of ephemeral opportunities.

Due to their hierarchical structure and organizational complexity, large criminal groups such as drug-trafficking organizations can be distinguished from gangs operating at street level. The behavior of gangs can be similar to the behavior displayed by large criminal organizations. Gang members may engage in some or any of drug trafficking, racketeering, kidnapping, crime, extortion, or violence against government authorities and rival gangs. However, gangs tend to operate in smaller geographic

²It is hard to describe a stereotypical structure of a criminal group. For example, consider the organizational characteristics of the Chinese, Colombian, Italian and Japanese criminal organizations presented by Mandel (2011). The Chinese mafia is composed of seven major groups divided along ethnic lines: the Sun Yee On, the Wo Group, the 14K, the Luen, the Big Circle Gang, the United Bamboo, and the Four Seas Gang. These groups were characterized by a tight hierarchy and rigid structure, but in recent decades have adopted a more flexible cellular organization. In Colombia, the Medellín and Cali cartels were the two most prominent drug-trafficking organizations that emerged in the 1970s. Pablo Escobar was the head of the Medellín cartel and the Rodríguez Orejuela brothers led the Cali organization. After their leaders were captured and killed in the mid-1990s, these large organizations eroded into smaller cells. Eventually, the Norte del Valle cartel emerged as a confederation of drug-trafficking families. The Italian Mafia is composed of three loosely connected groups known as the Camorra (in Naples), la Cosa Nostra (in Sicily) and the 'Ndrangheta (in Calabria). The Italian Mafia is structured around family and loyalty ties and operates with long-rooted cultural codes of morality and behavior. A final example, the Japanese Yakuza is composed of three large organizations: the Yamaguchi-gumi, the Ingawaka-kai, and the Sumiyoshi-kai. The Yakuza are notorious for their strict hierarchy and rigid codes of conduct regulating justice and duty.

areas than large criminal organizations and the menu of criminal activities and internal areas of specialization are more limited in gangs than in large criminal groups. Another central difference is that gangs do not seem to follow the command of a centralized authority. Instead, they operate in a horizontal and decentralized manner in small cells with fluid leadership.

Drug trafficking organizations

Organized criminals engage in a wide variety of activities ranging from production and trafficking of illegal drugs, human and arms smuggling, bookmaking, money laundering, extortion, and more. This research focuses on *drug trafficking organizations* (DTOs), a type of criminal organization primarily focused on growing, manufacturing, transporting, distributing and marketing substances which are subject to drug prohibition laws (United Nations Office on Drugs and Crime, 2013a). The main focus of DTOs on drug-trafficking activities does not exclude other illegal activities such as extortion, money laundering, kidnapping, or weapons smuggling. However, these activities are considered secondary as they are undertaken to facilitate, reinforce or complement drug-trafficking.

Due to the variety of activities associated with markets of illicit substances, drug-trafficking organizations tend to have large structures comprising different groups specializing in different aspects of the production chain of illicit drugs. Drug-trafficking organizations also tend to have a sector specialized in money laundering. In addition, these organizations generally have a strong security apparatus for protecting valuables at the various stages of the production process and for enforcing agreements. Due to the global characteristics of drug markets, drug-trafficking organizations also tend to extend their operations internationally by bridging drug-producing regions and drug-consuming regions.

In this research, the terms organized crime, criminal organizations, criminal groups, DTOs, and drug cartels are used indistinctively for referring to drug-trafficking organizations.

Violence

As mentioned above, one of the key characteristics of criminal organizations is their ability to use violence, or the threat of using it, in order to secure access to the economic benefits of illicit markets. Due to the centrality of violence, it is important to offer a definition of violent behavior. Following Kalyvas (2006), *violence* refers to the deliberate infliction of physical harm on people or damage on their property that can be inflicted for either tactical reasons – to eliminate a specific target – or strategic motivations – to prevent a certain behavior. In this sense, violence is defined from a rationalist perspective and is the result of strategic calculations by those perpetrating acts of violence.

The rationalist approach is certainly a minimalist point of view that does not consider the mental and physical stress related to killing and learning to kill as discussed by Grossman (1995). Nevertheless, the analytical leverage of analyzing violence from a strategic perspective is used for understanding the strategic interactions of conflict rather than explaining violence as the product of psychological disturbances or deviant behavior.³

This study utilizes broad definition of *drug-related violence* as the violence perpetrated either by drug-trafficking organizations or the state's security personnel when conducting anti-criminal activities. The general category of drug-related violence is further disaggregated into three distinct types of violence classified by the dynamic interactions between different actors. First, *enforcement* refers to the coercive actions conducted by the state against drug-trafficking organizations in an attempt to enforce the law. Government authorities have a broad menu of security tactics for

³For an excellent review of psychological explanations of violence see Gurr (1968).

fighting crime which includes the use of *violent enforcement* – referring to the use of lethal force against criminals – and *non-violent enforcement* – referring to arrests and seizure of criminal properties and goods. The second type of violence is *retaliation*, which includes the deliberate use of violence by members of drug-trafficking organizations against state security forces or government authorities. Finally, *competition* refers to acts of violence perpetrated by members of a criminal organization against rival criminal groups.

Returning to the analytical framework illustrated in Figure 1.1, law enforcement refers to violence in which state authorities have primarily political motivations to fight criminals in an attempt to change the status quo that allows those criminal groups to exist. Retaliation refers to violence perpetrated by criminal organizations against the state in an effort to preserve the power structures that enable them to extract economic benefits from illicit markets. Competition refers to violent interaction between rival criminal organizations fighting to preserve or change the status quo that generates more favorable economic conditions for some criminal groups over their competitors.

Finally, this research considers *large-scale drug violence* as the aggregated processes of violence caused by a systematic series of struggles between the state and drug-trafficking organizations, as well as between rival criminal groups. With respect to the state, this definition of violence implies the deployment of the armed forces for fighting criminal organizations and for conducting policing activities. For organized criminals, it implies the groups of heavily armed men conducting sustained campaigns of violence against government authorities and state security forces or against members of rival criminal organizations.

1.4 The Road Map

As aptly pointed out by Escalante Gonzalbo (2012), most of what we know, or think we know, about drug trafficking and organized criminal violence is often a jumble of stereotypes, fears, folklore, scattered facts, social reconstruction and abysmal ignorance. Categorical statements are usually informed by loaded ideological stands or laden with stigma. The secret and clandestine character of organized criminal activities make evidence elusive and increase the difficulty of analyzing it systematically. In consequence, it is hard to confirm or discard theoretical efforts. In addition, some of those who have ventured in the criminal underworld with investigative impetus found that the lethality of organized criminals is not simply a myth. Our “common wisdom” about organized criminal violence is rarely based on theoretical foundations, sound evidence or rigorous empirical analysis. This project seeks to contribute to correcting this state of affairs.

The research begins by laying out the theoretical foundations for the rest of the study. Chapter 2 presents a game theoretic model to understand the onset, escalation and geographic concentration and distribution of organized criminal violence. Based on a set of explicit assumptions and basic propositions, the model helps identify the conditions under which the various actors are likely to engage in violence. The general argument is that democratization erodes the peaceful configurations between the state and criminals and motivates politicians to fight crime, thus triggering a wave of violence between the state and organized criminals and between rival criminal groups fighting to control valuable territories. The micro-level predictions indicate that state action has a non-neutral effect among criminals: by weakening one criminal group through law enforcement, the state indirectly motivates a rival criminal organization to invade the weakened group. The analytical framework is used for generating a set of hypotheses about the micro-mechanisms inherent to drug-related violence.

These empirical implications are subject to scrutiny in the empirical chapters of this dissertation.

In order to test the empirical implications of a formal model emphasizing theoretical disaggregation, it is necessary to rely on fine-grained evidence reflecting the dynamic interactions among the different actors required by the theory. Chapter 3 presents the strategy for generating data that meets the standards of the theoretical explanation. This chapter describes the features and capabilities of Eventus ID, the software developed as part of this research to code event data from text sources in Spanish. After locating this data generation strategy within a broader family conflict databases, the chapter evaluates the strengths and shortcomings of computerized and manual annotation strategies. The chapter then discusses the massive data-gathering strategy that was used to collect thousands of news reports from 105 different information sources at the national and local level. For the sake of transparency, the discussion makes explicit the coding rules used in this research. Finally, the chapter discusses in detail the technological innovations that enable the software to cope with the challenges of Spanish grammar and complexities of geo-referencing event data.

Chapter 4 presents the database of event data on drug-related violence generated by the automated coding protocol. This chapter first discusses the conceptual and methodological limitations of extant databases of homicides in Mexico. Instead of taking a body-count approach, this research relies on an event data approach, which provides more detailed information on who did what to whom, when and where. This chapter discusses the characteristics of the data and describes the main trends of violence at the national, state and municipal level using different units of temporal aggregation. The “bulk” of violence is disentangled into its different components and the temporal and spatial variation of violent competition between rival criminal organizations: violent retaliation perpetrated by criminals against government authorities; violent law enforcement tactics used by the state to fight criminal or-

ganizations; and a broad menu of and non-violent law enforcement tactics including arrests, confiscation of criminal assets, drug interdiction and seizures of weapons. The data base thus comprises fine-grained information of different manifestations of violence perpetrated by different actors. The data covers all municipalities of Mexico on a daily basis from January 1, 2000, to December 31, 2010; a massive time-series cross-sectional array of more than 9.8 million observations.

Chapter 5 analyzes the onset of the Mexican war on drugs by tracing the historical process that led to the emergence, consolidation, and collapse of order. The analytical narrative presented in this chapter is based on a set of explicit assumptions presented in the theoretical model to explain how democratization undermines peaceful agreements between government authorities and criminal organizations and motivates politicians to fight crime. This chapter tells how political order emerged after the Mexican revolution with the formation of the PRI as a political agreement to peacefully regulate access to power. The pact granted relative autonomy to local leaders on the periphery, who benefited from the economic opportunities created by Prohibition in the U.S. The second section analyzes the consolidation of order during the period of political hegemony imposed by the PRI. Although corruption and selective enforcement served to maintain order among criminal organizations, the primary instrument used by the PRI to instill and impose order was a hierarchical, centralized system of political incentives aligned with the overall government, and party structures characteristic of the authoritarian regime. Finally, the third section analyzes how the process of democratization eroded the feasibility of establishing corrupt agreements. By increasing the number of political parties and favoring the effective circulation of political elites, democracy subverted the system of political incentives that allowed order and discipline to be imposed on criminal organizations. In addition, increased political competition generated incentives for political actors to enforce the law in an effort to gain popular support.

Chapter 6 provides the main quantitative assessment of the expectations derived from the theoretical model. The quantitative analysis is based on a careful examination of the hypotheses about the escalation and geographic concentration and distribution of violence among rival criminal organizations. The central dependent variable of this section is the quantity of violent competition among criminal organizations. The first section of the chapter estimates the analytical leverage of extant explanations based on macro-structural factors. The analysis reveals their limited explanatory power for understanding the broad and rapid variation in violent competition among criminals at the micro-level. The second section evaluates the main hypotheses derived from the theoretical model. To do so, the analysis builds on the set of structural explanations and incorporates an interactive approach to account for the effect of law enforcement on violence among criminal groups. This perspective reflects the conflict interactions between the state and criminal organizations specified in the theoretical framework, thus receiving the name of “interactive approach.” To overcome the challenges of endogeneity generated by distinct but overlapping types of violence, the identification strategy uses an instrumental variables (IV) method. This approach permits reliable estimates to be made of the effect of law enforcement on violence between criminals, while avoiding the problem of reciprocal causation. The research design uses measures of democratization and political strain as instrumental variables to generate plausibly exogenous variation in the levels of law enforcement, which then has an effect on levels of violent competition between criminals. This quasi-experimental research design not only represents a plausible identification strategy, but also conforms to the process of conflict specified by the theoretical framework, thus enabling a the ontology of the theory and the methodology used for testing it to be aligned. The results indicate that democratization and political strain increase law enforcement, which then has a profound disrupting effect and triggers waves of violent competition among rival criminal groups. These

results are consistent across the different model specifications evaluating the effect of violent and non-violent tactics on the levels of violence among criminals. The statistical analysis also reveals that criminal violence tends to cluster around strategic territories favorable for the reception, production and international distribution of illicit drugs.

Chapter 7 evaluates the dynamic interactions between law enforcement, criminal retaliation, and violent competition among criminal groups. The empirical analysis uses various time-series analysis strategies that allow the temporal inertia of each type of violence and its interaction with other forces of violence to be incorporated. The research design uses vector autoregressive (VAR) models and impulse response functions (IRF) to assess how changes in one process of violence affect the dynamic behavior of other processes of violence. These estimation techniques allow the magnitude and the duration of dynamic effects to be estimated. The results reveal that increasing the levels of law enforcement generates a massive escalation of violence among criminal groups and a substantial increase in criminal retaliation against the state. In addition, the dynamic analysis indicates that intensifying the levels of violent competition among criminals has a modest effect of increasing law enforcement. The results show that direct attacks perpetrated by criminals against government authorities, do however, generate more marked reactions from the state.

Finally, Chapter 8 concludes with a general discussion of the findings of this research and suggests future areas of development.

CHAPTER 2

AN INTEGRATIVE THEORY

OF ORGANIZED CRIMINAL VIOLENCE

2.1 Introduction

This research studies the dynamics of the ongoing wave of drug violence in Mexico by addressing three key questions. Why do politicians decide to fight criminal organizations after having peacefully coexisted with them for several decades? Once the conflict starts, why has drug-related violence escalated so rapidly? And lastly, why is violence more concentrated in some areas than in others? In contrast to unidirectional accounts of conflict primarily emphasizing the role of structural factors, I advance a dynamic and interactive explanation of violence driven by territorial competition. This chapter presents a formal model offering an integrative explanation for the onset, escalation and concentration of organized criminal violence. Based on a set of explicit assumptions and basic propositions, the general argument holds that democratization erodes the peaceful configurations between the state and criminals and motivates politicians to fight crime, thus triggering a wave of violence between

the state and organized criminals and among rival criminal groups, which tends to concentrate around valuable territories.

To explain the onset of the war on drugs, the theoretical model claims that democratization disrupts the peaceful configurations that enable coexistence between corrupt government authorities and criminal organizations in contexts of low democratic development. Increased democratization thus alters the system of political incentives for enforcing the law, motivating government authorities to fight crime. In addition, the model argues that government authorities obtain political benefits from implementing harsh security policies when their legitimacy is threatened by periods of political strain.

To explain the escalation of violence, the theory applies a contest success model for territorial competition. According to the model, increased levels of law enforcement are likely to trigger an escalation of conflict between the state and criminal organizations, and violence among rival criminal groups. In this way, the action of the state has a disruptive effect on the relative military balance of criminal organizations. Law enforcement weakens the capability of a criminal group to protect its territory, thus motivating an invasion from a competing criminal group that now faces a weaker rival. The equilibrium conditions of the model indicate that violence committed by criminal organizations is a function of the severity of military damage, their capability of recovering from it, and the value of the territory. As the elaboration of the model will show, the equilibrium implies that organized criminals are likely to use violence if the net military strength recovered through fighting back after being attacked is larger than the cost of fighting, given the value of a territory.

Finally, to explain the geographic distribution and concentration of violence, the model explicitly incorporates territorial value as a key determinant of conflict. According to the model, criminal organizations are willing to engage in violent confrontations to capture or defend valuable territory.

This chapter is divided into four sections. The first part surveys the literature on conflict research, criminology, and economics to assess a broad set of alternative explanations. The second section presents the theoretical model proposed in this research to explain the onset, escalation and concentration of large-scale organized criminal violence. The third section derives a set of observable implications based on the analytical leverage of the formal model; these implications are tested in the empirical chapters of this study. Finally, the conclusion summarizes the characteristics of the model and discusses its theoretical contributions.

2.2 A Fragmented Set of Alternative Explanations

This research draws on different bodies of literature including criminology, economics, and political violence to evaluate various arguments that seek to explain the dynamics of drug-related violence. Extant explanations of criminal violence can be classified into four main groups: economic benefits, sanctions against crime, social propensity and political factors. Table 2.1 compares these four types of explanations. Although some of them provide valuable insights, these explanations have two main limitations. First, extant theories offer a set of fragmented propositions of isolated aspects of criminal violence and there is no encompassing theory seeking to provide a comprehensive account of the onset, escalation and geographic concentration of criminal violence. The second shortcoming is that most of these explanations emphasize the importance of large-structural factors or processes that do not account for the rapid variations in violence across time and space nor the dynamic interactions among different actors. In consequence, these structural accounts leave a substantial amount of variation unexplained.

The theoretical model advanced in this research addresses the limitations of these approaches by offering two main contributions. First, the theory disaggregates dif-

TABLE 2.1

ALTERNATIVE EXPLANATIONS

Type	Concept	Expected effect on criminal violence
Benefits	Poverty	Increase
	Drug markets	
	Territorial value	
Sanctions	Law enforcement	Decrease
	State repression	
Propensity	Social structure	Increase
Political	Corruption and protection	Decrease
	Coercive reaction	

ferent mechanisms to explain the onset, escalation and diffusion of violence, and integrates them into a unifying analytical framework. Second, the theoretical model outlines a set of micro-mechanisms for the dynamic interactions of violence between the various actors and integrates these rapidly changing actions and reactions within larger structural factors. In this way, the theoretical explanation brings together structural and dynamic mechanisms of conflict. The remainder of this section outlines the explanations offered by other authors and evaluates their theoretical and empirical strengths and limitations.

Economic benefits Explanations focused on economic benefits refer to elements that increase the economic utility derived from engaging in violent criminal activities. These arguments emphasize the role of three central factors: poverty, the high value of drug markets, and the availability of natural resources. Poverty is one of the most common arguments invoked to explain criminal and violent behavior. Since poverty is a multidimensional factor, numerous disciplines have analyzed its relationship with crime and violence from diverse perspectives. Some authors argue that the benefits of

engaging in criminal behavior depend on the level of poverty. This approach claims that individuals living in lower economic strata derive relatively larger economic benefits from engaging in criminal activities than individuals with higher levels of income. From a sociological perspective, (Merton, 1938, 1957) proposed a seminal theory of social anomie arguing that crime is the product of a gap between the set of economic aspirations and the possibility of realizing them through licit means.¹ However, critics of this theory argue that societies do not have a set of homogeneous values equally shared across the population Miller (1958) and that social anomie does not explain why some individuals conform to the rules of society despite living in harsh economic conditions Hirschi (1969). Despite the theoretical shortcomings of sociological explanations linking poverty and crime, economists have identified a positive correlation between high levels of poverty and income inequality with high levels of criminal violence (Fajnzylber, Lederman and Loayza, 2000*a*, 2002*a,b*).

Conflict scholars in political science have also identified a strong association between poverty and political violence, but they offer at least two different mechanisms to explain this relationship. As mentioned before, Collier and Hoeffler (2004); Grossman (1999) argue that members of armed groups are largely characterised as loot-seeking actors using violence to appropriate sources of income. This being so, poverty intensifies motivations of greed and increases the propensity to use violence as a way to obtain personal economic benefits. An alternative explanation argues that poverty is indicative of state weakness. Rebels can easily prey on weak states because the latter usually lack the institutional capability, economic resources, and military strength to successfully control insurgents (Fearon, 2005; Fearon and Laitin, 2003; Herbst, 2004). Although explanations based on greed and state weakness provide

¹According to this theory, society homogeneously imposes a set of aspirations to economic well-being on all its members, yet the legitimate means of realizing such goals are not evenly distributed. If the social structure is not capable of allowing its members to achieve their economic aspirations, individual frustration motivates them to use illicit ways to fulfill their aspirations.

valuable analytical leverage, their applicability to an understanding of the Mexican war on drugs may be limited for two empirical reasons. First, Mexico is a middle income country with an annual per capita income of \$15,150 dollars (The World Bank, 2010), thus located well above the low levels of economic development associated with higher risks of intra-state violence. More importantly, even when considering the subnational variation of violence and poverty in Mexico, the relationship does not hold. States in the south and south-east of the country report the highest levels of poverty, illiteracy, malnutrition and lack of infrastructure, yet they have substantially lower levels of violence than the wealthy industrialized states in the north of the country.

Economists specializing in the study of organized crime argue that there is a strong relationship between the value of drug markets and the use of criminal violence (Kilmer et al., 2010; Levitt and Dubner, 2005; Reuter, 2008, 2009). According to this perspective, the high price of illicit drugs promises substantial economic benefits to those engaging in drug trafficking and motivates criminals to use violence for capturing those rents. The importance of illicit drugs fits within a broader consensus among scholars about the economic salience of illicit markets for explaining criminal activity (Gambetta, 1993; Guerrero, 2009*b*; Maltz, 1976; National Advisory Committee on Criminal Justice Standards and Goals, 1976; Reuter, 1989; Schelling, 1967*a*, 1971; Volkov, 2002) and is consistent with the argument of greed commonly used in civil war research. Based on this approach, it could be expected that increased drug prices are associated with higher levels of drug violence. However, according to the Office of National Drug Control Policy (2004), the prices of almost all drugs have been systematically declining during the past three decades. For example, the average price of a gram of pure cocaine powder in the United States dropped about 70 percent in the 1980s, then experienced an additional decline of 30–40 percent in the 1990s and a further reduction of 12–21 percent in the 2000s. Other drugs show

similar downwards trends. If the positive association between drug prices and criminal violence were true, we would expect lower levels of violence as drug prices decline. Nevertheless, in spite of the continued drop in drug prices, violence has recently escalated in Mexico. In consequence, there are reasons to be skeptical about a positive relationship between drug prices and violence.

Research on political violence has identified the relevance of natural resources to explanations of domestic conflict. Several studies on civil wars show that the production of oil, diamonds, minerals or other primary commodities is strongly associated with the risk of intra-state violence (Dunning and Wirpsa, 2004; Fearon, 2005; Humphreys, 2005; Ross, 2006; Snyder and Bhavnani, 2005). There are two mechanisms linking the availability of valuable commodities with conflict. Rent-seeking insurgents may use violence to seize control of sources of income (Collier and Hoeffler, 2004). In addition, rebels may use natural resources as valuable sources of funding that enable them to sustain prolonged campaigns of violence (Fearon, 2004). It is not only important to determine whether a country has natural resources or not, but also where those resources are located within the country. Research on the sub-national determinants of conflict find that the spatial variation of violence is largely influenced by geographic characteristics, including the spatial distribution of natural resources (Buhaug and Ketil Rod, 2006; Buhaug, Gates and Lujala, 2009). In consequence, the strategic value of particular regions is crucial for understanding the spatial distribution of violence.

The importance of territorial value is not only recognized by conflict researchers but has also been identified by organized crime scholars (Gambetta, 1993; Reuter, 2009; Schelling, 1971; Varese, 2013; Volkov, 2002). The boundaries of criminal territories, like any other property rights in illicit markets, are not protected by legal institutions or processes of conflict resolution. Therefore, criminals rely on violence or the threat of violence to protect the borders of their territory, and tend to allocate

more resources and effort to protecting the more valuable territories (Reuter, 1989). Of course, the menu of illicit activities is very broad, and not all illegal sectors rely equally on the importance of territorial value.² Among illicit activities, drug markets are particularly sensitive to the importance of territorial control. Effective control over specific areas is crucial for a wide range of drug-related activities such as cultivation of land for illicit crops, securing transportation routes or controlling street corners for retail sales.

In this sense, studies from political violence and organized crime address the the relevance of strategic territories as a valuable insight for understanding the structural determinants of organized criminal violence. However, the strategic location of some areas or the economic value associated with them are large structural factors that do not change over time (e.g. their geographic position) or if they change, they usually do so slowly and gradually (e.g. growing illicit crops). In consequence, they have limited explanatory power to account for rapidly changing actions and reactions of actors involved in violent conflicts. In any case, valuable territories can serve as containers of several micro-mechanisms of conflict concentrated around the specific characteristics that make them valuable.

Sanctions against crime and violence

The second group of explanations refers to societal and government actions aimed at inhibiting criminal and violent behavior by increasing the cost associated with engaging in this type of activities. According to Becker (1968), criminal behavior can be explained from an economic point of view by a cost–benefit analysis. Criminals assess the net benefit derived from committing a crime and the costs associated with

²For example, Schelling (1967*b*, 1971) argues that criminal activities such as gambling do not depend much on controlling a territory because illicit transactions can happen anywhere at any time. In contrast, other activities such as racketeering or drug distribution are highly territorial. In those markets, criminals do not want competition because allowing rivals to extract rents would reduce their own income. In consequence, criminals in protection and drug markets will try to monopolize the territorial control of those markets.

it. If the benefits outweigh the costs, then they are more likely to commit the crime; but if the costs are larger than the benefits, then it is less likely that they will engage in the behavior. This point of view is compatible with the theory of social control promoted by (Hirschi, 1969) and further developed by (Kornhauser, 1978). This account argues that societies play a central role in imposing sanctions (control) and instilling internalized codes of conduct (self-control) that reduce the propensity for criminal behavior. If formal or informal measures of control fail, then higher rates of crime are likely. In addition to society, government authorities count on the criminal justice system to enforce the law. States have police forces, prosecutors, judges, courts, correctional institutions, and laws to control and sanction criminal behavior. The traditional approach to fighting crime promotes the deployment of punitive actions under the expectation that increased probability and severity of sanctions will inhibit criminal behavior through deterrence, incapacitation, rehabilitation, imprisonment, and moral education (Tonry, 2009). Unfortunately, empirical research on the effectiveness of law enforcement is inconclusive and often plagued by anecdotal evidence lacking systematic scrutiny. For example, some studies show that incarceration is effective in reducing crime rates (Levitt, 1996; Marvell and Moody, 1994) while others argue that imprisonment is not an effective policy for reducing crime because some criminals such as drug traffickers and gang members are quickly replaced (Nagin, 1998).

Political scientists have also devoted considerable attention to studying why and how political authorities use coercive power domestically against potential and existing challengers (Davenport, 2007). According to Goldstein (1978), repression involves the threat or actual use of physical harm, instrumented by the state coercive apparatus within its territorial jurisdiction against individuals or organizations, for the purpose of imposing a cost on the target, as well as deterring specific activities and/or beliefs perceived to be challenging to government personnel, practices or institutions.

Early research on state repression understood government coercion as a behavior influenced by systemic factors such as the level of economic development or political characteristics (Dallin and Breslauer, 1970). Later work explained repression as a pathological predisposition of specific leaders who were unable or unwilling to rule by non-coercive means (Walker, 1969). The current theoretical paradigm explains state repression as a rational decision-making process based on cost–benefit calculations (Davenport, Johnston and Mueller, 2005; Duvall and Stohl, 1988; Gartner and Regan, 1996; Hoover and Kowalewski, 1992; Lichbach, 1984; Moore, 2000; Simon, 2008). According to this approach, if the expected benefits from successfully using coercive actions against potential or existing challengers outweigh the costs of using such tactics, then state repression is likely. In contrast, if the costs of coercion are larger than the potential benefits, government authorities may prefer less costly alternatives. Empirical analyses of the effectiveness of state repression in inhibiting or suppressing challengers show mixed results. Some authors argue that government repression is capable of deterring violent behavior by dissident organizations (Luttwak, 1999; Petraeus, 2006; Tilly, 1978; Wagner, 1993). Others argue that the use of force by the state’s coercive apparatus intensifies hostilities perpetrated by dissidents against government authorities (Gurr, 1970; Hibbs, 1973). As mentioned by Davenport (2007) and Lichbach (1987), there is no conclusive evidence nor prevailing theoretical explanation on whether state repression leads to the escalation or deterrence of contentious behavior by dissidents.

Social structure and the propensity for criminal behavior

The third block of explanations refers to social factors increasing the propensity for criminal violence. One of these explanations invokes the relevance of changes in traditional family structures. According to Hirschi (1969), families perform the function of instilling a sense of self-control in their members, thus reducing the propensity to engage in criminal or aggressive behavior. On a similar note, Sampson, Laub and

Wimer (2006) argue that marriage defines responsibilities between spouses and develops the sense of mutual support and self-discipline, which in turn reduces the propensity for engaging in criminal activities. In consequence, divorce dismantles the traditional family structure and disrupts these behavioral patterns, thus increasing the risk of criminal behavior. Following this argument, empirical studies have found that increasing divorce rates are associated with higher crime incidence (Cáceres-Delpiano and Giolito, 2008) and monoparental families increase the propensity for criminal behavior (Comanor and Phillips, 2002), especially in female-headed households (Glaeser and Sacerdote, 1999).

Research on criminology has also identified that adolescent motherhood increases the incidence of crime. For example, Nagin, Pogarsky and Farrington (1997) argue that children from adolescent mothers have higher propensity for engaging in criminal activities. However, in contrast to the theory of self-control proposed by Hirschi (1969), this propensity is not due to the lack of mother's emotional maturity nor to a dysfunctional family environment but to the lack of financial resources. According to this perspective, adolescent mothers are not fully incorporated into the labor force and often lack economic support from their partner or extended family. Following this argument, the relationship between adolescent motherhood and crime is not caused by deficient socialization within the family but by adverse economic conditions. As a counterexample to the positive association between adolescent motherhood and higher crime rates, Donohue and Levitt (2001) argue that legal reforms decriminalizing abortion are a crucial factor to explain the decline of crime rates in the United States. According to these authors, access to abortion allows women to postpone the age of motherhood until they consider their economic conditions are appropriate for having children.

Political scientists have also identified a relationship between sociological factors and criminal behavior. In his seminal work, Putnam (1993) defined social capital

as the features of social organization such as trust, norms, and networks that can improve the efficiency of society by facilitating coordinated actions. Subsequently, he found that crime rates in the United States began to rise sharply at about the time that social capital began a downturn (Putnam, 2000). The inverse relationship between social capital and crime has been broadly confirmed in several developed countries such as Finland (Salmi and Kivivuori, 2006), the Netherlands (Akçomak and ter Weel, 2008), Italy (Buonanno, Montolio and Vanin, 2009), and in developing countries including Mexico (Paras, 2007). In addition, Mexican government authorities largely relied on the argument of the deteriorating social fabric to justify the crusade against drugs (Presidencia de la República, 2012). However, when analyzing the relationship between specific indicators of social capital (including trust, religiosity, membership and participation rate in organizations) and crime across several countries, Lederman, Loayza and Menendez (2002) find that the association only holds for the indicator of trust, but is absent for the other measures. Moreover, (Glaeser, Sacerdote and Scheinkman, 1996) argue that increasing social interaction may lead to higher rates of crime. One possible causal mechanism suggests that denser social interaction may also include “perverse social capital,” understood as the networks, contacts, power relations and informal norms of behavior that reward and motivate rent-seeking or criminal behavior (Rubio, 1997).

Political determinants

According to Davenport (2007), one of the most long-standing and stable findings in the literature on political repression is that government authorities generally respond with some form of repressive action to behavior deemed to be a threat to the political or economic system. The consistency of this effect is known as the “law of coercive responsiveness.” State repression is generally observed as a reaction against challengers trying to subvert the political or economic status quo. Repressive action invariably occurs in contexts of civil wars, insurgencies, revolutions or protest move-

ments. However, there are several reasons why the applicability of this argument is limited for understanding aspects of large-scale organized criminal violence. First, the law of coercive responsiveness assumes that government authorities invariably repress challengers. However, in the Mexican case, as in many other scenarios, criminal organizations have the economic power to corrupt the state in order to deter or prevent it from using repression against them. These corrupt agreements allowed the peaceful coexistence of criminal organizations and the state for several decades. Second, criminal organizations are capable of neutralizing the law of coercive responsiveness not only because they have the economic means to co-opt government authorities but also, and perhaps most importantly, because criminals do not usually represent a political threat to the state. As mentioned in Section 1.2, criminal organizations function like firms primarily motivated by economic goals. They are not politically motivated to overthrow the state and impose a new regime aligned with their ideological preferences. In consequence, they might be considered not to be a threat to the political status quo, especially if they do not use violence against the state or against other groups. Third, once criminal organizations resort to violent means, the law of coercive responsiveness says that the state will react by employing repressive actions to counter or eliminate the threat. However, this interaction becomes highly endogenous as the state reacts in response to the violent threat of criminal groups.

Another political factor often associated with criminal violence refers to high levels of corruption. Dozens of authors have analyzed the relationship between corruption and drug violence in Mexico from a variety of approaches including history (Andreas, 1998; Astorga, 2005, 2010), journalism (Campbell, 2009; Osorno, 2009; Ravelo, 2007*a*, 2009) and political science (Bailey and Taylor, 2009; Bailey and Godson, 2000; Garay Salamanca and Salcedo-Albarán, 2012; Lessing, 2012; Morris, 2012, 2013; Snyder, 2006; Snyder and Duran-Martinez, 2009). However, the direction of the relationship is not clear. Most authors argue that criminal organizations use corruption as a

way to prevent law enforcement against them, thus suggesting that high levels of corruption are associated with low levels of enforcement and violence among criminal groups. In contrast, others argue that corruption is associated with weak states that allow criminal organizations to conduct their illegal activities using high levels of violence without incurring sanctions.

The debate linking corruption and violence is not only about the direction of the relationship, but also about who is the agent and who is the principal in this exchange. On one hand, Lupsha (1995) argues that the Mexican case is characterized by an “elite-exploitation model” in which politicians manipulate and exploit criminal organizations, which serve as “cash cows” that provide funding and illicit enrichment for the political elite. On the other hand, Lessing (2012) argues that criminals have the upper hand with respect to government authorities as they use violence to intimidate law enforcers and lower the price of bribes, exemplified by the infamous law of “*plata o plomo*” (silver or lead). In addition, Kenny and Serrano (2012a) argue that both models are right, but they correspond to different stages of Mexican history. During the period of PRI hegemony, the relationship between political elites and DTOs was characterized by criminal subordination to the state, but the power relationship inverted as the PRI’s dominance eroded. In any case, there is no theoretical agreement nor homogeneous empirical results regarding the relationship between corruption and violence.

Conflict scholars have also analyzed the link between democratization and political violence. Several studies argue that semi-democracies are more prone to civil war than either stable democratic or authoritarian regimes (Ellingsen and Gleditsch, 1997; Hegre et al., 2001). However, not only is the level of democracy important for assessing the risk of conflict, but the rate of political change characteristic of democratization processes may also trigger episodes of violence (Cederman, Hug and Krebs, 2010; Hegre et al., 2001; Mansfield and Snyder, 2005; Snyder, 2000). These

explanations, located in a Huntingtonian tradition (1968), generally agree that the failure of political elites to mobilize citizens massively franchised through democratization is likely to generate violent outcomes. However, these arguments are limited for providing an understanding large-scale organized criminal violence, as they fail to consider a key difference between political and criminal violence as discussed in Section 1.2. In political conflict, rebels, motivated by political or economic goals, use violence to *challenge the status quo*. In contrast, criminals do not seek to overthrow state authorities and impose their own government agenda. If criminals exercise violence, they do it in the course of resisting law enforcement that operates against their economic interests. Thus organized criminals use violence for *preserving the status quo* that allows them to extract economic benefits from illegal markets. This distinction makes it difficult to extend the argument of mass political mobilization to an explanation of large-scale organized criminal violence.

Recent research specifically focused on violence in Mexico provides a more illuminating account of the relationship between democratization and violence. Snyder and Duran-Martinez (2009) offer the dominant explanation to account for the increase of drug-related violence in Mexico. These authors propose a theory of *state-sponsored protection rackets* understood as a set of informal institutions through which law enforcers refrain from sanctioning criminal organizations in exchange for benefits. These state-sponsored protection rackets enable peaceful agreement between criminal and government authorities that help maintain low levels of violence. Peace is enforced through the expectation of selective enforcement in which the state will credibly punish criminals who are not capable of refraining from using violence against their rivals. But during the process of democratization in Mexico, the state-sponsored protection agreements collapsed and led to increasing levels of violence. A set of factors such as increasing political competition, anti-corruption reforms, and lack of coordination across levels of government eroded the state's capacity for protecting some criminals

and selectively enforcing the law against their rivals. In consequence, the lack of credible punishment allowed criminal organizations to engage in violent behavior.

Rios (2012*a*) provides a similar argument which states that greater decentralization of formal and informal political institutions increases the propensity of criminal groups to employ violence because criminal organizations are less likely to be punished. She refines the core argument, proposing that under decentralization there are several government agents that can protect criminals within small jurisdictions under their control, but they cannot guarantee protection outside their jurisdiction. If a criminal group protected by one government agent uses violence in the jurisdiction of another government agent, its behavior may go unpunished. In other words, decentralization reduces the likelihood of punishment.

The theory of state-sponsored protection rackets is further developed by Duran-Martinez (2012), who argues that the interaction between the cohesiveness of the state security apparatus and the distribution of drug markets determines the frequency and visibility³ of criminal violence. According to her argument, a shift from monopolistic to competitive drug markets increases the frequency of violence as criminal organizations use force to drive out their competitors. In addition, the transition of the state coercive apparatus from a cohesive to a fragmented condition increases the visibility of violence because fragmented states are less capable of protecting or punishing criminals.

The family of explanations around the concept of state-sponsored protection rackets offers some valuable insights. It is particularly useful for understanding variations in criminal violence caused by the collapse of protection rackets. However, the causal mechanism assumed by this theory is highly problematic. At its core, the theory of state-sponsored protection rackets argues that criminal organizations engage in

³Visibility is defined as the overt display of violence or criminal evidence and claims of responsibility for criminal attacks.

violence because government authorities are not capable of punishing criminal organizations. As the coercive capability of the state decreases, criminal groups face fewer restrictions or sanctions on violence against their rivals. Unfortunately, this depiction of the state as passive and incompetent does not correspond with the ongoing efforts of the Mexican government to fight crime. Empirical evidence shows unprecedented levels of law enforcement, substantial development of security institutions, and the massive deployment of the state coercive apparatus.

As will be discussed in Chapter 4, the punitive strategy launched by the Mexican government to fight criminal organizations is characterized by exceptionally high levels of both violent law enforcement and non-violent tactics such as arrests and seizures of drugs, assets and weapons across the country. The actions of the Mexican state include deployment of the Army and Navy for policing activities, substantial increases in personnel, equipment and intelligence capabilities of the Federal Police, implementation of several joint enforcement operations between federal forces and state and municipal security forces, unprecedented budgetary allocations for security forces at all levels of government, and a set of constitutional reforms to facilitate law enforcement. In consequence, the probability and severity of punishment against criminal organizations has never been so high in Mexico. The proactive and highly aggressive behavior of the state coercive apparatus does not correspond to the depiction of incompetent, passive security forces assumed by the theory of state-sponsored protection rackets. In summary, the central claim of the state-sponsored protection racket theory is based on the assumption that low expectations of punishment against criminal organizations motivates the use of violence. However, this assumption is not fulfilled by the empirical evidence. In consequence, the observed escalation of criminal violence may be caused by a different mechanism than that proposed by this theory.

In contrast to the passive role of the state proposed in the theory of state-sponsored protection rackets, the theoretical explanation advanced in this research emphasizes the proactive role of the state in the fight against crime as a key determinant of variation in the levels of organized criminal violence. The details of the theoretical argument will be discussed in the following section. The effect of law enforcement as a disturbance generating criminal violence has been identified in other recent studies. Various policy analysts, journalists and scholars argue that the punitive anti-crime campaign launched by President Calderón in December 2006 triggered the escalation of drug violence in Mexico (Calderón et al., 2012; Castañeda and Aguilar, 2010; Escalante Gonzalbo, 2011; Escalante Gonzalbo et al., 2011; Guerrero, 2010*a,b*, 2011*b,c*; Merino, 2011). However, with the exception of Dell (2011), most arguments lack a robust theoretical explanation, fail to empirically and systematically assess alternative explanations, and largely ignore problems of selection and endogeneity in their empirical evaluations. Dell's research is perhaps one of the most theoretically and empirically sophisticated studies on drug violence in Mexico. She argues that narrow election victories by the president's political party, the *Partido Acción Nacional* (PAN), at the municipal level are associated with an immediate increase in drug-related violence. Based on an innovative identification strategy, she finds that government crackdowns on drug-trafficking routes followed by close PAN victories diverted criminal activities to neighboring municipalities, thus generating a spillover effect and increasing the levels of drug violence in these municipalities.

Despite its valuable contributions, Dell's study has some limitations. The disposition to enforce the law is exogenous to the model: there is no discussion about the political determinants that generated the demise of state-sponsored protection rackets nor about the incentives for government authorities to enforce the law. Failing to provide a sound explanation for the collapse of the pre-existing order structures misses a central part of the explanation for the escalation of drug-related violence.

This theoretical limitation is also reflected in the empirical analysis, as it fails to assess the relationship between enforcement and violence before Calderón launched the war on drugs in December 2006. The empirical analysis has some further limitations. The measure of law enforcement used by Dell is based on a confidential database of unknown precedence containing data on high-level drug arrests. Besides problems of transparency and validity, focusing exclusively on high-level arrests ignores a broad menu of violent and non-violent security tactics used by law enforcers to fight crime. In addition, as will be discussed in Chapter 4, the use of homicide count as the dependent variable is problematic because it does not provide information about either the perpetrators or the profiles of the victim. This rough dependent variable obscures crucial information about the interactive dynamics of conflict between the state and criminal organizations, as well as among rival criminal groups.

General assessment of the literature

As discussed in this encompassing literature review, the extant accounts provide valuable insights about the economic benefits motivating criminal violence, the implementation of sanctions aiming to suppress crime, the set of societal factors increasing the propensity for delinquent behavior, and a group of political factors containing and triggering criminal violence. Despite their contributions, the extant theories offer only fragmented explanations of isolated aspects of criminal violence. There is no unifying theory attempting to provide an integrated explanation for the onset, escalation, and concentration of large-scale organized criminal violence. Another important limitation of extant accounts is that they rely largely on macro-structural factors to explain the rapid variations in violence. However, these structural factors provide limited analytical leverage for understanding the micro-dynamic and interactive characteristics of violence.

2.3 An Integrative Theory of Organized Crime Violence

The theoretical model advanced in this research provides an integrative framework to explain different yet interrelated aspects of organized criminal violence. The model disentangles the dynamic interactions among different actors operating within structural factors, and integrates these elements into a coherent set of systematic propositions. This analytical framework both disaggregates and integrates to provide an encompassing account for the onset, escalation, and concentration of large-scale criminal violence.

In general, the theoretical model provides an explanation of how democratization disrupts the political conditions that motivate politicians to fight crime, thus triggering an escalation of drug violence between the state and criminal organizations, and conflict among rival criminal groups. At its core, this model is driven by a contest success function in which players compete for territorial control. The analytical leverage of the formal model helps to elucidate how changes in the political structure affect the system of incentives for politicians and motivate law enforcement. According to this account, state action is not neutral: law enforcement has a disruptive effect on the relative military balance of criminal organizations. As government authorities fight crime, law enforcement against a target criminal group weakens the capability of this group to protect its territory and indirectly empowers the relative military position of a rival criminal organization, which may motivate an invasion into the territory of the weakened group. Depending on the strategic value of a territory, criminal organizations may be willing and capable of engaging in sustained territorial struggles against the state or their rivals if they have the capability to recover from the damage created by law enforcement or attacks from rival groups. The model indicates the conditions under which democratization motivates law enforcement and how fighting crime affects the relative military balance among rival

criminal organizations and generates a turf war for controlling valuable territories. Finally, extending the argument of the model reveals that when the state launches a general campaign against all criminal organizations within its territory, it generates a wave of conflict of all against all resembling a Hobbesian state of war.

The explanation of the theoretical model is divided into six sections. The first part presents a set of conceptual definitions of organized crime, drug-trafficking organizations and violence. The players and their actions in the model are then introduced. The third section explains how democratization changes the political incentives for fighting crime. The fourth part illustrates the micro-mechanisms of violence among criminal organizations caused by the disruptive effect of law enforcement. The fifth section presents the payoffs. Finally, the equilibrium conditions for the use of violence are analyzed in the sixth segment.

2.3.1 Players and Actions

The formal model consists of a sequential game of complete information. The model analyzes the interactions between three players: the State (S), the Target DTO (T) and the Challenger DTO (C). The game is played in a sequence of five steps. First, the degree of democracy of the political system is set by Nature (N) along a continuum ranging from low to high levels of democracy (D), where $D \in [0, 1]$. Second, the State chooses to enforce the law against the Target DTO (E) or not to enforce the law ($\sim E$). Third, if the State enforces the law, the Target criminal organization decides whether to retaliate against the State (R) or not ($\sim R$). Fourth, a Challenger criminal group decides whether to invade (I) the Target's territory or not ($\sim I$). Finally, if the Challenger invades, the Target decides whether to fight back (F) against the Challenger or not ($\sim F$).

Figure 2.1 presents the extensive form of the game illustrating the sequence of each player's possible moves at every decision point.

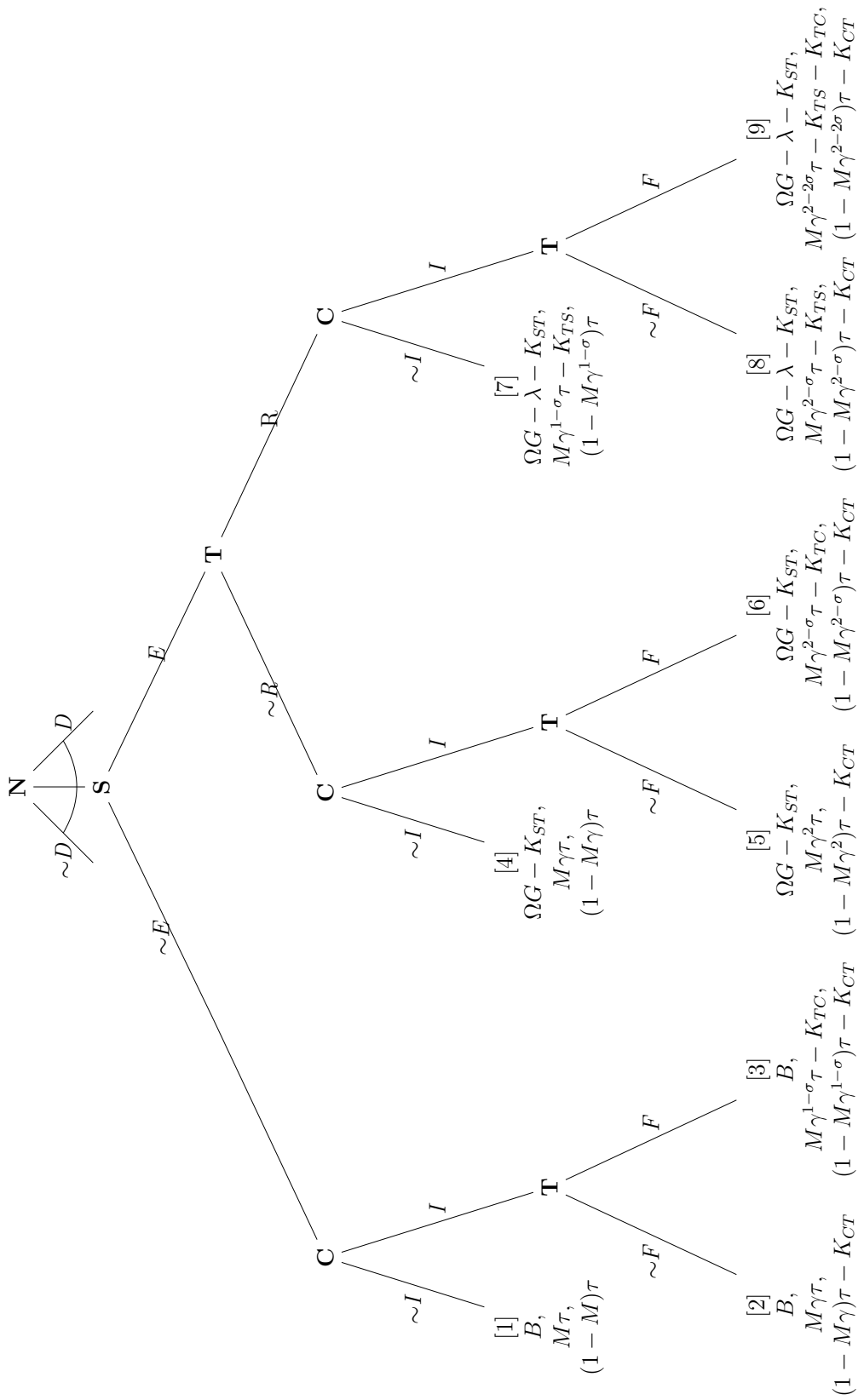


Figure 2.1. The Game of Drug Violence

The model is based on two key assumptions: (i) criminal organizations are primarily motivated by economic benefits, and (ii) before the breakout of hostilities, government authorities and organized criminals coexist in a peaceful arrangement. The scope conditions of this theory are valid at least in those cases where these assumptions hold.

Assumption 1: Criminal organizations as profit maximizers

The model assumes that DTOs primarily behave like profit-maximizing firms oriented towards extracting economic rents from illegal markets. This assumption is broadly supported by the literature on organized crime advanced from criminological (Maltz, 1976; National Advisory Committee, 1976), sociological (Gambetta, 1993; Volkov, 2002), policy (Guerrero, 2009*b*) and economic perspectives (Reuter, 1989; Schelling, 1967*a*, 1971). This assumption also implies that criminal organizations are not mainly driven by political goals. Although DTOs may use violence to resist or inhibit law enforcement, criminal organizations are not ideologically-oriented insurgents aiming to overthrow the government.⁴ In consequence, criminal organizations are not expected to unilaterally initiate an attack against the state.

Assumption 2: Peaceful coexistence in the status quo

The model also assumes that prior to the beginning of a state campaign against crime, government authorities and organized criminals coexist in a peaceful arrangement: the status quo is defined by a non-hostile coexistence between the state and DTOs. According to this perspective, the coexistence of state authorities with criminal organizations capable of committing violence does not mean the various parties

⁴There may be cases in which criminal organizations may seek to seize control over political institutions. For example, the prominent leader of the Medellin drug cartel in Colombia, Pablo Escobar, was elected to the House of Representatives of Colombia's Congress in 1982 (Guillén Jiménez, 2007). In addition, some authors argue that right-wing paramilitaries in Colombia have "captured" state institutions at various levels of government (Garay Salamanca and Salcedo-Albarán, 2012; Garay Salamanca et al., 2008; López, 2010). However, even in those cases, the penetration of criminal organizations into the political scene seeks to inhibit law enforcement or other kinds of policies that may affect or jeopardize criminal opportunities to extract rents from illegal markets. Therefore, their infiltration is mainly motivated by economic reasons, not political or ideological goals.

constantly engage in violent confrontations. Rather, this peaceful coexistence indicates that there is *order*, a set of norms regulating peaceful interaction among different actors. This assumption is similar to what Snyder and Duran-Martinez (2009) call “state-sponsored protection rackets,” in which public officials refrain from enforcing the law in exchange for a share of the profits generated by criminal organizations. The premise of peaceful coexistence diverges from the Weberian assumption that the state has the legitimate monopoly on violence and allows for coexistence of both state authorities and parallel power structures. As stated by O’Donnell (1993) and confirmed by others (Astorga, 2010; Obert, 2011), ineffective states in new democracies often coexist with autonomous, also territorially-based, spheres of power.

As part of the premise of peaceful coexistence between the state and criminal groups, the model also assumes that there are at least two DTOs existing within the state’s territory. By assuming the existence of multiple (at least two) criminal organizations, the model considers the origin of criminal groups as an exogenous process. Other authors have analyzed the historical and political conditions favorable to the emergence of criminal organizations. Anderson (2005) argues that mafias emerge due to the abdication of legitimate government power, excessive bureaucratic power and the potential for illegal markets. Olson (2000) addresses the importance of economic conditions leading to the origins of stationary bandits. Finally, Tilly (1985) and Skaperdas and Syropoulos (1995) draw parallels between the process of state formation and the emergence of criminal organizations based on their comparative advantage of coercion in a context of anarchy. The assumption of a peaceful configuration is also plausible for the Mexican case in which criminal organizations peacefully coexisted with government authorities for several decades and conducted their illegal activities without committing systematic violence (Astorga, 2005).

2.3.2 Fighting Crime in New Democracies

The link between democratization and drug violence is located within the Hobbesian tradition of conflict research, in which violence emerges as the product of the breakdown of political order (Hobbes, 1651; Kalyvas, Shapiro and Masoud, 2008; Olson, 2000; Tilly, 1985). The model assumes that at low levels of democratic development, state authorities coexist with criminals on a basis of corruption. The parameter $B > 0$ represents bribes received by government officials in exchange for not enforcing the law under a non-democratic regime. At higher levels of democratic development, government authorities are motivated instead to provide public goods, such as public security. The benefits of enforcing the law in a democratic setting are expressed by the parameter $G > 0$. One of the key assumptions of the model is that the political benefits of providing public security are larger than the benefits from corruption ($G > B$) at high levels of democratic development. In an authoritarian context, the political benefits that government authorities receive from enforcing the law are smaller than the benefits of corruption ($G < B$).

Peaceful configurations do not need to be explicit “pacts” between the state and DTOs, but can be achieved as a behavioral equilibrium. At low levels of democracy, organized criminals may bribe government officials as a way of preventing prosecution or even of receiving protection from the state (Bailey and Taylor, 2009; Guerrero, 2009*b*). The small number of relevant political actors characteristic of authoritarian regimes favors peaceful arrangements between the state and DTOs in several ways. Having a small number of political actors makes it easier for criminals to bargain with government officials and makes it cheaper to bribe them. The small number of key political actors also facilitates coordination among corrupt political elites and reduces the risk of defection (Olson, 1965). In addition, the hierarchical chain of command increases compliance by the lower ranks within the government structure, thus adding stability to the pacts. Finally, the lack of effective elite circulation through electoral

means in non-democratic settings favors credible expectations about the stability of these pacts. The coexistence of state authority and criminal power structures is consistent with the view of O'Donnell (1993) on the challenges that many new democracies face.

The process of democratization is considered as an external force gradually altering the peaceful arrangement between government officials and criminals. Democratization increases the number of relevant political actors at multiple levels of government. Increasing competition motivates politicians to provide goods such as public security. For organized criminals, a larger number of political actors increases the difficulty of bargaining with state officials and the costs of bribing them. For corrupt authorities, the entrance of new political actors makes coordination more difficult and reduces their capacity for detecting and sanctioning those not complying with the pact (Olson, 1965). Even if a non-aggression agreement is achieved, the diversity of party labels at different levels of government would break the chain of command and would make compliance with the pact very difficult. In addition, elections tending to increase the effective circulation of elites reduce the duration of any non-aggression arrangement and increase the uncertainty about the possibility of future arrangements (Przeworski, 1991). Under democracy, political actors also have direct incentives to enforce the law as they seek to gain citizen support by deliberately breaking corrupt agreements and framing themselves as honest politicians. Finally, elections leading to increases in the effective circulation of political elites reduce the duration of any non-aggression arrangement.

Democratization provides the basic conditions leading to higher levels of law enforcement. However, a full-fledged campaign against crime requires a trigger to shift from implicit peaceful coexistence to active belligerency. Goldstein (1978) provides a theory for understanding the decision of political leaders to use repressive tactics. He argues that increasing levels of tension in the political arena are perceived by

authorities as threats to their legitimacy, thus increasing their disposition to repress. According to this author, “a high level of strain and dissent will tend to increase the anxiety of political authorities and incline them towards a policy of repression” (Goldstein, 1978, p. 559). In addition, the adoption of repressive policies is facilitated by the presence of suitable target groups in society which can readily be made into scapegoats.⁵ Muller (1970) also argues that in periods of crisis, politicians usually reap political benefits from deploying aggressive policies and displaying an image of strong leadership. This is the well-known “rally-round-the-flag” effect.

The arguments advanced by Goldstein and Muller can be used as a meso-theory to explain the motivation of political elites towards aggressive security policies in periods of political crisis. As levels of strain and tension in the political arena intensify, government authorities can be expected to deploy increasingly aggressive security policies to fight crime. When political actors perceive that their legitimacy is threatened by episodes of political strain, they have greater incentives to use punitive security policies in an attempt to boost their levels of popular support. The provision of heavy-handed security policies is particularly attractive for reaping political benefits because public security is a highly valuable public good across partisan labels, thus making fighting crime very appealing to broad sectors of the population. In addition, criminal organizations are suitable scapegoats for repressive policies that are not likely to receive objections from other political elites. To express this idea in formal terms, let Ω be the level of political strain, such that $\Omega > 1$. Now, assume that raising political strain increases the political benefits of fighting organized crime, such that $\Omega^{High}G > \Omega^{Low}G$, when $\Omega^{High} > \Omega^{Low}$ and G is held constant.

⁵Scapegoats are individuals or groups in the society who are the focus of feelings of aggression and hostility or receive negative treatment from the political elites or other groups in society. Repressive policies against scapegoat groups are often feasible due to the lack of opposition to repression from political elites. Goldstein developed his theory to explain intense political repression in the United States against some political groups such as workers’ unions, communist groups and civil rights movements, which have variously served as scapegoat groups.

2.3.3 Shifting Military Capabilities

Criminal organizations use their military strength to control specific territories. The territory has a value of $\tau > 0$. In a simplistic perspective, the value of the territory is defined by the objective characteristics of a geographic space that can be translated into economic benefits for criminal organizations. A more sophisticated approach assigns territorial value as a function of the objective characteristics of the area and the specific production functions of criminal organizations. In this version of the model, criminal groups with different production functions could assign different values to the same objective features of a given territory.⁶ However, for the sake of simplicity, in this work the model assumes that all drug-trafficking organizations value the territory in the same way.

The military strength of the Target is denoted by $M \in [0, 1]$. The Target's relative military capacity can be considered as a *contest success function* for the probability of winning a turf war against a Challenger over a disputed territory. The military power of the Challenger is defined relative to the Target's strength as $(1 - M)$. The Target enjoys the share of the territory it manages to control as measured by $M\tau$, and the Challenger controls the rest of the territory; $(1 - M)\tau$. One of the central characteristics of contest success functions is that the efforts of the players are *adversarially combined* so that increased probabilities of winning for one actor imply decreased probabilities for all adversaries (Jia, Skaperdas and Vaidya, 2012). Contest success functions therefore reflect the substantive claim made by Tilly (1992, 71), "coercion is always relative; anyone who controls concentrated means of coercion runs the risk of losing advantages when a neighbor builds up his means."

⁶For example, suppose one criminal group specialises in aerial transport of illicit drugs and another in growing marijuana. Given their different production functions, these criminal groups would assign different values to a mountainous terrain. The mountain may represent low value for the group specialized in aerial transportation because airplanes cannot land on rough terrain, while the drug farming organization may assign a high value to the mountain because its sheltered recesses and high elevations are favorable for growing illegal crops.

The most common functional form of the contest success function is that proposed by Tullock (1980), sometimes called the “power” form, or also referred to as the “ratio” form. In its most basic version, the contest success function considers two adversaries, players i and j . Each contestant devotes some effort (e) to controlling its territory, their respective efforts denoted by e_i and e_j . For any given combination of efforts, each player has a probability of winning and a probability of losing a confrontation. Let player i be the Target DTO with a probability of winning denoted by $M_i(e_i; e_j)$ and let player j be the Challenger DTO with probability of winning $M_j(e_i; e_j)$. In order to define the player’s military capabilities as a reciprocal probability, M_i and M_j must take values between zero and one, and add to one such that $M_j(e_i; e_j) = 1 - M_i(e_i; e_j) \geq 0$. In consequence, we can express the players’ contest success functions as the ratio of their military efforts:

Target DTO (player i)

$$M_i(e_i, e_j) = \frac{e_i}{e_i + e_j}$$

Challenger DTO (player j)

$$M_j(e_j, e_i) = \frac{e_j}{e_i + e_j}$$

For notational simplicity, from here on $M = M_i(e_i; e_j)$ will refer to the Target DTO and $(1 - M) = M_j(e_i; e_j)$ to the Challenger.

The model also considers that an attack on the Target (delivered by either the State or the Challenger) damages its military capabilities by a factor of $\gamma \in [0, 1]$, such that $\gamma M < M$. If γ has values close to 1, then the degree of damage is minor and M is barely affected. In contrast, values of γ close to 0 indicate a substantial damage on the Target, severely affecting its military capabilities. The severity of military damage can sequentially increase or decrease depending on the actions of each player such that γ^V , where $V = (E - R\sigma + I - F\sigma)$. Parameters E, R, I and

F correspond to the set of violent actions sequentially available to each player. If any player opts to use violence, its respective action (E, R, I, F) takes the value of 1, or 0 otherwise. However, if the Target fights back, it may neutralize some of the damage caused by the attacker and reestablish part of the relative military balance by a factor of $\sigma \in [0, 1]$, which represents the Target's recovery capability. The Target can reestablish the relative military balance in two ways: it can increase its own military capabilities (e.g. recruiting more hit men, increasing the cruelty of its tactics or using more powerful weapons) or it can reduce the military capabilities of its opponent (e.g. killing a rival). Values of σ close to 1 indicate a strong Target capable of reestablishing the relative military balance in either of these ways. In contrast, if σ is close to 0, it reflects a weak Target incapable of recovering its relative military position.

Table 2.2 shows various scenarios of military damage and recovery based on the different values taken by V depending on the actions taken by each player. As the first row shows, if no one uses violence, then $V = 0$, $\gamma^0 = 1$, and the military balance is not altered. In the second and third rows, if either the State or the Challenger attack the Target and latter does not fight back, the attack diminishes the Target's military capabilities by γM . In the fourth and fifth rows, if the Target fights back against the attacker, the reaction offsets part of the damage and the net power balance is $\gamma^{(1-\sigma)} M$. In the sixth row, the Target's military strength is severely damaged by $\gamma^2 M$ if both the State and the Challenger sequentially attack and the Target does not respond to either of them. In the seventh and eight rows, the Target is attacked by the State and the Challenger but only fights back against one of them, thus leading to a net damage of $\gamma^{2-\sigma} M$ on the Target. In the last row, if the Target is attacked twice and fights both aggressors, the Target neutralizes part of the damage and the net military balance becomes $\gamma^{2-2\sigma} M$.

TABLE 2.2

SEVERITY OF MILITARY DAMAGE AND RECOVERY CAPABILITY

Target		State	Target	Challenger	Target		
Attacked	Responds	Enforces	Retaliates	Invades	Fights	V	γ^V
No	No	0	0	0	0	0	1
Once	No	1	0	0	0	1	γ
Once	No	0	0	1	0	1	γ
Once	Once	1	1	0	0	$1 - \sigma$	$\gamma^{(1-\sigma)}$
Once	Once	0	0	1	1	$1 - \sigma$	$\gamma^{(1-\sigma)}$
Twice	No	1	0	1	0	2	γ^2
Twice	Once	1	1	1	0	$2 - \sigma$	$\gamma^{(2-\sigma)}$
Twice	Once	1	0	1	1	$2 - \sigma$	$\gamma^{(2-\sigma)}$
Twice	Twice	1	1	1	1	$2 - 2\sigma$	$\gamma^{(2-2\sigma)}$

Figure 2.2 provides an example of the shifting military capabilities caused by violent interactions between different players. For the three different scenarios in this figure, let $M = 0.8$ for the Target's initial military strength, $\gamma = 0.5$ for the severity of damage inflicted by the aggressor and $\sigma = 0.7$ for the Target's effectiveness in recovering from the attack. In the first scenario (A), the Target is attacked by either the State or the Challenger, and fights back. The attack initially reduces the Target's military position from M to $M\gamma$. The reaction from the Target against its aggressor allows it to recover some of the military loss by shifting $M\gamma$ to its new position at $M\gamma^{1-\sigma}$. Although the Target is better off by retaliating against its aggressor ($M\gamma^{1-\sigma} > M\gamma$), there is some fraction of military strength that the Target is not able to recover ($M > M\gamma^{1-\sigma}$).

The second scenario (B) in Figure 2.2 shows the Target being attacked by both the State and the Challenger and retaliating only against one aggressor. In this scenario

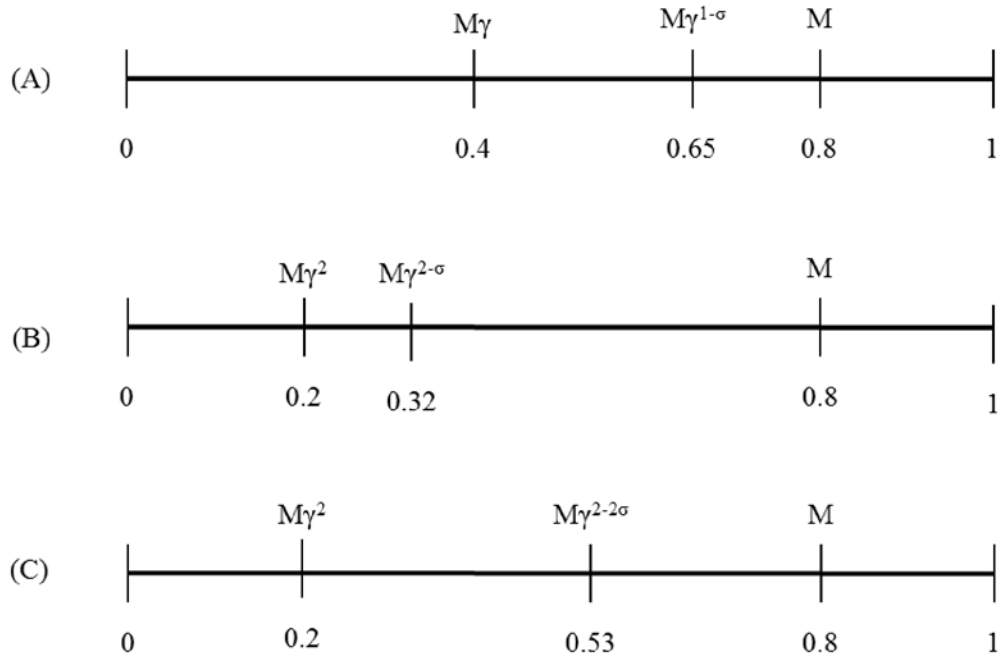


Figure 2.2. Shifting military capabilities

the military position of the Target is reduced down to $M\gamma^2$. If the Target only retaliates against one of its aggressors, it will be able to recover some of its military position up to $M\gamma^{2-\sigma}$. This figure shows that, even after retaliating, the Target will be severely weakened by the concurrent attacks of the State and the Challenger.

The third scenario (C) shows the net relative military capabilities of the Target after being attacked twice and retaliating both times. Aggressions by the State and the Challenger reduce the Target's military strength from M to $M\gamma^2$. If the Target retaliates against both aggressors, it will improve its military position from $M\gamma^2$ to $M\gamma^{2-2\sigma}$. Comparing scenarios (B) and (C) shows that the Target is better off if it fights back both aggressors rather than just one ($M\gamma^{2-2\sigma} > M\gamma^{2-\sigma}$).

Figure 2.3 illustrates the relationship between γ and σ at any level of damage and recovery. The surface shows the proportion of military power recovered by the Target after being attacked once ($\gamma^{1-\sigma}$) by either the State or a rival criminal group. For

example, assume an initial point where the Target's military capabilities are located at the top corner of the figure. If the Target suffers a severe attack (the value of γ is close to 0) and has a limited recovery capacity (the value of σ is close to 0), then the Target's net military strength will be located around the lower corner of the surface in Figure 2.3. This shows how the theory allows for reduction of violence caused by the elimination of a weak criminal organization incapable of recovering from a severe attack. The model shows, however, that the damage inflicted by the State or a rival group on a criminal organization must be devastating for the group to be eliminated.

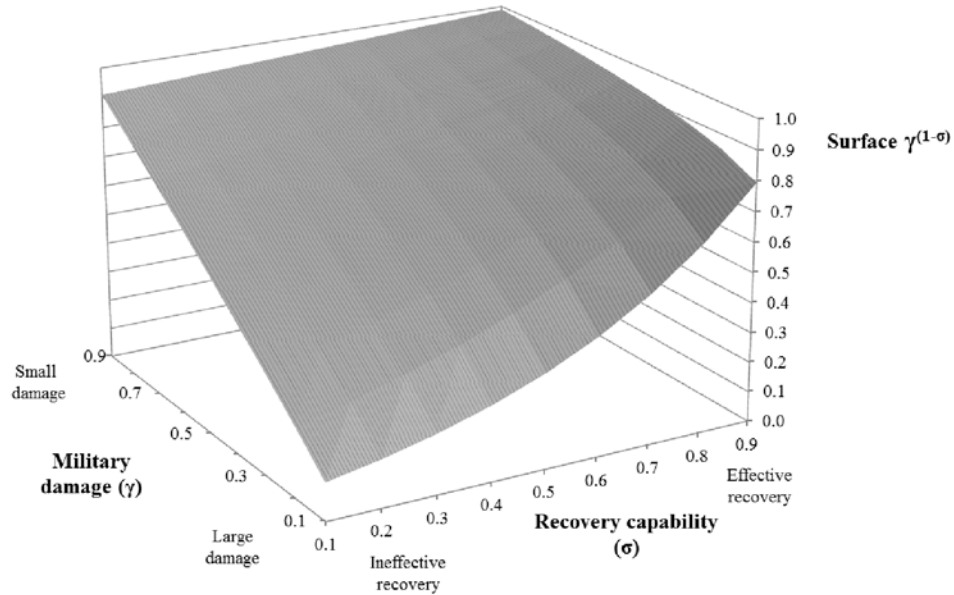


Figure 2.3. Military damage and recovery capabilities in $\gamma^{1-\sigma}$

Now consider an alternative scenario in which the Target suffers severe damage but still has the ability to effectively recover from the attack (the value of σ is

close to 1). As mentioned before, the Target can shift back the relative military balance by reducing the military capabilities of its rivals through a counter-attack or by increasing its own military capabilities by hiring more soldiers or improving its tactics. If the Target fights back and readjusts the military balance with respect to its adversary, the Target's net military strength will be located around the right corner of the surface in Figure 2.3. After this violent interaction, the relative military position of the Target is not that much different from the initial point at the top corner of the surface, but the process has generated two episodes of violence that altered and restored the balance of power.

In addition, the dark patterned surface in Figure 2.4 represents the Target's net military strength after being attacked both by the State and a rival criminal group and fighting back against both ($\gamma^{2-2\sigma}$). The net military balance in this surface is governed by the same relationship between the severity of military damage (γ) and the effectiveness of recovery (σ) as in the previous example when there is only one aggressor. Consider the case when the military balance of the Target is located around the top corner of Figure 2.4. If the attacks on the Target by the State and a challenging DTO cause minimum damage, its net military capabilities will be located at the left corner of the surface. However, if both attacks cause severe damage on the Target and its retaliation is not effective, then the Target's net position will be around the lower edge of the surface. Finally, if the Target has the capability to reestablish the military balance by effectively fighting back against both the State and the challenger DTO, then its net position will be around the right corner of the surface. Regardless of the number of aggressors, the logic of violence remains the same: if the attacks on the Target are severe enough, violence may end through extermination. However, if the Target is capable of fighting back and effectively recovering its military position, violence is likely to escalate.

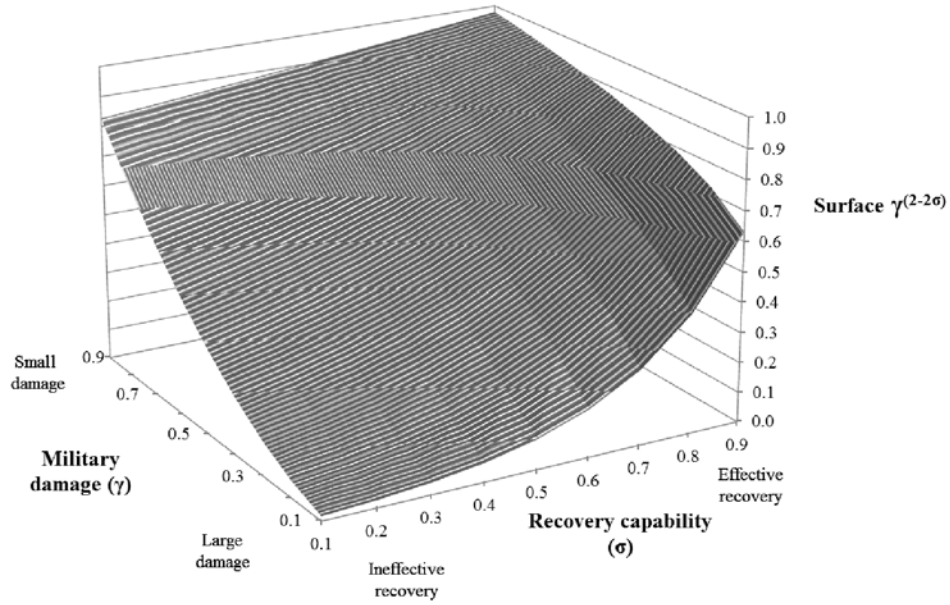


Figure 2.4. Military damage and recovery capabilities in $\gamma^{2-2\sigma}$

Figure 2.5 shows the overlapping surfaces of $\gamma^{1-\sigma}$ and $\gamma^{2-2\sigma}$ presented in Figures 2.3 and 2.4, respectively. These two surfaces illustrate the same underlying logic between military damage and recovery capabilities. In addition, the comparison between them shows that at any level of γ and σ , the Target's net military capacity recovered through force is lower after being attacked twice than after being attacked only once. The gap between the $\gamma^{1-\sigma}$ surface and $\gamma^{2-2\sigma}$ represents the net military loss suffered by the Target after the second attack.

2.3.4 Payoffs

This section discusses the payoffs of the game tree in Figure 2.1. The numbers inside brackets at the end of each branch of the extended-form game represent the sequence of payoffs. First consider the Status Quo (Payoff 1) where there is no violence between actors. If the State decides not to enforce the law against the

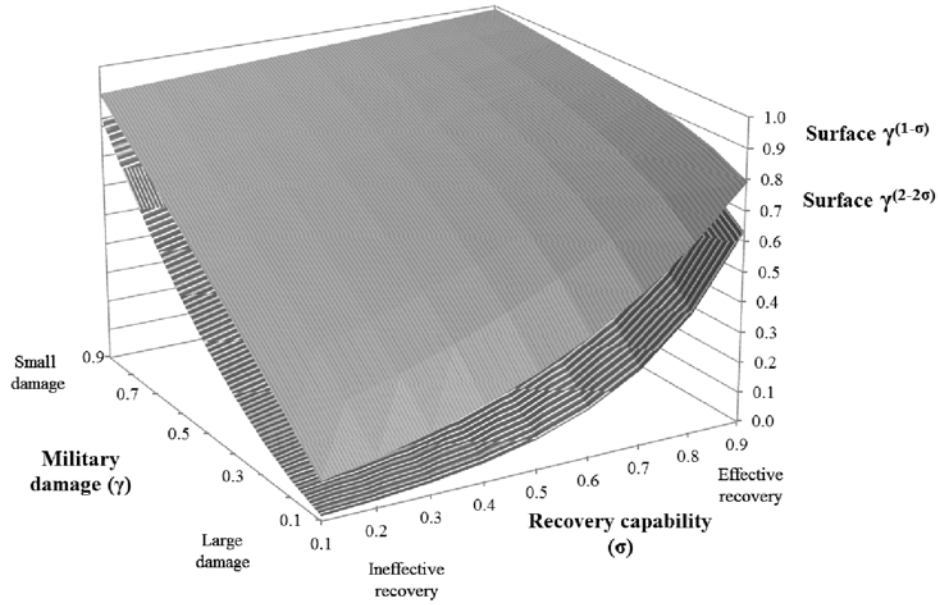


Figure 2.5. Military damage and recovery capabilities in $\gamma^{1-\sigma}$ and $\gamma^{2-2\sigma}$

Target, the only benefits it receives are from bribes (B). In the absence of law enforcement, the Target enjoys the benefits of controlling a territory based on its military capabilities for protecting it ($M\tau$) and the Challenger obtains a fraction of the territory it manages to secure given its military strength, $(1 - M)\tau$.

In Payoff 2, the State still does not deploy any action against the Target and receives bribes for not enforcing the law (B). In this scenario, the Challenger launches an invasion against the Target and undermines its military capabilities by $M\gamma\tau$. The invasion improves the Challenger's relative strength and enables it to control a larger share of the territory. The model assumes that violent actions perpetrated by any player i against any other player j generate a cost $K_{ij} > 0$ for using violence. According to this perspective, γ and K_{ij} are different types of costs. Parameter γ refers to damage caused by actor i on a rival j by the use of violence (e.g. wounding or killing enemies). In contrast, parameter K_{ij} refers to the costs incurred by the perpetrator i for the use of violence (e.g. costs of recruiting new fighters or buying

more weapons). In consequence, launching the invasion generates a cost of K_{CT} for the Challenger and leads to a payoff of $(1 - M\gamma)\tau - K_{CT}$.

In Payoff 3 the absence of law enforcement gives the State the benefits of corruption (B). The Challenger launches an invasion and the Target resists the attack. After the violent interaction between criminal groups, the Target enjoys the part of the territory that it managed to recover after the invasion at some cost $(M\gamma^{1-\sigma})\tau - K_{TC}$ and the Challenger gains a fraction of the territory after facing some resistance from the Target $((1 - M\gamma^{1-\sigma})\tau - K_{CT})$. In this scenario, the Target and the Challenger engage in a confrontation that generates some episodes of violence in their respective efforts to shift the military balance and control part of the territory.

In scenarios 4–9, the state enforces the law against criminals. In Payoff 4, the State fights the Target but there is no retaliation against law enforcement nor violence among rival DTOs. Enforcing the law gives the State a political benefit for providing public security at some cost of enforcement $(\Omega G - K_{ST})$. For now, Ω is held constant. In this case, the cost to the government (K_{ST}) may involve increasing the budget for security agencies or any other expense for spending financial, material or human resources to fight criminal organizations. In this case, the actions undertaken by the State's coercive apparatus against a criminal organization weaken the Target's military capabilities for defending its territory by $M\gamma\tau$ and improve the relative power of the Challenger by $(1 - M\gamma)\tau$. This implies that law enforcement has a non-neutral effect on rival criminal organizations that may disrupt the relative military balance existing between them. By enforcing the law, the State debilitates one group and indirectly benefits its rivals.

Payoff 5 shows the scenario in which the State enforces the law and the Challenger launches an invasion, but the Target does not retaliate against either the State or the Challenger. In this case the State receives the political benefit of providing public security at a certain cost $(\Omega G - K_{ST})$. Government action undermines the Target's

military capabilities. The damage caused by law enforcement on the Target indirectly increases the Challenger's relative strength. If the Challenger decides to launch an invasion, it will incur a cost and further improve its position by $(1 - M\gamma^2)\tau - K_{CT}$. If the Target does not defend itself from either the State or the Challenger, the sequential attacks from these two actors will reduce the Target's military capacity to control its territory by $\gamma^2 M\tau$. This scenario represents the worst situation for the Target, as it may be seriously damaged by the attacks from both fronts.

In Payoff 6 both the State and the Challenger fight the Target criminal organization, and the latter fights the invaders but not the government security forces. In this case, the payoff for the State is $\Omega G - K_{ST}$ for enforcing the law against the Target. The sequential attacks from the State and the Challenger undermine the Target's ability to secure its territory, but the Target's reaction against the Challenger helps it to recover part of the military loss caused by the invader's incursion $((M\gamma^{2-\sigma})\tau - K_{TC})$. After facing resistance from the Target, the Challenger enjoys a relative military position indirectly improved by the State's actions and further increased by the invasion $((1 - M\gamma^{2-\sigma})\tau - K_{CT})$.

Payoff 7 represents the situation in which the State enforces the law and the Target retaliates against the State but there is no violent interaction between competing criminal groups. In this scenario the State receives some benefit for enforcing the law. However, criminal retaliation against law enforcement diminishes the State's benefits for providing public security by a factor of $\lambda > 1$, thus leaving a payoff for the State defined by $\Omega G - \lambda - K_{ST}$. After being damaged by law enforcement and retaliating against the State, the Target's payoff is defined by the net military ability to defend its territory and the costs of fighting the State, as $(M\gamma^{1-\sigma})\tau - K_{TS}$. In this scenario the Challenger refrains from invading against the Target. In consequence, the Challenger only receives the benefits of an improved relative military position caused by State enforcement against the Target, $(1 - M\gamma^{1-\sigma})\tau$.

In Payoff 8, both the State and the Challenger attack the Target, but the latter only resists law enforcement, not the invasion. The confrontation between the State and the Target diminishes the benefits received by the State for providing public security ($\Omega G - \lambda - K_{ST}$) and undermines the Target's military strength. In addition, if the Challenger decides to launch an invasion and the Target does not expel the trespasser, the invasion would further reduce the Target's military power by $M\gamma^{2-\sigma}\tau - K_{TS}$ and substantially improve the Challenger's ability to control the territory ($(1 - M\gamma^{2-\sigma})\tau - K_{CT}$).

Finally, Payoff 9 represents the situation of a war of all against all. The State receives the political benefits of fighting criminals, even when facing resistance from the Target and incurring the cost of enforcing the law ($\Omega G - \lambda - K_{ST}$). Government actions undermine the Target's strength and indirectly improve the relative position of the Challenger. After retaliating against the State, the Target recovers some of its military position damaged by law enforcement. If the Challenger decides to launch an invasion, it will further weaken the Target and improve its own military strength. However, if the Target resists the invasion, it will recover some of its relative power position. These violent interactions will shift the military balance back and forth between the Target and the Challenger and generate some costs, thus yielding a payoff of $M\gamma^{2-2\sigma}\tau - K_{TS} - K_{TC}$ for the Target and $(1 - M\gamma^{2-2\sigma})\tau - K_{CT}$ for the Challenger.

This payoff represents the most violent scenario involving actions and reactions between the State and the Target and between rival criminal organizations. As mentioned in Section 2.3.3, depending on the severity of military damage and the ability of criminal organizations to recover from an attack, confrontations between different players may lead to the extinction of some criminal groups and the end of violence if they suffer serious damage and are incapable of recovering from it. However, this interaction may alternatively lead to sustained campaigns of violence

if the military damage caused to each other is not sufficiently severe and if actors manage to recover effectively after being attacked.

2.3.5 Equilibrium Conditions

I use backward induction to find the sub-game perfect equilibrium of this sequential game of complete information. I start at the bottom of the game tree in order to identify the conditions for the Target fighting against the Challenger. I then analyze the conditions for the Challenger to invade knowing that the Target will resist the invasion. At the next level, I identify the circumstances under which the Target will retaliate against law enforcement. Finally, I analyze the conditions that would motivate the State to enforce the law against organized crime. The equilibrium analysis reveals the conditions under which each actor has incentives to use violence against other players, given the benefits and costs associated with their actions.

2.3.5.1 Conditions for the Target to Fight the Challenger

A comparison of payoffs 2 and 3 for the Target shows that if the State does not enforce the law, the Target DTO will fight the Challenger if the following condition holds: $(\gamma^{1-\sigma} - \gamma) > \frac{K_{TC}}{M\tau}$. Parameter γ represents the extent of military damage caused by an attack on the Target and $\gamma^{1-\sigma}$ accounts for the Target's capacity to recover from an attack by fighting back. In addition, $\frac{K_{TC}}{M\tau}$ represents the attractiveness of engaging in a confrontation depending on the costs of fighting and the value of the territory that the Target manages to control given its military capabilities.

In order to present a more intuitive interpretation of the equilibrium condition, we can define $\theta = (\gamma^{1-\sigma} - \gamma)$ as the Target's net military strength recovered by fighting back after being attacked. Figure 2.6 offers a visual representation of parameter θ . Consider any unidimensional space representing the military strength of the Target (M) and assume that this actor has full control of its territory ($M = 1$). If the

Target is attacked once, its military strength will be diminished by a factor of γ . Now, if the Target retaliates against its aggressor, it will recover some of the military strength lost in the initial attack by a factor of $\gamma^{1-\sigma}$. Parameter θ represents the net military strength recovered through fighting and it is illustrated by the length of the space between γ and $\gamma^{1-\sigma}$ in Figure 2.6. Based on this definition, we can rewrite the equilibrium condition as $\theta > \frac{K_{TC}}{M\tau}$. This indicates that the Target will fight the Challenger if the net military strength recovered after fighting the invader is larger than the attractiveness of fighting for that territory.

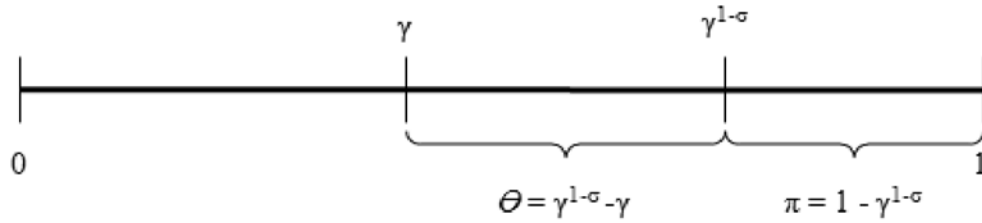


Figure 2.6. Military capabilities recovered or gained through fighting

Now compare payoffs 5 and 6 where the State enforces the law and the Target does not retaliate against the government. In this situation, the Target will use violence against the Challenger under the following condition: $\theta > \frac{K_{TC}}{\gamma M\tau}$. In this case, parameter γ on the right-hand side represents the additional damage on the Target caused by State law enforcement. Therefore, the Target will fight the Challenger if the net military strength regained by force is larger than the attractiveness of defending the territory after being weakened by the State.

The comparison of payoffs 8 and 9 in which the State enforces the law and the Target retaliates against the State indicates that the Target will fight the invader if the following condition holds: $\theta > \frac{K_{TC}}{\gamma^{1-\sigma} M\tau}$. Parameter $\gamma^{1-\sigma}$ on the right-hand side represents the Target's military strength recovered by retaliating against law enforcement. In this case, the Target will resist the invasion if the proportion of military strength recovered by fighting the Challenger is larger than the relative attractiveness of battling over the disputed territory, even after the Target has suffered law enforcement and retaliated against it.

In general, the analysis of equilibrium conditions indicates the same underlying logic for the Target: if the proportion of relative military capacity recovered by force is larger than the attractiveness of fighting for a valuable territory, then the Target will fight.

A more nuanced analysis of the equilibrium condition reveals that this is not a tit-for-tat model, since not every attack on the Target delivered by the Challenger is immediately reciprocated by a violent reaction from the Target. The same "tolerance" applies to law enforcement actions conducted by the State against the Target. The interaction among criminal organizations and between the state and DTOs can tolerate "minor errors." A member of the Challenger DTO could unintentionally cross into the Target's territory or government authorities might occasionally arrest a member of the Target DTO. These minor events might not necessarily provoke a violent reaction from the Target. The equilibrium condition reveals that the amount of military damage has to be sufficiently large to motivate the Target to weigh the benefits of waging war despite the costs associated with using violence. In particular, the Target will fight if the proportion of military strength recovered through violence is larger than the relative attractiveness of fighting for a territory of a certain value. This condition might not be fulfilled by minor events such as inadvertently crossing over to the rival's territory or sporadic arrests. However, if the frequency and in-

tensity of minor events become part of a sustained campaign of hostilities against the Target, then this condition is more likely to be fulfilled, thus triggering a violent reaction from the Target against the instigators.

2.3.5.2 Conditions for the Challenger to Invade the Target

The second level of the model helps identify the conditions under which the Challenger will invade even knowing that the Target will fight back. The comparison of the Challenger's payoffs 1 and 3 indicates that in the absence of law enforcement, the Challenger is likely to launch an invasion against the Target under the following condition: $1 - \gamma^{1-\sigma} > \frac{K_{CT}}{M_T}$. Parameter $1 - \gamma^{1-\sigma}$ represents the Challenger's net gain in military strength after launching an invasion and facing resistance from the Target. In addition, parameter $\frac{K_{CT}}{M_T}$ represents the costs of invading given the value of the territory and the Target's military strength.

We can define $\pi = (1 - \gamma^{1-\sigma})$ and rewrite the equilibrium condition as $\pi > \frac{K_{CT}}{M_T}$. This indicates that the Challenger will invade if the net military gain is larger than the attractiveness of invading, knowing that the Target will fight. Figure 2.6 also offers a visual representation of parameter π . The invasion will improve the Challenger's military capabilities by a factor of $1 - \gamma$) However, if the Target fights back against the invader it will recover some of the military loss by the amount $\gamma^{1-\sigma}$. Therefore, the net military gain for the Challenger launching an invasion and facing resistance from the Target is defined by the space between 1 and $\gamma^{1-\sigma}$.

Consider payoffs 4 and 6, in which the State enforces the law and the Target does not retaliate against the government. The equilibrium indicates that the Challenger will launch an invasion if $\pi > \frac{K_{CT}}{\gamma M_T}$. Parameter γ on the right-hand side represents the additional damage caused by law enforcement on the Target. This indicates that the Challenger will invade if the net military gain of doing so is larger than the

attractiveness of invading, even when the Target is likely to fight the Challenger after being weakened by the State.

Finally, consider payoffs 7 and 9, where the State enforces the law and the Target retaliates against the government. In this situation, the Challenger will invade if the utility of doing so is larger than the utility of not invading, even after knowing that the Target will resist the invasion. In this case, the Challenger will fight under the following condition: $\pi > \frac{K_{CT}}{\gamma^{1-\sigma} M_T}$. Parameter $\gamma^{1-\sigma}$ on the right-hand side accounts for the Target's damage and recovery caused by the violent interaction between the State and the Target. The model indicates that the Challenger will carry out an invasion if the net military gain of doing so is larger than the attractiveness of invading, even knowing that the Target will fight the Challenger after retaliating against the State.

The model consistently indicates that law enforcement weakens the Target criminal organization and improves the relative military position of the Challenger. This suggests another important intuition about the non-neutral effect of State actions on the relative military balance among criminals: regardless of the Target's reaction against its aggressors, the Challenger has more incentives to invade when the State enforces the law against the Target than when it does not.

2.3.5.3 Conditions for the Target to Retaliate Against the State

Now, consider the Target's decision to retaliate against the State by comparing payoffs 6 and 9. If there is law enforcement, the Target will retaliate against government authorities if the utility of doing so is larger than the utility of not fighting the state's coercive apparatus. The equilibrium analysis indicates that the Target will retaliate against law enforcement under the following condition: $\theta > \frac{K_{TS}}{\gamma^{1-\sigma} M_T}$. As defined before, θ represents the Target's net military capacity recovered through fighting after being attacked, in this case by the State. In addition, parameter $\gamma^{1-\sigma}$ on the right-hand side represents the Target's military strength recovered after re-

sisting the invasion launched by the Challenger. In consequence, the equilibrium condition indicates that the Target will retaliate against law enforcement if military strength recovered through fighting is larger than the attractiveness of engaging in a confrontation with the State after the Target and the Challenger have already clashed over a disputed territory.

2.3.5.4 Conditions for the State to Enforce the Law

Finally, comparing payoffs 3 and 9 reveals the conditions under which the State will enforce the law. Knowing that the Target and the Challenger will engage in territorial conflict and the Target will retaliate against law enforcement, the State will launch a campaign against criminal organizations if the benefits of fighting crime are greater than the benefits of not doing so. The equilibrium analysis indicates that the State will enforce the law under the following condition: $\Omega G > B + \lambda + K_{ST}$. Even incurring the costs of law enforcement and the damage created by criminal retaliation against government authorities, the State will enforce the law if the political benefits of providing security as a public good are larger than the benefits of corruption from not enforcing the law.

As mentioned before, while holding the levels of political strain (Ω) constant, the model assumes that the political benefits of enforcing the law are larger than the benefits from bribes ($G > B$) at high levels of democratic development, whereas the relationship is the opposite ($G < B$) at low levels of democracy. In consequence, as democratization increases, politicians are likely to intensify law enforcement activities against criminal organizations. As mentioned in Section 2.3.2, democratization undermines the feasibility of peaceful configurations between politicians and criminals and affects the system of incentives for authorities, thus motivating politicians to fight crime.

Now, if we allow variation in the levels of political strain, the equilibrium conditions for State action indicates that periods of strain in the political arena will lead to more aggressive security policies against criminal organizations. As suggested by Goldstein (1978) and Muller (1970), increased political tension facilitates repressive behavior from government authorities and allows them to reap political benefits from harsh security policies.

2.3.5.5 Summary of Equilibrium Conditions

Table 2.3 presents the summary of the equilibrium conditions for different processes of violence inherent to the war on drugs. The structure of the equilibrium conditions in columns 1–3 shows that criminal organizations follow the same underlying logic of violence whether fighting each other or against the state. According to the analysis, if the proportion of relative military capacity recovered by force is larger than the attractiveness of fighting for a valuable territory, then criminal organizations will fight. In addition, the table shows that the state will enforce the law if the political benefits derived from enforcing the law exceed the benefits from corruption.

2.4 Empirical Implications

Based on the set of conditions reported in Table 2.3, it is possible to derive some observable implications. Consider first the equilibrium condition for the use of state violence shown in the fourth column of Table 2.3. The equilibrium indicates that government authorities will intensify law enforcement against criminals if the political benefits from fighting crime (G) and levels of political strain (Ω) are larger than the benefits from corruption (B), the damage caused by criminal action (λ) and the cost of using force against criminals (K_{ST}). As discussed before, the model

TABLE 2.3

EQUILIBRIUM CONDITIONS FOR THE USE OF VIOLENCE

Target fights the Challenger	Challenger invades the Target	Target retaliates against the State	State enforces the law
$\theta > \frac{K_{TC}}{M\tau}$	$\pi > \frac{K_{CT}}{M\tau}$		
$\theta > \frac{K_{TC}}{\gamma M\tau}$	$\pi > \frac{K_{CT}}{\gamma M\tau}$		
$\theta > \frac{K_{TC}}{\gamma^{1-\sigma} M\tau}$	$\pi > \frac{K_{CT}}{\gamma^{1-\sigma} M\tau}$	$\theta > \frac{K_{TS}}{\gamma^{1-\sigma} M\tau}$	$\Omega G > B + \lambda + K_{ST}$

assumes that the process of democratization and periods of political strain are key external factors affecting the political incentives of politicians to enforce the law. Based on these equilibrium conditions, the following hypotheses can be derived:

- (H_1) Increased democratization is associated with high levels of law enforcement.
- (H_2) Increased political strain is associated with high levels of law enforcement.
- (H_3) Increased levels of corruption are associated with low levels of law enforcement.

Hypothesis (H_2) stating the relationship between political strain and law enforcement can be further refined for different types of enforcement tactics. Based on the “rally-round-the-flag” effect (Muller, 1970), assume that using violent enforcement to fight crime (G_v) provides greater political benefits than non-violent tactics ($G_{\sim v}$), such that $G_v > G_{\sim v}$. Also assume that the cost of using violent tactics (K_{STv}) is higher than that of using non-violent law enforcement ($K_{ST\sim v}$), such that $K_{STv} > K_{ST\sim v}$. In contexts of political strain, the net benefits of using violent tac-

tics are larger than those of non-violent enforcement, such that $(\Omega^{high}G_v - K_{STv}) > (\Omega^{high}G_{\sim v} - K_{ST\sim v})$ and $(\Omega^{low}G_v - K_{STv}) < (\Omega^{low}G_{\sim v} - K_{ST\sim v})$. This implies that violent law enforcement will only be used under high levels of political strain. This refinement can be stated in terms of the following hypothesis:

($H_{2.1}$) Increased political strain is associated with high levels of violent enforcement than non-violent enforcement tactics.

Now consider the equilibrium conditions for violence perpetrated by criminal organizations. Table 2.3 indicates that the Target and the Challenger have the same underlying incentives for committing violence. The equilibrium conditions contained in the first three columns of the table can be expressed in a more general set of conditions:

$$\delta > \frac{K_{ij}}{M\tau} \quad (2.1)$$

$$\delta > \frac{K_{ij}}{\gamma M\tau} \quad (2.2)$$

$$\delta > \frac{K_{ij}}{\gamma^{1-\sigma} M\tau} \quad (2.3)$$

where the Target's or Challenger's benefits from using violence, δ , can take values of $\{\theta, \pi\}$. Parameter K_{ij} represents the costs of using violence and can take any combination of pairs $\{TC, CT, TS\}$. These conditions enable some general observable implications to be identified.

First consider the disruptive effect of law enforcement. As mentioned in Section 2.3.3, parameter γ denotes the Target's loss of military strength caused by an attack either from the state or a rival criminal organization. For illustrative purposes in this example, consider that γ is exclusively caused by law enforcement from the state. Holding everything constant in equations (2.1), (2.2) and (2.3), comparing the denominators on the right side of the three equations indicates that $M\tau > \gamma^{1-\sigma} M\tau > \gamma^{1-\sigma} M\tau$. This suggests that based on a given level of military capabilities ($M\tau$) and

in the context of a valuable territory, criminal organizations control a larger share of their territory than when the state cracks down on them and reduces their military capabilities ($M\tau$ or $\gamma^{1-\sigma}M\tau$). Still, if the territory is valuable enough, criminal groups are better off retaliating against law enforcement in order to recover part of the lost territory than not contesting law enforcement ($\gamma^{1-\sigma}M\tau > M\tau$). In consequence, if the model is correct, we should expect that criminals will use violence to fight back the state. This suggests the following hypothesis:

(H_4) Increased law enforcement is associated with high levels of criminal retaliation against the state.

According to the equilibrium conditions, the actions of the state also have a disruptive effect on the relative military balance among criminal organizations and, if the territory is valuable enough, law enforcement may trigger violence among criminal organizations. Consider that a Target criminal group has a certain military strength to control a territory ($M\tau$); in this case the relative military strength of the Challenger DTO is denoted by $(1 - M)\tau$. If the state enforces the law against the Target, the crackdown will cause a certain amount of damage and reduce the military capabilities of this group by a factor of γ , such that $M\gamma\tau < M\tau$. By weakening the capability of the Target to defend its territory, the State indirectly improves the relative military strength of the Challenger criminal group, such that $(1 - M)\tau > \gamma(1 - M)\tau$. The Challenger is thus better off after the State has enforced the law against the Target. In consequence, the improved relative military position of the Challenger generates an opportunity in this actor's favor and may motivate an invasion against the already weakened Target criminal group. In addition, following the same logic of the Target's retaliation against the State, the Target is better off by fighting back the Challenger's invasion if the territory is worth the battle. Of course, it is difficult to observe the operation of these micro-mechanisms of violence, but if the model is correct, we should observe higher levels of violence among criminal organizations after

government crackdowns. This violent interaction can be expressed in the following hypothesis:

(H_5) Increased law enforcement is associated with high levels of violent competition among criminal organizations.

The equilibrium conditions also suggest a set of empirical implications for the degree of military damage and recovery capabilities of criminal organizations. As discussed in Section 2.3.3, rival criminal groups may engage in violent interactions trying to shift the relative military balance between them. Criminals can do so by increasing their capability to inflict damage against their rivals (high values of γ), or by increasing their own ability to recover from an attack (high values of σ). If criminals become more able to inflict damage on their rivals, it is expected that they will use that military strength to undertake violent actions. Therefore, violence is likely to increase. In addition, if criminal organizations increase their capacity to effectively recover from damage inflicted by their rivals, they are likely to keep fighting for control of valuable territory. In consequence, violence is also likely to rise. These relationships can be formulated according to the following hypotheses:

(H_6) Increased capability to inflict damage is associated with high levels of violent competition among criminal organizations.

(H_7) Increased capability to recover from an attack is associated with high levels of violent competition among criminal organizations.

Now, consider the importance of territorial value. As indicated by parameter τ in equations (2.1), (2.2) and (2.3), increasing the strategic value of a territory (higher values of τ) is associated with a higher propensity to use violence for capturing or defending those territories. In this way, the model incorporates the importance of structural factors such as geographic conditions that may determine the concentration of different dynamics of violence. This relationship can be formulated in the following hypothesis:

(H_8) Increased territorial value is associated with high levels of violent competition among criminal organizations.

Finally, Table 2.4 summarizes all the hypotheses that have been derived from the formal model. These empirical implications are organized according to their correspondence to the main research questions motivating the theoretical model: the onset, escalation and concentration of large-scale drug-related violence. The first set of hypotheses refers to the effect of democratization and political strain on increasing levels of law enforcement. This group also includes the negative relationship between corruption and enforcement. The second group of empirical implications relates to the diverse mechanisms operating in the escalation of violence. These include the effect of state actions on levels of criminal violence against government authorities and the disrupting effect of enforcement on violent competition among criminals. This group also includes a set of hypotheses for the relationship between the extent of military damage and recovery capability on violence among criminal organizations. Finally, to explain the geographic concentration of violence, the equilibrium conditions suggest the hypotheses linking the strategic value of certain territories with the level of conflict among criminal organizations. In general, the set of hypotheses reveals how the theoretical model is capable of integrating distinct explanations for the onset, escalation and concentration of violence into a unified analytical framework.

2.4.1 War of All Against All

The formal model presented in this research analyzes interactions between the state and two criminal organizations. By focusing on a small number of actors, the theoretical explanations allow the different micro-mechanisms of violence between the state and criminal organizations to be disentangled, as well as conflict between rival criminal groups. In addition, the model helps in understanding the effect of law en-

TABLE 2.4

SUMMARY OF EMPIRICAL IMPLICATIONS

Question	Hypothesis	Independent var.	Relationship	Outcome var.
Onset	H_1	democratization	increase	law enforcement
	H_2	political strain	increase	law enforcement
	H_3	corruption	decrease	law enforcement
Escalation	H_4	law enforcement	increase	violence against the state
	H_5	law enforcement	increase	violence among DTOs
	H_6	damage capability	increase	violence among DTOs
	H_7	recovery capability	increase	violence among DTOs
Concentration	H_8	territorial value	increase	violence among DTOs

forcement in disturbing the relative military balance between criminal organizations, which is capable of triggering a turf war between two criminal groups. The basic premises of this model can be generalized to more than two criminal organizations.

Generalizing the formal model to any number n of DTOs would make the mathematical argument too complex. Instead, consider Figure 2.7, which shows the extension of the argument visually. Assume that there are several drug-trafficking organizations operating within the jurisdiction of the state, denoted by DTO 1–6 in the figure. Panel (a) shows the interaction between the state and DTO 1. In this scenario, the use of law enforcement against DTO 1 generates criminal retaliation against government authorities but there is no violence between rival criminal groups. In Panel (b), state law enforcement against DTO 1 has disturbed the relationship between DTO 1 and DTO 2, triggering an invasion by DTO 2 against DTO 1. In this scenario, DTO 1 retaliates against the state and fights back against DTO 2 to repel the invaders. In Panel (c), state action not only triggers conflict between the state and DTO 1 but also a turf war between DTO 1 and DTO 2. Weakening DTO 1

may also signal to DTO 6 that it has an opportunity to invade the territory of DTO 1, thus opening an additional front of territorial competition between DTO 1 and DTO 6. This scenario shows that law enforcement can generate a wave of violence among neighboring criminal organizations.

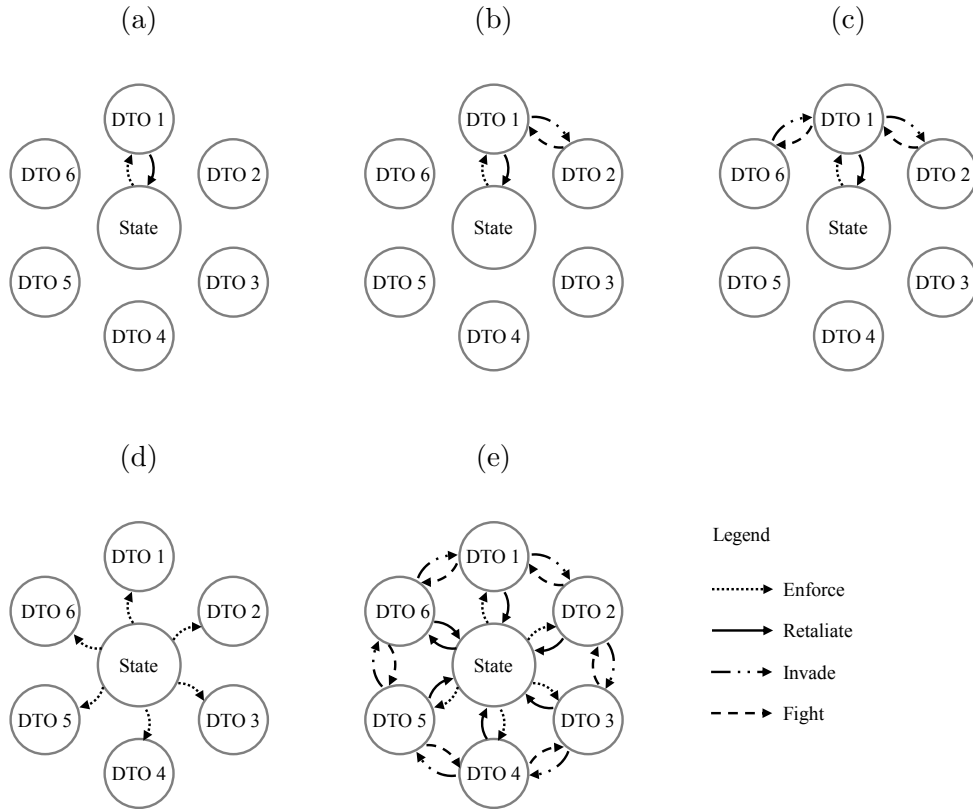


Figure 2.7. War of all against all

Panel (c) in Figure 2.7 also reveals an interesting characteristic of the strategic interaction between the state and drug trafficking organizations. In some circumstances, the state can threaten criminal organizations with the deployment of selec-

tive punishment. Consider a context where there is a general agreement between government authorities and DTOs capable of maintaining a peaceful configuration. In this scenario, the state might threaten to deliver selective punishment against a specific criminal group and not prevent predation by its neighbors. Law enforcement would signal that the targeted criminal group is no longer protected by a peace agreement with the state and might trigger an invasion from all other criminal organizations operating around that group. The threat of severe damage caused by law enforcement and simultaneous invasion by competing groups could deter criminal organizations from breaching the terms of the agreement. The prospects of law enforcement affecting the relative military balance among criminals against the targeted DTO should be especially worrisome if the criminal group has low military and recovery capability. The expectation of selective punishment might help the state to maintain criminal violence at bay in contexts characterized by non-aggression pacts.

Panel (d) in Figure 2.7 depicts the scenario in which government authorities launch a full-fledged campaign against all criminal organizations operating within the state's territory. This situation is likely to happen when there is a general decision from government authorities to end corrupt agreements and fight criminal groups. According to the theoretical model, this kind of political motivation to enforce the law is likely to emerge from democratization. As discussed in Section 2.3.2, improving democratic conditions is likely to erode peaceful configurations between corrupt government officials and criminal organizations, thus favoring the collapse of the preexisting order based on corruption. Improving democratic conditions increases the number of political actors and fosters political competition for the provision of public goods, including public security. Having a large number of political actors makes it more difficult for politicians to bargain with criminals and solve problems of collective action. Even if a corrupt pact is achieved, the diversity of party labels across levels of government would break the chain of command, thus compromising the feasibility of the

agreement, and effective elections would reduce its duration. Democratization also provides personal incentives for politicians to enforce the law as they seek to gain citizen support. In particular, new politicians might enforce the law as an effort to distinguish themselves from corrupt former officials. In addition, according to the model, periods of political strain tend to increase the willingness of government authorities to use harsh security policies as an effort to boost approval rankings and increase their legitimacy.

Finally, Panel (e) in Figure 2.7 represents a situation of war of all against all. In this *bellum omnium contra omnes* scenario, there is no order or peace. This situation resembles a Hobbesian state of war where life is “poor, nasty, brutish, and short” (Hobbes, 1651). According to the basic implications of the formal model, there are certain conditions under which law enforcement is likely to generate criminal retaliation against the state and territorial conflict between two criminal organizations. Panel (e) shows the extension of the implications of this argument to a generalized and sustained crime-fighting effort by the state. If government authorities enforce the law against several criminal organizations operating within their territory, these punitive efforts are likely to trigger a massive wave of violence where the targeted criminal groups retaliate against the state and fight each other in territorial conflicts. Thus generalized law enforcement is likely to open several battle fronts at the same time between the state and criminals and among competing criminal groups.

When the state tries to deliberately subvert the conditions that allow these criminal organizations to exist and to extract valuable rents from illicit markets, a violent reaction against the state can be expected. However, as discussed in Section 1.2, this is an effort by criminal organizations to maintain the status quo for economic purposes, not an attempt to overthrow the government for political reasons. In addition, Panel (e) shows how generalized law enforcement is likely to trigger a massive wave of violence between rival criminal organizations competing for valuable territories. The

disruptive effect of state action may affect the relative military balance across all criminal organizations, thus generating multiple opportunities for criminal groups to seize control over strategic areas using violence whether as instigators or defenders. If the model is correct, we could expect to observe that law enforcement stimulates more events of violent competition among rival criminal organizations than criminal violence against the state. In addition, we should be able to observe higher levels of violence in territories holding a larger number of criminal organizations, which are likely to be areas of high strategic value for drug-related activities.

In the scenario depicted in Panel (e), no actor has enough military power to monopolize the means of coercion. This implies that the state is not sufficiently strong to be able to suppress all criminal organizations. In Hobbesian terms, the state is not a Leviathan capable of imposing order by force on all the criminal groups. This also implies that criminal organizations have some capability for using violence to either fight the state or their rivals. However, it does not mean that all players (authorities or criminals) have equal military capabilities. It merely assumes that actors have enough military power to protect themselves or to employ violence against other actors if the conditions are favorable and the situation demands it. As stated by Hobbes, in times of war of all against all, actors have no other security than what their own strength can provide them. In this sense, the term “war on drugs” may not be rhetoric, but actually imply a generalized state of hostility between government authorities and criminal groups, as well as violence between rival criminal organizations. This state of violence of all against all in the context of the Mexican war on drugs is what motivates the title of this dissertation, “Hobbes on Drugs: Understanding Drug Violence in Mexico.”

2.5 Conclusion

Based on the analytical leverage of formal modeling, this research advances an integrated explanation for the onset, escalation and concentration of organized criminal violence. The model emphasizes both theoretical disaggregation and integration to account for the dynamic interactions between the actors – between the state and criminals and among rival criminal organizations – operating under the influence of structural factors – such as changing democratic conditions and varying levels of territorial value. In this way, the model allows for the interconnection between micro-mechanisms of violence and structural factors. The general argument of the model states that democratization motivates politicians to enforce the law against criminals, thus triggering a wave of violence between the state and criminal organizations and between rival criminal groups, which tends to concentrate around strategic territories.

The theoretical model helps create an understanding of how democratization disrupts the peaceful configurations allowing coexistence between corrupt government authorities and criminal organizations in contexts of low democratic development. Democratization erodes these peaceful configurations and alters the system of political incentives for government authorities, thus motivating politicians to fight crime. In addition, the model incorporates the effect of periods of political strain that increase the political benefits of government authorities using forceful security tactics to fight crime.

Based on a contest success model for territorial control, the theoretical explanation identifies the conditions under which increased levels of law enforcement are likely to trigger an escalation of conflict between the state and criminal organizations, and violence between rival criminal groups. In the model, the action of the state has a disruptive effect on the relative military balance of criminal organizations. Law enforcement weakens the capability of a criminal group to protect its territory, thus

motivating an invasion from a competing criminal group that now faces a weaker rival. The equilibrium conditions of the model indicate that criminal violence is a function of the severity of military damage, capability of recovering from damage, and the value of the territory. Organized criminals are thus likely to use violence if the net military strength recovered through fighting back when attacked is greater than the attractiveness of engaging in a confrontation given the value of a territory.

The model uses a set of clearly defined propositions and certain assumptions to build an integrative analytical framework to account for the onset, escalation and concentration of organized criminal violence in Mexico. The basic propositions of the model allow clear empirical implications to be derived, which will be evaluated in the empirical chapters of this dissertation.

CHAPTER 3

AUTOMATED CODING OF EVENT DATA

USING EVENTUS ID

3.1 Introduction

The previous chapter presented the formal model of how political factors and structural determinants affect the violent interactions between the state and criminal organizations, and conflict between rival criminal groups. In order to test the empirical implications of a formal model emphasizing theoretical disaggregation, it is necessary to have fine-grained evidence reflecting the dynamic interactions among different actors. Unfortunately, extant measures of drug-related violence in Mexico are exclusively focused on counting homicides and are too approximate or aggregated to provide sufficient analytical leverage to test the implications of the theoretical model. In contrast to the usual body count approach, this research relies on event data to analyze the actions and reactions between the different actors involved in the Mexican war on drugs. Building this database of event data required bringing together cutting-edge advances in computer science with research on political violence. The product of this multi-disciplinary approach is the development of *Eventus ID*,

a novel software for automated coding of event data from text written in Spanish. Eventus ID is useful for extracting detailed data on who did what to whom, when and where from news reports. This software allows fine-grained information to be generated on the actions undertaken by government authorities against criminal organizations, and violent actions perpetrated by criminal groups against the state and against other criminal organizations. In consequence, Eventus ID provides detailed information that can be used to analyze the micro-dynamics of conflict stipulated in the theoretical model.

This chapter is focused on describing the features and capabilities of Eventus ID. In addition, it presents the coding strategy implemented in this research for building the database on large-scale organized criminal violence that supports the empirical chapters of this dissertation. In general terms, Eventus ID is an automated protocol capable of reading news reports in order to identify event data from text written in Spanish. Eventus ID relies on the core coding technique used in TABARI, another automated protocol developed by (Schrodt, 2009) for coding event data from text written in English. However, TABARI performed poorly when coding text written in Spanish. Eventus ID provides several technological innovations that overcome the limitations of TABARI. Eventus ID is the first software for event coding capable of processing text written in Spanish. This is possible thanks to the development of a more sophisticated and flexible coding algorithm that adapts to the grammatical features of Spanish. In addition, Eventus ID has an ancillary application capable of identifying the geographic location of events at municipal level, thus enabling the possibility of georeferencing event data.

This chapter is structured in two parts. The first section locates the automated coding protocol used in this dissertation within a broader context of databases of event data in conflict research. This section also discusses the methodological advan-

tages and limitations of different computer-based coding protocols vis-à-vis coding projects relying on manual annotation.

The second section presents Eventus ID, the automated textual annotation protocol used to build the database on large-scale organized criminal violence used in this research. This segment provides a technical discussion of the five stages implemented for generating the database. The first stage explains the strategy for gathering a massive collection of news reports from 105 sources of information at the national and local level. This section makes explicit the criteria for selecting news reports that meet the inclusion requirements and explains how individual reports are reformatted for Eventus ID. The second stage describes the characteristics of the actors and verb dictionaries used by Eventus ID as searching categories for identifying events from news reports. This section also provides a technical discussion of the algorithms that enable Eventus ID to accurately identify events in the text. The flexibility of these algorithms enable Eventus ID to adjust the coding protocol to the grammatical features of Spanish. The third section illustrates the procedure for georeferencing events already identified from news reports. The fourth section provides an assessment of the accuracy of the automated coding protocol compared to manual annotation and discusses some recoding rules to improve the coding precision. Finally, the last stage discusses the characteristics of the validated database of event data.

3.2 Historical and Technological Developments of Automated Coding

3.2.1 A Brief History of Event Data

Political scientists have relied on event data to conduct quantitative analysis of conflict in international relations and internal violence for several decades. In the beginning, researchers relied on large teams of coders who would read newspapers or

other information sources in order to manually code event data. These projects were highly demanding in terms of labor and financial resources. Eventually, high costs made it difficult to update or expand most of those projects. With the advent of artificial intelligence and increasing availability of information in the Internet, quantitative conflict research received a new impulse with machine-generated databases. Scholars in political science took advantage of developments in a branch of computer science called natural language processing and developed protocols for extracting textual information from written sources and building new databases.

Some of the earliest projects to systematically study international crises began in the 1960s. McClelland (1978) developed the World Event Interaction Survey (WEIS), a coding scheme for studying conflict and cooperation between states in a political crisis. WEIS used information from *The New York Times* and organized the flow of action and response between countries into 22 broad categories comprising 63 types of events ranging from diplomatic cooperation to conventional warfare. The data and coding scheme of this seminal project have been broadly used by international relations scholars for several decades (see Azar and Ben-Dak, 1975; Dixon, 1981; Goldstein, 1992; Howell, 1983; McClelland and Hoggard, 1969; Tanter, 1972; Volgy and Quistgard, 1974).

WEIS motivated other efforts to quantify conflict and cooperation in international relations such as the Dimensionality of Nations Project (DON) which analyzed conflict interactions of 1,557 nation pairs between 1950 and 1965 (Rummel, 1966, 1976*a,b*, 1979). DON codes the actor and target involved in a conflict, the date of conflict, and a dichotomous variable for the presence or absence of violent conflicts. Another study was the Comparative Research on the Events of Nations (CREON) (Hermann, 1975; Hermann et al., 1977, 1973). CREON contains conflict data for 36 countries between 1959 and 1968 from the *Deadline Data on World Affairs*, a publication containing information on historical, political and economic matters from 46 international sources.

This project provided a more detailed list of actors and sources, and categorized action variables into verbal and nonverbal behavior, which can be further divided into conflictual and cooperative actions.

Perhaps one of the largest projects influenced by WEIS is the Conflict and Peace Data Bank (COPDAB) directed by (Azar, 1970, 1975, 1980) at the University of North Carolina. This database contains international interactions and domestic events for 135 countries from 1948 to 1978 coded from more than 70 sources. COPDAB includes a detailed description of each event and records the date of the episode, the actor initiating the event, the target of the action and other information about the scale and severity of the event. COPDAB uses this information to create 16 ordinal categories of conflict and cooperation.

The enthusiasm for generating conflict databases in international relations extended to studies of intra-state violence. In the late 1960s, Arthur Banks launched the Cross-National Time-Series Data Archive at the Center of Comparative Research in State University of New York at Binghamton (Banks, 1971). The Bank's dataset contains conflict event data on a variety of actions such as general strikes, guerrilla warfare, purges, riots, revolutions and anti-government demonstrations. In addition, Gurr (1968) led a large data collection project named "A Causal Model of Civil Strive" coding data for 114 nations between 1961 and 1965. This project included data on conspiracy (e.g. internal war, turmoil and total strife), deprivation (e.g. economic and political deprivation in the short and long term) and mediating variables (e.g. legitimacy, coercion, institutions and previous levels of strife).

In general, the 1960s and 1970s saw the production of large event data sets of international and domestic conflict. These quantitative efforts relied on a large number of coders to process vast amounts of information. Due to their nature, these coding projects were highly intensive in terms of time and labor, and demanded large amounts of financial resources. According to Schrodtt (2006), the production of

large data sets slowed down as funding by the U.S. Department of Defense Advanced Research Projects Agency (DARPA) was discontinued. With resources scarce, researchers struggled to find the funding necessary for updating existing projects or producing new databases that relied on legions of coders flipping newspaper pages. In consequence, many of the data sets generated during these two decades were not even updated due to the lack of funding.¹

In the late 1980s, the generation of conflict databases received a new impulse thanks to the support of the National Science Foundation (NSF) through the “Data Development in International Relation” (DDIR) project (Merritt, Muncaster and Zinne, 1993). In contrast to previous coding projects in the 1960s and 1970s, several new projects began incorporating machine coding instead of human coders to reduce the labor and financial costs of generating and updating data sets. One of these developments was the Global Events Data Set (GEDS) project led by Davies (1998), which incorporates computer-assisted coding to identify daily international and intra-national events from Reuters reports.

At the end of the 1980s, Philip Schrodt started incorporating developments from artificial intelligence for building data sets as an effort to overcome some of the limitations and costs of generating databases using human coders. Schrodt received funding from the NSF to develop the Kansas Event Data System (KEDS) (<http://web.ku.edu/~keds/>). KEDS is an automated protocol for coding news reports to generate event data on international conflicts in the Middle East, the Balkans and West Africa (Schrodt, Davis and Weddle, 1994). KEDS uses the lead sentence of English-language news wires generated by the international news agency Reuters and gathered through LexisNexis.

¹Arthur Banks was one of the few authors who managed to update his data set, doing so by creating a private firm and selling the data. The Cross-National Time-Series Data Archive is current up to 2011 and can be found at <http://www.databanksinternational.com/>

KEDS represented a break with the past in the generation of databases of political behavior because of its *sparse parsing* technique. Sparse parsing requires only some parts of a sentence (subject, verb and object) in order to identify an event. These elements are determined by dictionaries providing patterns of pronouns and verb phrases. Because of this, sparse parsing only needs to focus on the basic subject-verb-object structure to code an event. This strategy allows news reports to be coded much faster than human coders with similar levels of accuracy can, thus substantially reducing the costs of generating event databases (Schrodt, 2001; Schrodt, Davis and Weddle, 1994).

KEDS strongly influenced other machine-coding projects such as the Protocol for the Analysis of Nonviolent Direct Action (PANDA) led by Doug Bond at the Center for International Affairs at Harvard (Bond et al., 1997). PANDA eventually turned into a commercial risk management enterprise named Virtual Research Associates, Inc. (VRA) (<http://vranet.com/>). The PANDA protocol also served as the basis for the Integrated Data for Event Analysis (IDEA) (Bond et al., 2003).

Based on the experienced gained with KEDS over several years, Schrodt developed another software program called Textual Analysis by Augmented Replacement Instructions (TABARI) (Schrodt, 2009). TABARI uses the same sparse parsing principles originally developed for KEDS, but in contrast to its predecessor written in PASCAL, TABARI is written in C/C++ programming language, which makes it faster, more efficient and readily usable in Macintosh and LINUX environments. Data generated by TABARI is widely used for studying international conflict and the software itself is used in other projects generating new datasets such as The Rice Events Data Extractor (REDE) (Subramanian and Stoll, 2006*a,b*) and the Project Civil Strife (PCS) (Shellman, 2008, 2013). Schrodt and his team later began working on the Political Instability Task Force and eventually developed the Conflict and Mediation Event Observations (CAMEO) scheme (Gerner et al., 2002).

Several technological innovations such as the Internet enable massive amounts of machine-readable text to be generated that greatly facilitate creating computer-generated databases. Readily available information also helps to substantially reduce the costs associated with launching new coding projects and updating existing ones. According to Lazer et al. (2009), the emergence of computational social science is based on the unprecedented capacity to collect and analyze data with an exceptional breadth, depth and scale. Based on these technological possibilities, political science is joining a recent surge on “big data” using vast amounts of data to analyze complex behavior. The most important development made in this area is the Global Data on Events, Location and Tone (GDELT) database developed by Leetaru and Schrodt (2013). Based on the initial developments of CAMEO, GDELT relies on TABARI to code event data from 1979 to the present covering all countries in the world to generate more than 200-million political events. This unprecedented amount of data created vivid enthusiasm in the academic community as “big data” opens new ways to analyze political events.

Despite the boom in computerized coding, conflict scholars still rely on human coding for studying conflict processes. For instance, the Uppsala Conflict Data Program (UCDP) started by Wallensteen (1981) comprises several data sets on global armed conflicts since the 1970s and is currently one of the most used databases in conflict research <http://www.pcr.uu.se/research/ucdp/>. However, the generation and sustainability of ambitious data projects such as UCDP are still highly dependent on substantial financial resources. In particular, UCDP receives funds from Sida (the Swedish International Development Cooperation Agency), the Bank of Sweden Tercentenary Foundation, the Swedish Research Council, Uppsala University and other contributors.

Whether automated or human-based strategies are used for building or updating databases, the central challenge of building databases of any sort is that raw infor-

mation must be organized and classified so that researchers can use it for analytical purposes (Cardie and Wilkerson, 2008). As discussed in the following section, there are trade-offs between manual and computer-assisted protocols. Manual approaches can be challenging for large tasks of information gathering and data coding, especially when human and financial resources are scarce. Humans, although slower, are substantially better than computers at comprehending abstract and complex information. Automated methods, on the other hand, have the advantage of coding at a greater speed than human coders. However, machine coding is usually not as accurate as manual methods for coding complex information. In any case, researchers should analyze which coding scheme represents a better strategy for the needs of any specific project.

3.2.2 Trade-offs Between Manual and Machine Generated Event Data

According to Cardie and Wilkerson (2008), textual annotation methods can be categorized according to the extent to which humans intervene in the coding process. Figure 3.1 shows how annotation strategies can be located in a continuum of textual annotation methods. At one extreme, *manual methods* refer to coding schemes in which humans perform all the activities associated with analyzing and classifying raw information according to specific categories. At the other extreme, *unsupervised learning algorithms* refer to computer-based protocols used for identifying patterns in text without any human intervention. Between these two extremes, *supervised learning algorithms* refer to coding protocols in which the computer uses annotation instructions developed by the researcher to replicate human annotation decisions.

Human-based methods are the best for generating accurate interpretation of complex texts. However, manual annotation is time and resource intensive. Baumgartner, Jones and MacLeod (1998) describe the difficulties of building large data sets using

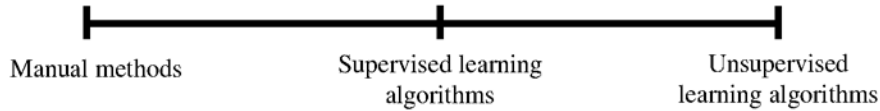


Figure 3.1. Continuum of Textual Annotation Methods

human coders. The process usually involves a broad range of activities including developing coding protocols, training coders, managing teams, evaluating the data quality, updating the codebook, assessing progress, fixing problems, ensuring individual motivation, assessing coder reliability, training new coders, and holding periodic meetings to discuss issues, among other activities. According to Schrodtt and Gerner (2012), manual annotation protocols are the best alternative when the research has the following characteristics: coding small data sets; data is to be coded only once; existing dictionaries cannot be modified; text has complex sentence structures; the research object requires metaphorical or idiomatic analysis; and the coding unit is focused on the paragraph or entire document.

Fully automated clustering (FAC) is an example of unsupervised learning algorithms that simultaneously estimate the topics covered in specific documents and then classify the documents into those categories (Grimmer and Stewart, 2013). In unsupervised methods the researcher does not need to know the underlying categories or features of the text *a priori*. FAC can be used to discover topics or categories when the volume of documents is too large or the information they contain is too complex. For example, Quinn et al. (2010) use FAC to analyze 118,000 speeches in the U.S. Senate from 1997 to 2004.

A wide range of supervised learning algorithms are used for assigning texts to predetermined categories. This is why these coding schemes are the most common type of content analysis used in political science (Grimmer and Stewart, 2013). Supervised methods usually require the researcher to develop *dictionaries* containing key words that represent categories of interest. Automated-coding protocols use these dictionaries as input provided by humans to classify text according to the set of categories. The combination of dictionaries and the coding algorithm aims to replicate the decision process that humans would use for classifying text according to the predetermined categories.

Although machine coding offers some advantages over manual methods, computerized annotation is not a silver bullet. Moreover, as mentioned by Grimmer and Stewart (2013), the first principle of automated text analysis is that *all quantitative models of language are wrong, yet some are useful*. A language is a system – a set of ordered rules – that allows its users to structure symbols for reference or representation purposes. Different languages (e.g. English, Spanish, Chinese, mathematical, chemical, gesture, chromatic, etc.) use different sets of rules and symbols to represent their objects of interest. In natural language (phonetic and written), words constitute these symbols of representation. Words are abstractions of the things they refer to. These abstractions, represented by symbols, are the building blocks of language and the key elements used for reasoning and knowledge. Language is thus not only useful for communication purposes, it also constitutes an instrument. Natural language is often highly complex, and computerized methods of textual analysis fall short in accurately capturing the abstractions represented through language. However, despite this limitation, automated-coding protocols can be highly valuable for specific research objectives.

Based on the analysis made by Schrodtt and Gerner (2012) on the advantages and shortcomings of human and automated coding approaches, Table 3.1 compares the

trade-offs between manual and supervised methods across four main issues. The first group refers to trade-offs concerning the characteristics of the coding project. Supervised textual annotation is better suited for processing large volumes of documents, whereas human coding is more appropriate for small scale projects. Automated coding has the advantage of allowing researchers to recode the same documents in repeated coding periods. Supervised machine coding also allows researchers to easily modify or update dictionaries and recode the entire set of documents with the new dictionaries. This also allows for easily updating or expanding the project by processing new information. In contrast, coding projects relying on humans usually carry out the coding stage only once because recoding would require substantial resources in terms of time and labor. Sometimes researchers using manual methods discover limitations or problems in their dictionaries when the coding project is at an intermediate or advanced stage. In such cases, modifying the dictionaries for the rest of the project would cause problems of internal consistency, but not modifying them would mean carrying the dictionary problems or limitations through to the end of the project. Another option would be to modify the dictionaries and restart the coding from the beginning. However, as discussed in Section 3.2.1, scarcity of resources often makes it impractical to recode or update projects using manual methods.

TABLE 3.1

COMPARATIVE ADVANTAGES OF MANUAL AND SUPERVISED
ANNOTATION METHODS

Criteria	Manual coding	Supervised coding
Coding project		
Volume of documents	Small	Large
Coding period	Once	Repeated or continuous
Recoding possibility	No	Yes
Updating possibility	Difficult	Easy
Dictionary modification	Not recommended	Easy
Content of interest		
Coding unit	Entire document	Sentence or paragraph
Syntax characteristics	Complex	Simple
Content of interest	Metaphoric or idiomatic	Literal
Bias concerns		
Sources of coder bias	Several	Unique
Concern of inter-coder reliability	Considerable	Non-existent
Bias caused by coder fatigue	Considerable	Non-existent
Possibility of information bias	Considerable	Minimum
Feasibility of the coding project		
Coding time	Slow	Fast
Labor and financial demands	High	Low

The second group of trade-offs refers to the specific content of interest in a coding project. Automated coding is more appropriate when the coding unit consists of sentences or short paragraphs with simple syntax, and when the researcher is interested in the literal content of the text. In contrast, manual methods are more appropriate when researchers are interested in analyzing the overall content of entire documents.

In particular, human coding is more suitable when the coding process requires analytical abstraction from the text or when the researcher is interested in the figurative or metaphorical use of language.

The third group refers to concerns of bias by coders or in the information sources that may affect the quality of the database. According to Adcock and Collier (2001), measurement validity is a central concern in both quantitative and qualitative research and the application of coding protocols may sometimes yield to some inconsistencies. If these inconsistencies are non-systematic, then the measure may have some problems of random error which could affect the reliability of the results but are not likely to generate misleading results. However, if the error is systematic in a specific direction or form, the measure may suffer problems of bias which could lead to erroneous conclusions (Collier and Brady, 2004; Geddes, 2003; King, Keohane and Verba, 1994). Coding projects based on manual methods usually require training human coders to understand and apply the rules of the coding protocol. However, as Tversky and Kahneman (1974) show, these efforts are not sufficient to guarantee compliance with the coding rules since human coders often apply their own subjective assessment and heuristic principles to classify information. In consequence, as the complexity of the coding scheme increases, interpretation and judgment become more important (Harvey, 2008; Sipes, 1976).

If the project uses human coders, each individual person involved in the coding process is a potential source of coder bias. There is a broad range of subjective influences that can generate inconsistencies between coders. Unfortunately, despite a few exceptions (Coppedge and Reinicke, 1990; Rohner and Katz, 1970), researchers do not usually pay much attention to inter-rater reliability of coders in projects based on manual coding methods. Systematic repetition of the same coding scheme in automated methods eliminates the problem of inter-coder reliability; however, the

dictionary developed by the researcher remains a potential source of coder bias in automated coding.

As noted by Baumgartner, Jones and MacLeod (1998), coder fatigue is an important source of bias in manual coding. Large projects usually involve teams of coders slowly reading vast volumes of information and often individual motivation and attention diminish while boredom increases over time. When coders are fatigued they may simply skim through the information they are supposed to read carefully, thus missing some important pieces of information and introducing type II error into the database. Tired coders also tend to be less meticulous in the application of complex coding rules, thus leading to more type I error. In machine-generated databases tiredness and boredom are not a concern as the machine never tires.

Another source of bias may come from the information sources used in the coding project. Due to limited resources and time constraints, researchers using manual methods tend to rely on a handful of information sources. In conflict research, newspapers remain the dominant source of information for studying violence.² However, as noted by Davenport and Ball (2002) and Davenport (2009*a*), different sources of information may cover the same events from very different perspectives, thus generating important consequences for the inferences drawn from the evidence reported in those sources. Automated coding reduces the effect of specific newspapers by simultaneously processing a large number of information sources. Increasing the number of information sources reduces concerns of under-reporting due to coverage bias and helps minimize ideological bias caused by specific political views.

Finally, the fourth group of trade-offs refers to the resources required by different coding strategies. Manual coding usually requires a substantial investment in terms

²For example, news report databases are prevalent in research on contentious politics (Hibbs, 1973; McAdam, 1982), as well as in social movements (Almeida, 2008; Tarrow, 1998; Trejo, 2009), state repression and dissent (Davenport, 1995; Francisco, 1996; Moore, 1998), and international conflict (Bond et al., 1997; Davis and Moore, 1995; Shellman, Hatfield and Mills, 2010).

of time, labor and financial resources. Unfortunately, research projects often face significant constraints that have to be weighed when assessing the overall feasibility of the project. Machine-based protocols offer an alternative that substantially reduces the time and financial demands for some types of coding projects that may increase the feasibility of research endeavors when there are budgetary constraints. However, as reflected in Table 3.1, automated coding may not be the best strategy for all projects and researchers have to carefully evaluate the trade-offs between manual and machine-assisted methods.

3.3 Coding Event Data Using Eventus ID

Initially, I attempted to use TABARI (Schrodt, 2009) for building the database of events of drug-related violence in Mexico. As mentioned in Section 3.2.1, TABARI is a widely used software for coding event data which has stimulated a broad spectrum of research in international relations and intra-state conflict.³ TABARI has some nice features that allow it to accurately code events from news reports written in English. Most research projects using TABARI rely on headlines of news reports generated by Reuters. These headlines are usually crafted by professional journalists who manage to provide a succinct yet accurate description of an event in a well-written sentence. Reuters headlines are the main coding unit for most projects using TABARI, which facilitates the task of event coding using high quality text. In addition, English is a highly structured language with clear sentence patterns and simple, yet general, grammatical rules that enable clear, direct communication of ideas (Stockwell, Bowen and Martin, 1965). As mentioned by Schrodt (2009), the quality of text is crucial for

³For a non-exhaustive list of research using TABARI-generated data, see <http://eventdata.psu.edu/papers.html>.

the accuracy of TABARI, and the carefully crafted Reuters reports written in English are key elements for accurate performance of this software.

Unfortunately, several tests showed that TABARI performed poorly for coding event data from text written in Spanish. Of course it is not reasonable to ask a natural language processing protocol originally designed to code in one language to perform well when processing information in a different language. There are two elements that undermine the performance of TABARI for coding event data from text in Spanish. First, the grammatical structure of Spanish is different than that of English. In addition, journalists in the Mexican media tend to write sentences in passive voice, which increases the complexity of the text. However, the limited performance of TABARI was not only caused by the need to process text in a language for which the software was not designed. The other limitation is directly related to the lack of flexibility of TABARI's coding algorithm. TABARI looks for three elements in the text: source, action and target. In order to code an event, *all three elements* have to appear in the text *in that specific order*. If one of those elements is missing or the three of them do not appear in the required sequence, TABARI does not report an event. Spanish word order is more flexible than English, and the subject of a sentence can be unstated and implicit; therefore the rigidity of TABARI's coding algorithm generated substantial error and under-reporting when attempting to code events from text in Spanish. The lack of software capable of accurately coding events from text written in Spanish motivated the development of Eventus ID.⁴

⁴The development of Eventus ID was possible thanks to Phillip Schrodtt who kindly shared with me the core event-coding algorithm of TABARI, which served as the cornerstone for independently developing Eventus ID. The development of Eventus ID was possible thanks to the collaboration of Alejandro Reyes, a computer scientist of extraordinary talent, who guided me through the fascinating discipline of natural language processing.

3.3.1 Eventus ID coding process

Eventus ID is a supervised coding protocol for automated identification of event data based on pattern recognition of text written in Spanish. The empirical evidence that supports this research is produced using Eventus ID according to a coding scheme consisting of five stages represented in Figure 3.2. The first stage refers to the process of gathering information from news reports based on specific inclusion and exclusion criteria; the compilation of individual files containing relevant reports; reformatting the files for making them machine-readable; and compiling individual reports into a general text corpus to be used as the input file for automated coding. The second stage consists of running Eventus ID's coding algorithm to identify event data. This task requires the development of actor and verb dictionaries for identifying events in the text. The output of this stage is a file containing event data. The third stage refers to the process of georeferencing the data set. In this stage, Eventus ID takes the database generated in the previous step and identifies the location of the events mentioned in the original reports. This stage requires the development of a location dictionary and produces a database of georeferenced event data. The fourth stage consists of validating the data set by comparing a sample of the machine-generated event data to a database manually coded by humans which serves as the "gold standard" for validation purposes. Validation often requires the modification of actor, verb and location dictionaries as well as recoding of some events to improve the accuracy of the machine-generated database. The validation and recoding process is repeated several times to increase the convergence between human and machine coding. Finally, the fifth stage generates and outputs a validated database of georeferenced event data. The following sections of this chapter describe the processes implemented in each stage.

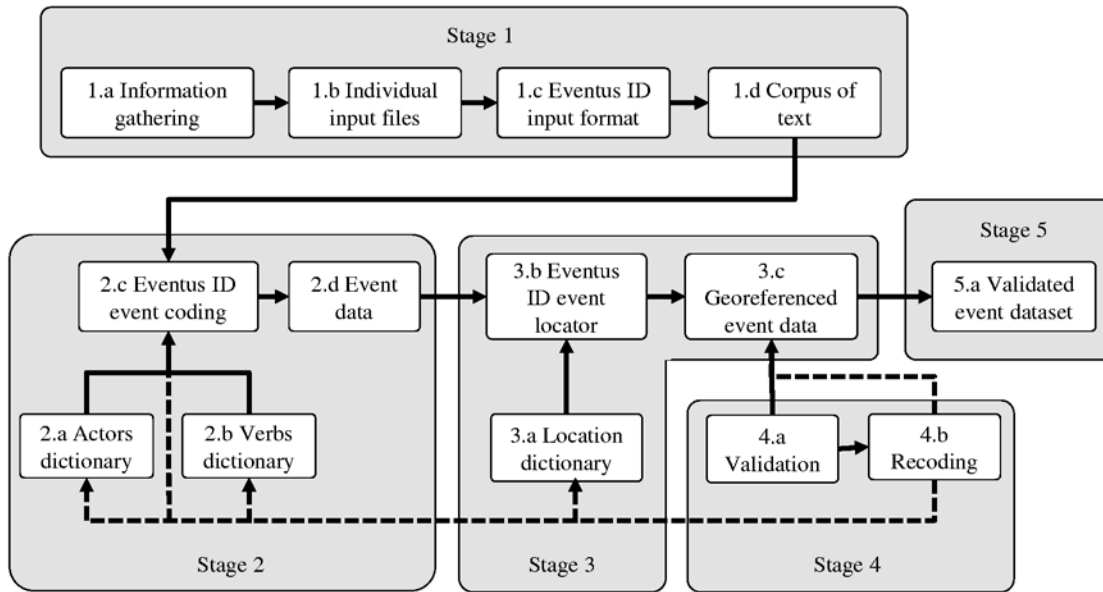


Figure 3.2. Eventus ID process

3.4 Stage 1. Input Files

3.4.1 Step 1.a. Information Sources, Coverage and Selection Criteria

As mentioned in Section 3.2.1, most conflict databases rely on newswires written in English and reported by a handful of sources such as Reuters, *The New York Times* or *Agence France Presse* (AFP). A few projects on international conflict use local news sources for studying specific countries.⁵ In contrast, some country-specific studies such as the one conducted by Trejo (2009) in Mexico on indigenous insurgency and the one by Almeida (2008) on social movements in El Salvador rely on national level newspapers written in the local language. However, due to the financial and

⁵For example, the Project on Civil Strife led by Shellman, Hatfield and Mills (2010) as part of the Violent Intra-national Political Conflict and Terrorism (VIPCAT) (Shellman, 2013) includes five sources; the Associated Press, British Broadcasting Corporation, Japan Economic Newswire, United Press International, and Xihyua.

labor demands of manually coding newspaper databases, large coding efforts rarely include subnational level sources.

Although news reports are a primary source of information for conflict databases, the use of newspapers does not come without problems. According to (Davenport and Ball, 2002), news coverage of contentious politics is affected by three elements: event intensity, media location and media sensitivity. Media tends to devote more attention to large, violent or bizarre events. Newspapers are also more likely to report events occurring close to their location or within their area of coverage. In addition, the political orientation of the newspaper also imprints a specific bias on the events reported. These elements may combine to generate two main types of systematic bias in newspaper-generated data. One source of bias is *selection bias*, which refers to the media bias in determining what is published or not among the many possible events they can observe and report. Another source refers to *description bias* in the events they do select to report, which includes aspects such as emphasizing the source's political orientation, highlighting specific aspects of the event, and including different subsets of the report.

Coverage bias is an important concern, but the magnitude of the problem is not clear.⁶ Since there is no consensus on the magnitude of bias caused by differences in media coverage, the most appropriate strategy is to take a conservative approach. As Davenport (2009a) argues, probably the best way of minimizing the influence of specific coverage bias from individual information sources is to build the data sets using multiple sources.

⁶Some argue that coverage among national newspapers is fairly similar. For example, Jenkins and Perrow (1977) found little difference in how *The New York Times*, *The Chicago Tribune* and *Los Angeles Times* covered farm worker insurgencies in California over a twenty-seven-year period. In contrast, others argue that coverage differences are substantial between national and local newspapers. Snyder and Kelly (1977) found large discrepancies in national and local newspaper accounts of racial disturbances across 673 U.S. cities between 1965 and 1969, and nonviolent protests occurring in 43 U.S. cities in 1968.

To minimize concerns about coverage bias, this research relies on 105 information sources that issued news reports written in Spanish between 2000 and 2010. Table 3.2 reports the main types of information sources, which includes four federal government agencies, 32 local government agencies (one per each state), 11 national newspapers, and 58 local newspapers (at least one per each state). This combination of official and public sources at the national and local level minimizes the risk of coverage and description bias in the database.

TABLE 3.2

NUMBER OF INFORMATION SOURCES

Source Type	Number of sources
Federal government agencies	4
Local government agencies	32
National newspapers and magazines	11
Local newspapers	58
Total	105

Government information sources at the federal level include the Federal Security Ministry, *Secretaría de Seguridad Pública* (SSP); the Army, *Secretaría de la Defensa Nacional* (SEDENA); the Navy, *Secretaría de Marina Armada de México* (SEMAR); and the Office of the Attorney General, *Procuraduría General de la República* (PGR). Official sources at the local level came from the offices of State Attorney Generals, *Procuradurías de Justicia Estatales* (PJE) for each of the 32 states.⁷ Table 3.3

⁷Press releases from the different government agencies can be found at the following links; Federal Police (http://www.ssp.gob.mx/portalWebApp/wlp.c?__c=85c), the Army (<http://www.sedena.gob.mx/index.php/sala-de-prensa/comunicados-de-prensa>)

shows that, with the exception of the Federal Police and the Navy, all other sources of information have available information throughout the research period from 2000 to 2010, thus minimizing concerns of temporal bias in news coverage.⁸

TABLE 3.3

AVAILABILITY OF INFORMATION SOURCES

Source	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Police											
Navy											
Attorney General											
State Attorneys											
Army											
National press											
Local press											
Dark gray is for gathered reports and light gray is for not available reports.											

The list of national newspapers includes *Servicio Universal de Noticias* (also known as *El Universal*), *El Economista*, *El Financiero*, *Excélsior*, *Notimex-Nacional* (the state news agency), *Reforma*, *La Jornada*, *El Sol de México*, *Milenio Diario*, *Revista Proceso*, and *La Crónica de Hoy*. It is known that different national level

for central headquarters and <http://www.sedena.gob.mx/index.php/sala-de-prensa/comunicados-de-prensa-de-los-mandos-territoriales> for the different territorial divisions), the Navy (<http://www.semar.gob.mx/s/sala-prensa/comunicados-2013.html>), Office of the Attorney General (<http://www.pgr.gob.mx/Prensa/prensa.asp>), and the offices of State Attorney Generals (<http://www.pgr.gob.mx/prensa/prensa.asp?tRcd=2>).

⁸I issued a couple information access requests asking the Police (request number 0002200060811) and the Navy (request number 0001300022711) to give me copy of their press releases between 2000 and 2006. However, these to agencies responded that all the press releases for those years have been destroyed and are no longer available. In Mexico there is a Bill allowing government agencies to destroy all official information, archives and records older than five years (see *Diario Oficial de la Federación*, 1998).

newspapers in Mexico have different coverage and ideological orientations. For example, *Reforma* has better coverage of the north of the country and is usually considered to be a conservative newspaper. In contrast, *La Jornada* has better coverage of the south of Mexico and often takes a left-wing view in its reports. Having several national newspapers reduces the coverage and ideological limitations of each individual source.

Although illustrative, national newspapers may not tell the full story. News that are important at the local level often do not find their way up to national newspapers. Space limitations and editorial decisions often prevent a large number of local news stories from appearing in national newspapers. In order to minimize problems of media under-reporting between the national and local levels, this research also collected data from 58 local newspapers. Appendix A.2 presents the number of information sources per year and shows that there is at least one local newspaper per state in the entire research period. In addition, Appendix A.3 reports the complete list of sources. This research paid special care to attempting to minimize coverage and under-reporting of events by using a large number of official and private sources. Such a large number of information sources may raise concerns of multiple counting when more than one newspaper reports the same event. For this reason, as discussed in Section 3.7.3, a procedure for detecting and eliminating duplicates was implemented.

3.4.1.1 Manual gathering and selection criteria

Information gathering consists of a hybrid strategy combining information technologies for retrieving reports and a team of research assistants for identifying relevant news reports from the large number of information sources.

For national and local newspapers, the information-gathering strategy uses *Infolatina* (<http://www.infolatina.com.mx/>), a system providing access to a large collection of news sources in Mexico. A query entered into Infolatina's search en-

engine is used for systematically searching within the large number of newspapers for any reports associated with drug violence. Appendix A.1 shows the query used in Infolatina's system.⁹ The result of the search is a list of news reports that meet the criteria specified in the query. The list includes the headline of each report and a link to its entire content. After Infolatina has presented the results of the search, a team of human coders reads all the headlines and selects the set of news reports according to a specific selection criteria.

Infolatina was only used for identifying reports from newspapers. However, this collection of sources does not include press releases from government agencies. To overcome this limitation, the team of human coders searched the websites of the government agencies associated with the war on drugs and identified any press releases relevant to this study. In most cases, state agencies make their press releases available online, especially those issued since 2007. Press releases issued by the Army before December 2006 are not available on the Internet and were obtained in hard copy. Research assistants reviewed the Army press releases and selected those relevant to this research.

To select the appropriate news reports, research assistants were trained on the key conceptual definitions guiding this research that are mentioned in sections 1.2 and 1.3. In addition, they were instructed 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:

⁹The query consists of two parts. The first section, presented in *typewriter font* in Appendix A.1, refers to all the words used in the search for selecting news reports that contain any of the specified words. However, violence tends to receive intense coverage from the media and often generates a large volume of reports that are not directly relevant to this research. For that reason, the second part of the query refers to the exclusion criteria which is presented in *typewriter font in Italics* in the Appendix. The elements of this exclusion criteria are used for filtering out reports that are not directly relevant to the objectives of the research.

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:¹⁰
 - 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).
 - Presence of signs, marks or messages (“*narcomensajes*”) associated with organized crime.
 - Bodies discovered in clandestine mass graves, wrapped in blankets (“*ensarpados*”), found inside abandoned vehicles (“*encajuelados*”) or in containers (“*entambados*”).
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,

¹⁰This 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 (2011b).

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 a lot of attention from the media and lots of people talk about it. However, this research is strictly focused on events (facts, episodes, things that happened), not what people have said 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. Ejercito Zapatista de Liberación Nacional (EZLN) or Ejercito 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).

Systematic application of the inclusion and exclusion criteria help identifying valid events of organized criminal violence that correspond to the conceptual definitions presented in Section 1.3 of Chapter 1. These news reports constitute the raw material for building the database and are crucial for validation of the coding protocol discussed in Section 3.7.1.

3.4.2 Step 1.b. Collecting Individual Input Files

Application of the selection criteria identified 41,838 reports of events associated with organized crime violence. Table 3.4 presents the distribution of the number of reports across different sources of information. The largest number of news reports were from the offices of State Attorney Generals, national news sources and local newspapers. These three sources of information provided 80.05% of all reports.

TABLE 3.4

NUMBER OF NEWS REPORTS

Source type	Num. of documents	Percentage by type	Gathering goal
Police	1,572	3.76%	100%
Navy	421	1.01%	100%
Attorney General	3,328	7.95%	100%
State Attorney General	12,728	30.424%	100%
Army	3,026	7.23%	100%
National press	10,849	25.93%	100%
Local press	9,914	23.7%	100%
Total	41,838	100%	

The content of all individual reports were extracted from their original formats and stored in plain text files. Due to the diversity of information sources, original files come in a variety of formats such as Hypertext Markup Language (*.html*), Microsoft Word (*.doc*) and Portable Document Format (*.pdf*). The set of press releases issued by the Army which were available in hard copy were scanned and converted to *.pdf* format. The content of individual *.pdf* files was converted to plain text format (*.txt*) using the ReadIris 12 Optical Character Recognition (OCR) program.¹¹ After being processed, all *.html*, *.doc* and *.pdf* files were saved in plain text *.txt* with UTF-8 encoding.

The process of transforming different file formats into plain text files includes assigning a unique name to each file. The nomenclature standard consists on three elements: the date of the event; an acronym indicating the type of information source; and a counter for unique identification. The name of each file is structured as:

YYYYMMDDccc_SRC.txt

The first eight digits (YYYYMMDD) represent the date of the report in year (YYYY), month (DD), day (DD) order. The second element, (ccc), is a counter starting from 001 up to 999 to distinguish different reports issued by the same source on the same day. The third element, (SRC), represents the acronym identifying the information source. In this way, the nomenclature allows news reports to be identified uniquely, a key element for finding and eliminating duplicates (see Section 3.7.3).

3.4.3 Step 1.c. Eventus ID Input Format

Lessons from natural language processing of event data show that it is easier to process text using smaller coding units such as sentences or paragraphs rather than entire reports. The idea is straightforward: simpler coding units reduce the amount of

¹¹The software and its documentation can be found at <http://www.irislink.com/>.

error. For this reason, the basic coding units analyzed by Eventus ID are paragraphs. In general, Eventus ID is capable of processing any UTF-8 plain text file with the following structure:

```
date doc_id
text line 1 no longer than 80 characters
text line 2 no longer than 80 characters
:
text line n no longer than 80 characters
blank line
```

However, news reports do not originally come in this format. In order to make news reports readable for Eventus ID at the paragraph level, it is necessary to use *Doc2Eventus.pl*. This is an ancillary software developed for this research that automatically reformats the content of individual news reports into Eventus ID-readable text. The program breaks the entire content of a report into paragraphs and creates a unique identifier for each paragraph by executing the following tasks:

1. Take the entire content of each report and break it into individual paragraphs.
 - The content of the paragraph must be broken down into 80-character lines.
2. Extract the date from the file name and write it to the top of each paragraph.
3. Write the rest of the file name next to the date at the top of each paragraph.
4. Add a sequential counter for each paragraph of the report next to the file name at the top of each paragraph.
5. Add a global sequential counter for all paragraphs of all the reports already processed.
6. After the end of the paragraph add a blank line.

For example, consider a sample press release named `20100908001_SEDNA_001.txt` which was issued by the Army on September 8, 2010:

20100908001_SEDNA_001.txt

Lomas de Sotelo, D.F. 8 Sep. 2010.

Ejercito mexicano asegura mas de dos toneladas de mariguana en Sonora.

La Secretaria de la Defensa Nacional, informa a la opinion publica, que dentro del marco del combate integral del estado mexicano contra el narcotrafico y delincuencia organizada, tropas jurisdiccionadas a la 45/a. Zona Militar, establecidas en el municipio de San Luis Rio Colorado, Son., aseguraron 227 paquetes de mariguana con un peso total de dos toneladas 250 kilogramos.

Este aseguramiento se logro durante la revision de un tracto camion que remolcaba un tanque que contenia melaza, entre la cual se localizaron los paquetes del citado enervante; por lo que el personal castrense procedio a la detencion del conductor, asi como al aseguramiento de la droga y el automotor, mismos que fueron puestos a disposicion de la autoridad correspondiente.

Doc2Eventus.pl separates the content of the document into individual paragraphs and assigns a unique identifier to each paragraph. The identifier beginning with the date of the event (which is extracted from the filename assigned in Step 1.b), followed by the name of the file, and ends with a counter for the paragraph within the document and a global counter for all paragraphs already processed from other reports. The Eventus ID-readable output from the document shown above is:

100908 20100908001_SEDNA_P0_P631.

Lomas de Sotelo, D.F. 8 Sep. 2010.

100908 20100908001_SEDNA_P1_P632.

Ejercito mexicano asegura mas de dos toneladas de mariguana en Sonora.

100908 20100908001_SEDNA_P2_P633.

La Secretaria de la Defensa Nacional, informa a la opinion publica, que dentro del marco del combate integral del estado mexicano contra el narcotrafico y delincuencia organizada, tropas jurisdiccionadas a la 45/a. Zona Militar, establecidas en el municipio de San Luis Rio Colorado, Son., aseguraron 227 paquetes de mariguana con un peso total de dos toneladas 250 kilogramos.

100908 20100908001_SEDNA_P3_P634.

Este aseguramiento se logro durante la revision de un tracto camion que remolcaba un tanque que contenia melaza, entre la cual se localizaron los paquetes del citado enervante; por lo que el personal castrense procedio a la detencion del conductor, asi como al aseguramiento de la droga y el automotor, mismos que fueron puestos a disposicion de la autoridad correspondiente.

In this example, the nomenclature produced by *Doc2Eventus.pl* enables the date to be identified in every paragraph, as 100908. It also identifies each paragraph with the document 20100908001_SEDNA from which they were all extracted. In addition, there is an identifier for each paragraph in the document, denoted by the first counter P0-P3, and a global identifier for each paragraph in the complete corpus, which in this example ranges from P631 to P634.

3.4.4 Step 1.d. Corpus of Text

All 41,838 documents were processed with *Doc2Eventus.pl*, breaking them into paragraphs and assigning unique identifiers. All files were grouped according to the information source from which they were extracted. All the documents of each group were then compiled into one large text file. These files constitute the *text corpus* used as input information for Eventus ID.

TABLE 3.5

CORPUS OF TEXT FILES BY INFORMATION SOURCE

Source type	Document size in KB	Number of text lines in each file
Police	5,256	134,200
Navy	1,001	22,929
Attorney General	8,299	213,388
State Attorney General	21,310	575,129
Army	7,236	168,579
National press	26,432	789,020
Local press	24,517	791,784
Total	94,051	2,695,029

3.5 Stage 2. Event Coding

Eventus ID relies on pattern recognition to identify events from text. The intuitive concept of an event is that it provides information on someone doing something to someone else. Events are composed of three key elements:

Source: Refers to the actor or perpetrator of the action. Actors are identified by Eventus ID as proper nouns 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 large dictionaries of proper nouns and verbs for identifying events in the corpus. While reading the text, Eventus ID uses the categories provided by the dictionaries to recognize actors and actions. Once these elements are detected, Eventus ID puts the textual information from the elements in numeric format into a database. Identifying actors and verbs in the text enables information on who (source) did what (action) to whom (target) to be extracted. This section describes the development of actor and verb dictionaries used to identify the key components of an event. It also describes the coding algorithm used by Eventus ID for event coding. Finally, it provides an example of the output database.

3.5.1 Step 2.a. Actor Dictionary

Eventus ID uses the actor dictionary to identify both the source and target of an event. The actor dictionary consists of a list of proper nouns related to perpetrators and victims of various types of organized crime violence. This dictionary contains 2,277 actors grouped into nine categories presented in Table 3.6. These categories enable identification of a wide variety of political actors and security forces at federal and local levels, members of different criminal organizations, victims, and a wide variety of criminal assets, drugs and weapons. As reflected in Table 3.6, each category is assigned a specific code number. These categories are further divided into sub-types with their corresponding sub-codes. Disaggregating groups in this way provides the system with a detailed coding criterion while maintaining consistency within categories.

TABLE 3.6

ACTORS CATEGORIES

Actor category	Main group code
Federal government	1
Coercive apparatus	2
Local government	3
Individuals	4
Victims	5
Criminal organizations	6
Criminal assets	7
Drugs	8
Weapons	9

Each actor in the dictionary is associated with a numeric code that corresponds to the actor’s main group and subgroup. Words in the dictionary are separated by an underscore “_” to help Eventus ID searching for the words in the text¹². The following list presents an example of the actor dictionary:

army_troops_	[202051]
police_officer_	[204021]
member_of_a_criminal_organization_	[601060]
cocaine_	[801022]
AK_47_	[901013]

Developing the actor and verbs dictionaries required a gradual process of learning, refinement, knowledge accumulation, detailed reading and, most importantly, feedback from the validation process detailed in Section 3.7.1. This iterative process of coding and validation enabled the dictionaries to be fine-tuned by adding

¹²Eventus ID does not require words in the source text to be separated by an underscore. The software “reads” the corpus containing words separated by blank spaces as in any regular text, but it uses the concatenated words of the dictionaries to identify patterns in the corpus.

actors and verbs or modifying existing ones. Although the actor dictionary already includes an exhaustive list of 2,277 actors, this list may not be “perfect” in the sense of including “absolutely all” possible actors. However, as discussed in Section 3.2.2, supervised learning the dictionaries to be updated and further refined to improve coding accuracy.

3.5.2 Step 2.b. Verb Dictionary

The verb dictionary consists of a list of 1,755 verb phrases referring to a set of violent and non-violent actions grouped into eleven categories. Table 3.7 presents the list of categories used to classify the actions analyzed in this research.

TABLE 3.7

VERB CATEGORIES

Violent actions		Non-violent actions	
Action category	Group code	Action category	Group code
Attack	101	Detect	201
Shoot	102	Seize	202
Clash	103	Eradicate	203
Arrest	104		
Kidnap	105		
Raid	107		
Burn	108		
Wound	177		
Torture and mutilate	188		
Kill	199		

As presented below, the verb dictionary consists of a list of verbs followed by a numeric code for its corresponding action category. As shown in the example, the verbs “**attack**” and “**attacked**” have the same code 88101. Some verbs are followed by a set of associated words that refine the meaning of the verb in its context. In these cases, the “*” indicates where the verb itself should appear in the phrase. In the example below, Eventus ID automatically inserts the verb ‘textttattacked” into the item `were_*` and looks for the verb phrase “**were attacked**” in the text. The code for “**attack**” is slightly different than for “**were attacked**.” The root code is the same in both cases (101) but they differ in the prefix (88) for the former and (99) for the latter. The prefix (99) indicates a verb conjugated in passive voice and serves as a hint for the recoding process. This is important for coding in Spanish because, in contrast to writing recommendations in English, the use of passive voice is highly common in journalistic reports written in Spanish. The following list is an example of the verb dictionary:

<code>attack_</code>	[88101]
<code>attacked_</code>	[88101]
<code>- were_*</code>	[99101]
<code>- was_*</code>	[99101]
<code>arrest_</code>	[88104]
<code>- under_*</code>	[88104]
<code>fight_</code>	[88101]
<code>- strengthen_the_*_against_</code>	[- - -]

As mentioned earlier, Eventus ID uses a pattern recognition coding scheme similar to that implemented by TABARI. However, a key difference between these two protocols lies in the way they handle verb phrases. TABARI is designed for coding in English, whose grammatical rules allow for simple general ways of combining the subject, verb and object in a sentence. For example, most regular verbs in English are easily conjugated by adding “s,” “ed,” or “ing” at the end of the infinitive verb form. Another characteristic of English is that the gender and number of the noun generally do not affect the conjugation of verbs. This means that “you,” “he,” “she,”

“we” or “they” can be combined with the different verb forms almost indistinctly. Based on these simple general grammatical rules, TABARI incorporates a *stemming* algorithm to automatically identify all the different forms from a verb stem. Using the verb “to arrest” as an example, Table 3.8 shows how TABARI’s stemming algorithm can easily identify a variety of verb tenses. In this case, the verb dictionary would only require the stem “arrest” and the software takes care of detecting the different verb forms by adding “s,” “ed,” or “ing” at the end of the stem.

Although TABARI’s stemming facility is very convenient for coding in English, this feature caused a substantial amount of error when coding in Spanish. Using an English-based stemming algorithm is not appropriate for event coding in Spanish because verb tenses in the latter do not end with “s,” “ed” or “ing.” Verb conjugation in Spanish is much more varied, and using an English-based stemming algorithm would require more than simply “tweaking” the algorithm. Table 3.8 shows that the ending part of the verb “*arrestar*” (to arrest) is very different across the various combinations of verb tenses, number and gender. Given the complexity of conjugation in Spanish, Eventus ID does not include a stemming algorithm. The “shortcuts” that might be useful for coding in English would be counterproductive in Spanish. Unfortunately, reducing the propensity to generate error through a stemming process comes at a cost. Eventus ID demands the development of large, detailed verb dictionaries, thus putting a heavier burden on the researcher to develop detailed dictionaries.

Some items in the verb and actor dictionaries are coded as [- - -]. This is an instruction for Eventus ID to ignore that word in order to avoid confusion. For example, the verb “fight” is coded as [88101] because it refers to a specific action. However, the phrase “strengthen the fight against” is identified as a common closing formula in government press releases, which has a metaphoric meaning but does not refer to a specific event. In such cases, the code [- - -] indicates Eventus ID that the phrase should be ignored.

TABLE 3.8

VERB TENSES IN ENGLISH AND SPANISH

Person	Indicative		Subjunctive		Gerund	Past passive voice
	Present	Past	Present	Imperfect		
English						
I	arrest	arrested	arrest	arrested	arresting	was arrested
You	arrest	arrested	arrest	arrested	arresting	were arrested
He, she	arrests	arrested	arrests	arrested	arresting	were arrested
We	arrest	arrested	arrest	arrested	arresting	were arrested
You	arrest	arrested	arrest	arrested	arresting	were arrested
They	arrest	arrested	arrest	arrested	arresting	were arrested
Spanish						
Yo	arresto	arresté	arreste	arrestara o arrestase	arrestando	fui arrestado
Tú	arrestas	arrestaste	arrestes	arrestaras o arrestases	arrestando	fuieste arrestado
Ella, él, usted	arresta	arrestó	arreste	arrestara o arrestase	arrestando	fue arrestada, fue arrestado
Nosotros	arrestamos	arrestamos	arrestemos	arrestáramos o arrestásemos	arrestando	fuiamos arrestados
Vosotros	arrestáis	arrestasteis	arrestéis	arrestarais o arrestaseis	arrestando	fuiesteis arrestados
Ellas, ellos, uds.	arrestan	arrestaron	arresten	arrestaran o arrestasen	arrestando	fueron arrestadas, fueron arrestados
Vos	arrestás	arrestaste	arrestes	arrestaras o arrestases	arrestando	fuiesteis arrestado

3.5.3 Step 2.c. Event Coding Using Eventus ID

Eventus ID requires three input files for event coding:

1. **Text corpus:** source of the text to be analyzed.
2. **Actor dictionary:** provides the list of actors and their numeric codes.
3. **Verb dictionary:** provides the list of verbs and their codes.

In order to code events from the source text, Eventus ID uses two pattern recognition algorithms: the *general sequence algorithm* which focuses on the source–action–target structure and the *partial sequence algorithm* which focuses on the verb–target structure. Both algorithms use the principles of the *sparse parsing* technique originally developed by Shrodt in KEDS and later refined in TABARI. The sparse parsing method uses the actor and verb dictionaries as searching criteria to identify only the relevant parts of the text that correspond to an event, while the rest is ignored for coding purposes.

Both coding algorithms first identify the date of the event (`date`) and the document identification label (`docid`) from the top of each paragraph (the input format for Eventus ID is discussed in Section 3.4.3). Each algorithm then uses its own scheme to recognize the elements of the event contained in the paragraph. Table 3.9 describes the steps undertaken by each algorithm for event coding. Eventus ID then saves the outcome of the coding process in a plain text file. Each line of the outcome file contains the set elements corresponding to each coded event, separating those elements by tabs and ordering them as follows:

```
date doc_id [actor1] [verb] [actor2]
```

TABLE 3.9

EVENTUS ID CODING ALGORITHMS

General sequence algorithm	Partial sequence algorithm
1) Search for the actor	1) Search for the verb
<ul style="list-style-type: none"> - Load the actor dictionary - Start reading the text - Search for the longest actor first - When an actor is found, store as actor1 - Pause the search where the actor is found 	<ul style="list-style-type: none"> - Load the verb dictionary - Start reading the text - Search for the longest verb first - When a verb is found, store as verb - Pause the search where the verb is found
2) Search for the verb	2) Search for the actor
<ul style="list-style-type: none"> - Load the verb dictionary - Resume reading from previous pause - Keep reading the text - Search for the longest verb first - When a verb is found, store as verb - Pause the search where the verb is found - If no verb is found, go to Step 4 	<ul style="list-style-type: none"> - Load the actor dictionary - Resume reading from previous pause - Keep reading the text - Search for the longest actor first - When an actor is found, store as actor2 - Pause the search where the actor is found - If no actor is found, go to Step 3
3) Search for the actor	3) Save the event
<ul style="list-style-type: none"> - Reload the actor dictionary - Resume reading from previous pause - Keep reading the text - Search for the longest actor first - When an actor is found, store as actor2 - Pause the search where the actor is found 	<ul style="list-style-type: none"> - Save [- - -] [verb] [actor2] in database If no actor is found, save the event as [- - -] [verb] [- - -] in the database - Start again from Step 1
4) Save the event	
<ul style="list-style-type: none"> - Save [actor1] [verb] [actor2] in database - If no verb is found, save the event as [actor1] [- - -] [- - -] in the database - Start again from Step 1 	

3.5.3.1 General sequence algorithm

The general sequence algorithm is useful for identifying events that follow the source–action–target structure. In order to code an event with this algorithm, all three elements must appear in a sentence in the required order. Consider the following sentence:

Army troops arrested a member of a criminal group.

In this example, all the three elements of the event are present in the sentence in the required order. In consequence, the general sequence algorithm identifies “Army troops” as the source, “arrested” as the action and “member of a criminal group” as the target. Eventus ID then codes the event in numeric format in the database as:

[202051] [88104] [601060]

Since sparse parsing only focuses on the relevant parts of the text based on the words provided by the actor and verb dictionaries, the text could be more verbose without affecting the result of the coding. Consider the following sentence:

In a press release, the Mexican government informed the public that troops posted in the municipality of San Luis Rio Colorado, Son. seized 227 packages of marijuana with a total weight of two tonnes, 250 kilograms while patrolling rural roads in the area.

Despite the wordiness of the paragraph, sparse parsing allows Eventus ID to recognize the key components of the event and code the “troops” as the source, “seized” as the action and “packages of marijuana” as the target.

As mentioned above, journalists in Mexico often use passive voice to write their news reports. Passive voice increases the grammatical complexity of a sentence by inverting the order of the subject and object. Consider the following line:

A member of a criminal organization was arrested by Army troops.

In this example, all the three elements of the event are present in the sentence. However the subject and object appear in reverse order. According to the general sequence algorithm, Eventus ID identifies “member of a criminal group” as the first actor, the verb phrase “was arrested” as the action, and “Army troops” as the second actor. The output of this event after coding is:

[601060] [99104] [202051]

However, this could be interpreted as “a member of a criminal group arrested elements of the Army,” which does not correspond to the idea presented in the text. As discussed in Section 3.5.2, the verb dictionary adds prefix [99] to codes corresponding to verb tenses in passive voice. Later, the recoding process (discussed in Section 3.7.2) uses this prefix as a cue to correct the erroneous coding directionality caused by use of the passive voice. In this way, dictionary development, the coding algorithm and the recoding scheme work together to disentangle more complex grammatical structures and reduce coding error in the database. When the recoding rules have been applied, the event is correctly coded as:

[202051] [88104] [601060]

As indicated in Table 3.9, the general sequence algorithm begins by searching for the first actor in the sentence. Once it is found, it switches to the verb dictionary and looks for the action. However, sometimes news reports mention a series of items which are not followed by a verb. This particularly common in government press releases including a list of items. For example consider the following paragraph:

Army troops arrested a member of a criminal group. Troops seized 6 kilograms of cocaine, 372 packages of Clindamycin phosphate, two AK-47s and an R-15 assault rifle with the respective ammunition.

Applying the general coding algorithm, Eventus ID recognizes “Army troops,” “arrested” and “member of a criminal group” as the first set of source, action

and target. Next, it identifies “troops” “seized” “cocaine” as the second set of source, action and target in the paragraph. Then, continues reading and identifies “Clindamycin phosphate,” “AK-47,” “R-15 assault rifle” and “ammunition” as independent items not followed by a corresponding action. The output of this paragraph is:

[202051]	[88104]	[601060]
[202051]	[88202]	[801022]
[604021]	[- - -]	[- - -]
[901013]	[- - -]	[- - -]
[901014]	[- - -]	[- - -]
[901021]	[- - -]	[- - -]

As discussed in Section 3.7.2, the recoding scheme uses the information from the complete coding lines to rearrange and fill in the information in the incomplete coding lines. In this way, Eventus ID allows more detailed information to be extracted from complex events, thus better reflecting the multidimensionality of conflict.

3.5.3.2 Partial sequence algorithm

The partial sequence algorithm is useful for identifying more complex grammatical structures such as sentences using present indicative tenses. In general, the present indicative is used similarly in English and in Spanish. However, the key difference is that in English the present progressive is more commonly used than the present indicative, while Spanish uses the present indicative tense. In English, the present progressive tense is a finite form of the verb that has the mood, tense, and person clearly defined. For example, in the sentence “they are arresting a criminal” the verb “to arrest” is conjugated in the indicative mood, present progressive tense, third person plural.

The present progressive sentence that literally corresponds to this example in Spanish is “*ellos están arrestando a un criminal*”. However, in Spanish one would simply use the present indicative tense; thus the sentence would read “*arrestan a*

un criminal.” As shown in Table 3.8, this conjugation of the verb “*arrestar*” (to arrest) corresponds to the third person of the present indicative. What makes present indicative in Spanish more complex is that the conjugation already gives information about the person as part of the verb, and in consequence, the subject of the action is often omitted from the sentence. To make things even more complex, the present indicative is often used for referring to events that occurred in the *past* (historical present). Thus while the sentence “*arrestan a un criminal*” might refer to an action carried out in the present, it might equally refer to a past event.

The use of present indicative is a very common grammatical structure in Spanish media. There might be several reasons why journalists use it so often. The first might be editorial. Since the present indicative tense usually omits the subject, sentences using this conjugation tend to be shorter than those using the present progressive form. This feature makes the present indicative more efficient in terms of printing space. Since newspapers have strict space limitations – determined by the size of the paper they use for printing – editors may favor the use of present indicative tenses for making news reports shorter, which might allow for more reports to be included. The second reason may be related to a higher impact on readers. Sentences written in present indicative usually start with the verb, which draws the reader’s attention to the action that took place. In this way, editors and journalists often use sensationalist – sometimes lurid – verbs to craft headlines to hook the readers.

The partial sequence algorithm helps code sentences in which the verb is conjugated in present indicative tense. This feature is particularly useful for event coding from text written in Spanish because this verb tense is very common in Latin American media. Since the translation of present indicative from Spanish into English obscures the nuances of this verb form, the next example is presented in Spanish. Consider the following sentence:

Arrestan a un criminal

In this sentence, the subject of the action is omitted because of the conjugation of the verb in present indicative tense. In the absence of a first actor, Eventus ID uses the partial sequence algorithm to identify “*arrestan*” (to arrest) as the action and “*a un criminal*” (a criminal) as the second actor. In consequence, the algorithm generates the following event coding:

```
[- - -] [88104] [601060]
```

The recoding process described in Section 3.7.2 then uses Rule 4 to complete the missing part of the event by assigning a default source actor to specific types of actions. In the example used above, the recoding process assigns a default source code for the state as the source of the event because it is the only kind of actor capable of making an arrest.

3.5.4 Step 2.d. Event Database

The coding process used by Eventus ID generates an output database containing the numeric codes of the events identified through both coding algorithms. The output file is stored in a plain text UTF-8 file (*.txt*) referred as the “Event Database” (*event_database_file.txt*). Each row in this file contains information about the date of the event (*date*), the specific document and paragraph (*doc_id*) from which the event was extracted, and the codes for the source (*actor1*), action (*verb*) and target (*actor2*). Based on the criteria provided by the dictionaries, the output also includes the words recognized in the text as the source (*srctxt*), action (*vrctxt*) and target (*trgtxt*) of the event. In this way, the output database indicates when the event took place and provides information about who did what to whom in both numeric and textual format. The following example illustrates the basic structure of the output file:

```
date1 doc_id1 [actor1] [verb] [actor2] srctxt vrbtxt trgtxt
date1 doc_id1 [actor1] [verb] [actor2] srctxt vrbtxt trgtxt
date1 doc_id1 [actor1] [verb] [actor2] srctxt vrbtxt trgtxt
date1 doc_id3 [actor1] [verb] [actor2] srctxt vrbtxt trgtxt
date2 doc_id1 [actor1] [verb] [actor2] srctxt vrbtxt trgtxt
:
```

In this example, the first three lines correspond to three events identified on the same date (`date1`) from the same document (`doc_id1`). The fourth line corresponds to an event that took place on the same date (`date1`) but was extracted from a different document (`doc_id3`). The remaining lines correspond to other events taking place on different dates and extracted from different sources.

3.6 Stage 3. Event Location

The features of Eventus ID described above enable pieces of information that describe when the event took place and who did what to whom to be extracted. However, in order to provide a complete account of the event, it is also crucial to know where the episode took place. Eventus ID has the capability to identify the location of an event at state and municipal level when the information is provided in the source text. Having georeferenced event data allows the interaction dynamics between a variety of actors across time and space to be analysed. The event location function is another feature that distinguishes Eventus ID from TABARI.

In general terms, Eventus ID uses events identified by event coding protocol and goes back to the original source of information to find the location where the event took place. The software uses detailed dictionaries of states and municipalities in order to identify the locality mentioned in the original sources. In addition, due to the complexities of this specific research, the location protocol includes a filter dictionary that prevents certain words or phrases from being wrongly classified as geographic locations.

3.6.1 Step 3.a. Location Dictionaries

Georeferencing event data using Eventus ID requires the development of location dictionaries at the state and municipal level. Eventus ID uses these dictionaries as categories for pattern recognition of event locations in the source text. The list of states and municipalities and their corresponding codes comes from the National Geostatistical Framework generated by the Mexican census bureau, *Instituto Nacional de Estadística y Geografía* (INEGI) (2011b). Using official locality codes enables the event data generated in this research to be readily cross-referenced with other databases using the same codes for describing demographic, economic or geographic attributes of each location.

The following list shows an example extracted from the state dictionary:

- 1 Aguascalientes
- 2 Baja California
- 3 Baja California Sur

The following list presents an example extracted from the municipality dictionary:

- 1002 Asientos
- 2004 Tijuana
- 3001 Comondu

Feedback from the validation check discussed in Section 3.7.1 revealed the need to include a set of filters to prevent the event location algorithm from identifying false positives. These problems emerged from the fact that some criminal organizations are named after the states or cities where they operate. That is the case of “*El Cartel de Sinaloa*,” “*El Cartel de Tijuana*,” “*El Cartel de Juárez*” and “*El Cartel de Jalisco Nueva Generación*,” among others. Eventus ID uses a filter dictionary to reduce the risk of the algorithm confusing the names of criminal groups such as these with locations.

The filter dictionary also performs other nuanced filtering tasks. For example, there is a municipality in the state of Tabasco named “*Centro*,” which means “center” or “downtown.” The validation process revealed that some reports describing armed clashes occurring in the center of the respective city (“*centro de la ciudad*”) or dead bodies left with a criminal mark in the center of their chest (“*centro del pecho*”) were mistakenly coded as taking place in the municipality Centro, Tabasco. Other sources of location error are reports mentioning the registration of vehicle license plates when they are seized by the authorities states included within military regions, and local newspapers that have the state or municipality as part of their name (e.g. “*El Diario de Juárez*”). The Eventus ID location filter dictionary helps to minimize the risk of coding error caused by these types of reports.

The following list shows an example extracted from the filter dictionary:

```
0 Cartel de Sinaloa
0 3/a Zona Militar La Paz BCS
0 Operativo Conjunto Michoacan
```

3.6.2 Step 3.b. Event Location Using Eventus ID

To find the location of an event, Eventus ID combines four different types of files:

1. Text corpus: source of text to be analyzed.
2. Event database: containing the event data identified in Stage 2.
3. Location dictionaries: provides the list of locations and their codes.
 - State dictionary: provides the list of states
 - Municipality dictionary: provides the list of municipalities and towns
4. Location filter: provides a set of items that should not be confused with geographic locations.

The event location coding procedure is outlined in Table 3.10. In general, the location algorithm uses the event database generated by the event coding algorithms

and identifies the source paragraph from which each event was extracted. Then reads the entire text corpus in order to identify the specific paragraph containing that event. Once the paragraph is identified, the algorithm uses the information provided by the location dictionaries to search for the name of a state or municipality in the paragraph. If a location is identified, the protocol uses the filter dictionary to verify whether the location should be assigned or discarded. If the location is not filtered, the algorithm saves the location code next to the corresponding event in the event dataset. If no location is found in the paragraph, the algorithm expands the search to the rest of the document (Section 3.4.3 discusses the nomenclature and formatting characteristics of the text corpus that enable all paragraphs that constitute a single document to be identified). If a state or municipality is recognized in the document, the protocol checks whether it should be filtered or not. If it passes the filter, the algorithm saves the code of the location next to its corresponding event in the event dataset. If no location is identified in the document, the protocol stops searching for the location of this event and moves to the next event in the event database.

TABLE 3.10

EVENTUS ID LOCATION ALGORITHM

1) Identify an event
<ul style="list-style-type: none"> - Load the event database - Select an event - Identify the paragraph name (<code>doc_id</code>) from which the event was extracted - Use the entire paragraph name as searching criteria
2) Identify the document in the source text
<ul style="list-style-type: none"> - Load the text corpus - Search for the paragraph from which the event was extracted
3) Search for the location of the event in the paragraph
<ul style="list-style-type: none"> - Load the location directory - Use the items of the location directory as searching criteria - Start searching for the location in the source paragraph - If the location is found, pause the search, store the code and go to Step 5 - If the location is not found in the paragraph, go to Step 4
4) Expand the search to the rest of the document
<ul style="list-style-type: none"> - Select the remaining paragraphs belonging to the same document - Search for the location in all paragraphs of the document - Begin searching in the first paragraph - If the location is found in the document, store the location code and go to Step 5 - If the location is not found in the document, stop searching and go to Step 1
5) Filter the location
<ul style="list-style-type: none"> - Load the location filter - Verify that the location identified does not match any item in the location filter - If the location matches a filter, go back to Step 3 - If the location does not match a filter, go to Step 6
6) Save the location
<ul style="list-style-type: none"> - Save the location at the end of the coded event line in the event database - Start again from Step 1

3.6.3 Step 3.c. Georeferenced Event Data

The location algorithm takes the information generated at the event coding stage and if a location is assigned, adds the coded location information. The output of this procedure is a plain text UTF-8 file called the “Georeferenced Event Database” (*georeferenced_event_database_file.txt*) with information on who did what to whom, when and where. The following example illustrates the output of the georeferenced file indicating the state (*state1*) and municipality (*mun1*) of each event:

```
date1 doc_id1 [actor1] [verb] [actor2] srctxt vrbrtxt trgrtxt state1 mun1
date1 doc_id1 [actor1] [verb] [actor2] srctxt vrbrtxt trgrtxt state1 mun1
date1 doc_id1 [actor1] [verb] [actor2] srctxt vrbrtxt trgrtxt state1 mun1
date1 doc_id3 [actor1] [verb] [actor2] srctxt vrbrtxt trgrtxt state1 mun1
date2 doc_id1 [actor1] [verb] [actor2] srctxt vrbrtxt trgrtxt state1 mun1
```

3.7 Stage 4. Validation and Recoding

Measurement validity is a central concern for social scientists using both quantitative or qualitative methods (Adcock and Collier, 2001; Bollen, 1989; Collier and Brady, 2004; Goertz, 2005; King, Keohane and Verba, 1994). Measurement validity is achieved when the scores meaningfully capture the ideas contained in the corresponding concepts. Simply stated by Bollen (1989, 184), a score is valid if “a variable measures what it is supposed to measure.” According to Adcock and Collier (2001), measurement validity should be understood in relation to the congruency between concepts and observations. These authors propose an analytical framework for evaluating measurement validity in terms of the degree of congruency across four levels:

1. Background concept. This level encompasses the constellation of diverse meanings associated with a given concept.
2. Systematized concept. This level contains the specific formulation or definition of a concept adopted by a particular researcher.

3. Indicators. This level refers to the procedure used for systematically building the measures associated with the definition.
4. Scores for cases. This level refers to the numerical scores or qualitative classification assigned as values for each measure.

In general terms, the framework indicates that a measure is valid to the extent that the scores (level 4) correspond to a set of indicators (level 3), that can be meaningfully interpreted in terms of the definition (level 2) used to represent a broader concept (level 1).

As discussed in Section 3.4.1.1, the criteria for including or excluding relevant notes on drug-related violence correspond to the relationship between the background concept (level 2) and the systematized concept (level 3) of the validation framework. This reflects the extent to which the indicators are congruent to the definition. The systematic application of these criteria helps to identify valid news reports that correspond to the conceptual components of organized crime violence defined in Section 1.3 of Chapter 1 and for excluding reports that do not meet the required criteria.

In order to validate the measures used in this research, it is necessary to assess the congruence between levels 3 and 4, referring to the match between indicators and scores. As discussed in Section 3.2.2, computerized textual annotation is not a silver bullet. For some types of research projects manual coding may be a more useful and feasible strategy, whereas in other cases machine coding may be a better fit for the research objectives and resources. For this reason, it is necessary to validate the output of an automated coding protocol. According to Grimmer and Stewart (2013), the complexity of natural language implies that no computerized method is capable of providing an exact representation of the content of texts. Although automated text analysis may substantially reduce the amount of time and financial resources required in manual annotation projects, computer-based coding schemes are likely to generate some error. For this reason, researchers have the responsibility of validating the coding result.

3.7.1 Step 4.a. Validation

The approach used in this research is an iterative process consisting of automated coding, validation and recoding. Validation is conducted by comparing a sample of the machine-generated database with a manually coded database. Discrepancies between human and machine coding are used to inform modifications in the dictionaries, coding algorithm or reformatting protocol. Repeated iterations of automated coding, human-based validation and recoding increase the validity of the coding output. This validation process is illustrated by the dotted line looping back from stage 4 to stages 2 and 3 in Figure 3.2 on page 107.

The validation check generated several contributions that proved crucial for the development of this coding project and the validity of the output:

1. **Software development:** As mentioned previously, this project initially expected to use TABARI as a tool for event coding. However, initial validation checks revealed the poor performance of TABARI for coding in Spanish. This was the first step towards the development of Eventus ID to code event data from text written in Spanish.
2. **Development of flexible event coding algorithms:** Initial validation checks helped to identify the limitations of a rigid algorithm only capable of coding events with the subject–verb–object structure. This motivated development of the *general sequence algorithm* (described in Section 3.5.3.1) to allow greater flexibility in the coding process. In addition, the validation process was crucial for identifying the coding errors caused by the substantive grammatical differences between English and Spanish regarding the use of the present indicative tense. This difference motivated the development of the *partial sequence algorithm* discussed in Section 3.5.3.2.
3. **Actors and verb dictionary development:** The validation process and reading of several press reports helped to enhance and refine the nouns, pronouns, verbs and verb phrases used in the actor and verb dictionaries.
4. **Location filter:** The validation check also helped identify complex reports in which the event location process was identifying the location of an event erroneously. As discussed in Section 3.6.1, the detection of these situations motivated the inclusion of a filter as part of the location algorithm in order to reduce coding error.

5. **Recoding:** The repeated iterations between automated coding and validation checks helped develop a set of rules used for recoding certain types of events using statistical software. These rules are discussed in the next section.

The output validation process consists of comparing the events generated by automated coding with a human-generated database. The comparison is based on a sample of news reports. These documents constitute the text corpus for the validation check. A team of trained research assistants manually coded relevant events of drug-related violence from the sample corpus while keeping in mind the stages and steps of the automated coding algorithm. In addition, the sample text corpus was used for automated event coding using Eventus ID. The comparison between human and automated annotation resulted in an 82 percent rate of accuracy. This indicates that the dictionaries and recoding rules used in this project enable Eventus ID to be right most of the time when coding event data from text in Spanish. However, as in any other computer-based protocol, sometimes the text is so complex that there is a small margin of error, which is estimated to be 18 percent in this project.

3.7.2 Step 4.b. Recoding

Eventus ID combines the use of detailed actor and verb dictionaries, the application of flexible event coding algorithms that consider grammatical characteristics of the Spanish language, location recognition and filtering processes, and an iterative validation coding process for generating accurate event data from text written in Spanish. However, sometimes the characteristics of the source text and codification strategies require additional recoding to improve the accuracy of the coding output. This section outlines the main recoding rules used for refining the quality of event data. Due to their complexity, these procedures are not integrated into Eventus ID and are implemented using statistical software.

Recoding Rule 1: Passive voice. As discussed in Section 3.5.2, sentences using the passive voice invert the order of the subject and object in the grammatical structure. For example, consider the following sentence presented first in past indicative and then in passive voice:

Army troops arrested a member of a criminal organization.

A member of a criminal organization was arrested by Army troops.

The passive voice sentence is erroneously coded as:

[601060] [99104] [202051]

But the recoding process corrects the directionality of the event as:

[202051] [88104] [601060]

Passive voice is a common grammatical structure in written news media in Spanish and it generates error in the directionality of the event. To deal with those cases, the dictionary development included a prefix 99 in the codes corresponding to verb phrases conjugated in passive voice. The recoding recognizes the 99 prefix of verbs conjugated in passive voice and inverts the position of the first and second actor so it accurately reflects the directionality of the source conducting an action towards the target.

Recoding Rule 2: Single actor. In some instances, the event identification protocol only generated an event code for the first actor ([actor1]) and put missing codes for the verb ([- - -]) and second actor ([- - -]). This is usually the case of government press releases about seizures as presented in the following sentence:

Military troops seized 6 kilograms of cocaine, two AK-47 rifles and ammunition.

This sentence is coded as:

[202051]	[88202]	[801022]
[901013]	[- - -]	[- - -]
[901015]	[- - -]	[- - -]

In this type of situation, the recoding protocol first whether the coded element in [actor1] [- - -] [- - -] correspond to the categories of criminal assets, drugs or weapons (see Table 3.6 for actor categories). If [actor1] meets the requirement, then the recoding rule moves the code from the column of [actor2] and uses the [actor1] and [verb] of the previous cell to fill in the empty spaces.¹³ The output of this recoding process is:

[202051]	[88202]	[801022]
[202051]	[88202]	[901013]
[202051]	[88202]	[901015]

Depending on the paragraph structure, news reports sometimes mention the list of seized items in separate lines. For example, consider the following sentence:

Military personnel seized the following items:
- 6 kilograms of cocaine,
- two AK-47 rifles,
- ammunition caliber 5.56×45

This sentence is initially coded as:

[202051]	[88202]	[- - -]
[801022]	[- - -]	[- - -]
[901013]	[- - -]	[- - -]
[901015]	[- - -]	[- - -]

In those cases, the recoding protocol applies the same rule to generate the following event codes:

[202051]	[88202]	[801022]
[202051]	[88202]	[901013]
[202051]	[88202]	[901015]

¹³If the [actor1] code does not meet the criteria of criminal assets, drugs or weapons, it means that the code corresponds to a state actor, victim or criminal organization. In those cases, the event coding provides no information about the action related to an actor of this type. In these cases the event code is discarded from the database.

Recoding Rule 3: Authorities arrest an unidentified person. Eventus ID uses the nouns and pronouns provided by the actor dictionary to identify the source and target of an action. However, the software only recognizes an actor if it is already loaded in the dictionary. There are some instances in which government press releases inform about the arrest of a person, identifying the detainee by name. With the exception of prominent criminal leaders, the actor dictionary used in this research does not include a detailed list of names and last names of all people arrested.¹⁴ The following sentence constitutes an example of this situation:

Army troops arrested Javier Osorio.

Since the name “Javier Osorio” is not part of the actor dictionary, the coding scheme does not recognize it in the text `source` and it generates the following event:

[202051] [88104] [- - -]

In these cases, the recoding protocol verifies whether the code in `[actor1]` corresponds to the categories of any state actor (see Table 3.6) and if the `[verb]` code coincides with the action category of arrests (see Table 3.7). If both elements meet the criteria, the recoding protocol assigns a default code for “member of criminal group” and generates the following event code:

[202051] [88104] [601060]

Recoding Rule 4: Sentences in present indicative. As discussed in Section 3.5.3.2, sentences in which the verb is conjugated in the present indicative tend

¹⁴Building such a detailed list of names would require a large number of coders reading all the reports in order to identify the names of all individual and putting them into the actor dictionary. The labor required for such a task would defeat the entire purpose of automated coding. Even if the technological means were developed for gathering all names, building such a database would contradict ethical principles required by the Institutional Review Board (IRB) that supports this research and could even imply security concerns for the researcher.

to omit the subject of the action. The partial sequence algorithm enables events to be identified from text in which the first relevant element of the sentence is a verb in present indicative form. In those cases, the recoding rule assigns a default code for [actor1] that corresponds to the type of action indicated by the verb.

The recoding rule for sentences in present indicative considers two types of default actors; state [99999] and criminals [66666]. As shown in Table 3.11, some kind of actions can only be undertaken by either one or the other of these actors. In these cases, the recoding rule assigns the corresponding default code for [actor1]. If the action refers to arrests, seizures, eradication, detection or raids, the recoding rule uses the default code of the state. If the action refers to kidnapping or torture and mutilation, the rule inserts the default code for criminals.¹⁵

TABLE 3.11

DIRECT CRITERIA FOR DEFAULT ACTOR ASSIGNMENT

Default state code [99999]	Default DTO code [66666]
Arrest	Kidnap
Seize	Torture and mutilate
Eradicate	
Detect	
Raid	

¹⁵Assigning a default criminal code for perpetrators of torture and mutilation does not necessarily mean that state authorities are not capable of conducting this kind of action. In fact, there have been news reports indicating that the police or the army have used torture and similar abuses against presumed members of criminal organizations. When these events are reported in the media, they usually are presented in such a way that explicitly indicate the state security forces as the perpetrators of such actions. The main purpose of those reports is to clearly denounce this type of behavior. In such cases, reports usually do not omit the subject of the action and explicitly state the subject, verb and object of the sentence. In consequence, this type of report is more likely to be fully coded by the complete sequence algorithm than the partial sequence algorithm where the subject is implicit. Therefore, it is highly unlikely that the recoding rule would erroneously assign a default criminal code for a torturing event perpetrated by the state.

For example, the state is the only actor that can arrest a person. Consider the following sentence:

Arrestan a un criminal

The coding algorithm generates an event where [actor1] is missing:

[- - -] [88104] [601060]

The recoding protocol then identifies that the verb corresponds to the action “to arrest” and fills the missing subject with the corresponding default, which is the state code.

[99999] [88104] [601060]

Unfortunately, not all actions are mutually exclusive. Some actions, specially violent ones, can be perpetrated by either the state security forces or members of criminal organizations. In those cases, the recoding rule uses a more sophisticated identification process based on the wording of the action and the type of target identified in the sentence. Table 3.12 shows the conditional criteria used in this rule for assigning default actors. Some actions are easily identifiable. For example, if the sentence uses the verb “to burn” in present indicative to report that drugs were burned, the recoding rule assigns the state as the default actor. The reason is that security forces often burn drugs after seizures or crop eradication. In contrast, if the report indicates that a body was burned, the rule assigns the default code for criminals. The reason is that organized criminals sometimes burn the body of their victim to prevent identification of the body.

Some other cases are more complicated. For example, consider a sentence using present indicative to describe a situation in which a man was shot. In Spanish, the report would say:

Le disparan a un hombre

TABLE 3.12

CONDITIONAL CRITERIA FOR DEFAULT ACTOR ASSIGNMENT

Action in [verb]	Wording in [verb]	Target in [actor2]	Assigned source
Burn		Drugs Crops	State
		Body Person Property	Criminal
Attack	<i>“repelen”</i>	Criminal	State
	<i>“agreden”</i> <i>“atacan”</i> <i>“emboscan”</i>	State or person	Criminal
Shoot	<i>“disparan”</i> <i>“abren fuego”</i>	Criminal	State
	<i>“ametrallan”</i> <i>“balacean”</i> <i>“rafaguean”</i> <i>“disparan”</i>	State or person	Criminal
Wound		Criminal	State
		State	Criminal
Kill	<i>“abatan”</i>	Criminal	State
	<i>“asesinan”</i> <i>“matan”</i> <i>“acribillan”</i> <i>“masacran”</i> <i>“encajuelan”</i> <i>“entamban”</i>	State or person	Criminal

The coding algorithm generates the following event without specifying the perpetrator of the action:

[- - -] [88104] [601060]

Fortunately, the writing style of journalists and the language of press releases issued by government agencies provide valuable hints for identifying the most likely perpetrators of particular types of actions. Based on the content analysis of several reports, it was clear that reports use different words for referring to violent acts conducted by criminal organizations that those carried out by the state. For example, journalists tend to use words such as “*ametrallan*” (shoot with a machine gun), “*rafaguean*” (spray with bullets) or “*acribillan*” (riddle with bullets) for referring to shootings perpetrated by criminal organizations. In contrast, they use more formal terms, such as “*abren fuego*” (open fire), for referring to situations when the state security forces shoot at presumed criminals.

For example, if the sentence says that a man was “riddled with bullets,”

Acribillan a un hombre

the coding algorithm attributes the event to criminal organizations:

[66666] [88104] [601060]

In contrast, if the sentence suggests that some one “opened fire” against a man,

Abren fuego contra un hombre

the recoding rule attributes the event to the state:

[99999] [88104] [601060]

In this sense, the conditional criteria for default actor assignment uses the nuances of language and journalistic style to identify the perpetrator of certain types of actions expressed in present indicative.

Recoding Rule 5: Discovery of a dead body. Although fatal victims are often the result of overt armed clashes between rival criminal groups or between the state

and a criminal organization, a large number of casualties are killed out of sight and their bodies are abandoned. In those cases, news reports usually describe the event as:

The police found a dead body

In this case, the event coding algorithm identifies `the police` as the source, `found` as the action and `a dead body` as the target, and generates this event code:

[99999] [88104] [601060]

Of course, this does not mean that the police killed that person. The sentence indicates that a person died (or was killed) and the body was discovered by the police. However, Eventus ID does not know that. It is simply an algorithm following coding instructions and is not capable of abstracting the action represented in the sentence. For this reason, the recoding rule codes the event as a murder perpetrated by a criminal organization and generates the following event:

[99999] [88104] [601060]

Recoding Rule 6: Armed clashes. There are several instances in which news reports describe confrontations between government authorities and criminal organizations. Since the event-based approach used in this research emphasizes the interactive characteristics of violence, the recoding rule considers armed clashes as dyads between the actors involved in the confrontation. An armed clash is usually described as:

Troops of the Fifth Infantry Battalion clashed with a group of hired assassins.

In this case, the event coding algorithm identifies `Infantry Battalion` as the source, `clashed` as the action and `a group of hired assassins` as the target, and generates this event code:

[202031] [88103] [501050]

In order to provide an interactive measure of conflict, the recoding rule generates the following dyadic event of the Army conducting violence against criminal organizations and the latter responding in kind to the former:

[202031] [88103] [501050]

[501050] [88103] [202031]

3.7.3 Duplicates

There are several instances in the data gathering process and the coding protocol used in this research that could lead to multiple coding of events. As discussed in Section 3.4.1, 105 information sources are used in an effort to minimize coverage bias by having multiple national and local sources of news reports and government press releases. However, using multiple sources increases the risk of artificially inflating the number of reports. This can happen when several newspapers report a prominent event. In addition, as discussed in Section 3.4.3, the coding protocol extracts information from the entire content of news reports. This generates the risk of multiple event coding when the news report mentions the same episode several times as part of the narrative.

To avoid artificially augmenting the number of events, this research pays detailed attention on identifying and excluding multiple events. I use the term “duplicates” for referring to events counted multiple times (two or more times). Technically, the detection of duplicate observations is implemented through the `duplicates` command in Stata, which makes it possible to report, give examples of, list, browse, tag, and delete duplicates. This research relies on a highly conservative approach for detecting and eliminating duplicates.

The first step of the protocol operates at the paragraph level and identifies multiple events occurring in the same municipality–day and mentioned in the same paragraph. If a single paragraph contains two or more events of the *same kind* taking place in the same municipality–day (e.g./ the police seized some drugs), then one of those events is excluded from the database. In contrast, if the paragraph contains multiple events in the same municipality–day indicating different types of actions (e.g./ the army seized drugs and arrested a criminal), then these different events are not considered duplicates at this stage.

This is a conservative approach for eliminating duplicates especially for events related to drug interdiction and gun seizures. Sometimes reports describe episodes where government authorities seize drugs detected in different bundles or arsenals containing a variety of weapons and calibers. For example, a news report could indicate that the army seized “25 packages of marijuana and a bag with 12 kg. of marijuana seed.” Initially, Eventus ID would code this report as two events of drug seizure, but one of those events would be excluded in the duplicates detection protocol.

After excluding duplicates at the paragraph level, the protocol focuses on the document as the unit of analysis. The second step compares the content of paragraphs within the same document. If there are multiple events of the same kind occurring in the same municipality–day in the document, the protocol keeps only one of these events and excludes the rest. This avoids multiple counting of the same event mentioned in different paragraphs of the same news report.

Finally, the third step of the duplicates detection protocol analyzes the different documents contained in the text corpus. Having already excluded duplicates at the paragraph and document levels, the protocol detects and excludes multiple events of the same kind occurring in the same municipality–day that might get reported

by several information sources. This prevents inflation of the event count of highly visible episodes of violence that are reported by multiple newspapers.

It is important to note that the detection of duplicates focuses on events identified at the municipal level. This implies that multiple events reported exclusively at the state level are excluded from the database. National newspapers sometimes issue news reports providing very general accounts of drug-related violence without specifying the facts. These reports usually say something like: “Yesterday, the wave of violence left 10 people dead. Drug cartels killed five men in Chihuahua, two in Durango and three more in Sinaloa.” Reports of this kind do not indicate the municipalities where the events took place. In consequence, they are excluded from the database. In this way, the database contains exclusively those events that are reported only once at the municipal level on a daily basis and excludes possible duplicates and those reported at the state level.

3.8 Stage 5. Validated Event Database

The final stage of the coding protocol is the release of the validated event database containing unique events which are components of large-scale organized criminal violence at municipal level on a daily basis. The content of the output database has the following structure:

```
date1 doc_id1 [actor1] [verb] [actor2] srctxt vrbrtxt trgtxt state1 mun1
date1 doc_id1 [actor1] [verb] [actor2] srctxt vrbrtxt trgtxt state1 mun1
date1 doc_id1 [actor1] [verb] [actor2] srctxt vrbrtxt trgtxt state1 mun1
date1 doc_id3 [actor1] [verb] [actor2] srctxt vrbrtxt trgtxt state1 mun1
date2 doc_id1 [actor1] [verb] [actor2] srctxt vrbrtxt trgtxt state1 mun1
```

In order to reduce the complexity in the myriad of combinations among perpetrators, actions and targets, the information in the database is aggregated into three main types of events; law enforcement activities conducted by the state against organized criminals, violence perpetrated by criminal organizations against government

authorities, and violent events between rival criminal organizations. In addition, depending on the analytical purposes of the empirical chapters of this dissertation, the information of the validated event data set can be aggregated at different units of analysis such as municipal, state or national level, or by daily, monthly or yearly time periods. Disaggregated events can also be used as data points for spatial analysis using geographic information systems.

3.9 Conclusion

This chapter focuses on describing the main features and operational capabilities of Eventus ID, a novel software for automated textual annotation of event data from text written in Spanish. The software uses a sparse parsing algorithm capable of extracting event data information from news reports, thus providing a detailed account on who did what to whom, when and where in the Mexican war on drugs.

The data collection strategy used in this research relies on a massive collection of news reports from 105 information sources including press releases from the main federal and local government agencies, several national newspapers and dozens of local newspapers. The selection of reports is conducted by a team of human coders carefully applying explicit criteria for inclusion and exclusion of relevant news reports, thus contributing to the validity of the database. Eventus ID processes thousands of news reports related to the different components of organized criminal violence. In contrast to the poor performance of TABARI for coding text written Spanish, Eventus ID provides an accurate and proficient way of identifying event data from news reports in Spanish. This is possible thanks to the development of a coding algorithm capable of adapting to grammatical features of the Spanish language. In addition, Eventus ID is capable of georeferencing event data at municipal level. The

next chapter presents the database on drug-related violence generated using Eventus ID.

The validation assessment shows that Eventus ID reached a level of accuracy of 82 percent in this research project, when compared to the coding results generated by manual annotation methods. This suggests that Eventus ID has a high level of accuracy when coding event data, despite the grammatical complexities of Spanish and given the quality of news reports. Although no computerized annotation method is perfectly accurate, the detailed methodological discussion presented in this chapter provides a transparent and feasible strategy for coding event data from text in Spanish.

Based on the combination of recent technological advances in natural language processing and quantitative research on conflict, Eventus ID constitutes a key contribution for generating fine-grained event data to analyze the micro-dynamics of conflict. Previous efforts to implement automated coding protocols have relied exclusively on news reports written in English. However, this has limited the amount and kind of information that researchers can use for building databases on conflict. In contrast, Eventus ID opens up the possibility of accurately coding events from non-English information sources, thus allowing researchers to obtain more detailed information from original sources.

Finally, Eventus ID constitutes a public good that could help other researchers to conduct their own event coding projects in other Spanish-speaking countries. Appropriate modifications to the coding protocol used in this research could allow this coding strategy to be replicated in other Latin American countries, thus facilitating the generation of comparative data on organized criminal violence in the region.

CHAPTER 4

MAIN TRENDS OF ORGANIZED CRIMINAL VIOLENCE

4.1 Introduction

The previous chapter discusses the empirical strategy used for measuring processes of conflict inherent to the Mexican war on drugs. The measurement strategy is based on collecting data from a large number of news reports and relies on Eventus ID for automated-coding of event data. This chapter presents the database generated by the Eventus ID coding protocol. The central empirical support used in this research comes from a novel database called “Organized Criminal Violence Event Data in Mexico 2000–2010” (OCVED). This data set comprises daily event data geo-referenced at municipal level on the law enforcement actions conducted by government authorities against criminals, violent actions perpetrated by criminals against the state, and events of violence between different criminal organizations. OCVED includes information from all Mexican municipalities on a daily basis between January 1, 2000 and December 3, 2010, thus comprising more than 9.8 million observations. In general

terms, the database used in this research provides fine-grained information on who did what to whom, when and where in the Mexican war on drugs.

The analysis of the data indicates varying trends in the components of violence in the Mexican war on drugs. The data reveals that violent competition between rival criminal organizations constitutes the most prominent type of violence. After operating non-violently for several years, criminal organizations engaged in an unprecedented wave of violence against their rivals. The sustained increase of criminal conflict is evident at the national level and shows varying levels of intensity at the sub-national level. In addition, the spatial analysis of violence among criminals shows different patterns of intensification and diffusion across time and space.

Violence perpetrated by criminal organizations against government authorities constitutes the second most common type of violence. Criminal hostilities against the state also show a sustained increase after 2007. Violent law enforcement actions constitute the smallest share of violent actions, thus suggesting that government authorities do not generally resort to the use of violence to fight crime. Nevertheless, the trend of violent enforcement shows a substantial increase in the recent years. However, the state has a broader menu of security tactics to fight crime beyond violent law enforcement actions. The data reveals that beyond violence, the government mostly employs drug interdiction and arrests to fight criminal organizations. Other non-violent tactics such as seizures of criminal assets and weapons complement the menu of policy options available to the state, but these are used less frequently.

This chapter is divided in two sections. The first part discusses the limitations of current efforts for measuring drug-related violence in Mexico by counting homicides, also known as the body-count approach. This section also discusses how an event-based perspective of OCVED overcomes some of the shortcomings of homicide data. In addition, it discusses the analytical leverage gained from disentangling the different

types of actors and actions inherent to the war on drugs, and from emphasizing temporal and spatial disaggregation of data.

The second section describes the main trends of violence in the Mexican war on drugs. The first part of this section provides a general description of the frequency and distribution of the different types of law enforcement tactics, and of violence perpetrated by criminals against the state or against rival criminal organizations. The next part provides an aggregated overview of temporal trends of violence. This is followed by a disaggregation of the analysis focusing on the temporal variation of violence across states. The next part discusses the main trends of violence at the municipal level on a daily basis. Finally, the last segment gives an overview of the spatial trends of intensification and diffusion of violence.

4.2 Limitations of Body Counts

One of the central challenges of studying drug violence from a quantitative perspective is the scarcity of systematic, reliable, good quality, available data. In Mexico, there are four main databases measuring drug-related violence. One of these databases was generated by the Mexican government, two were created by national newspapers and the fourth belongs to a policy analyst. In 2010, the Mexican Security Council, *Sistema Nacional de Seguridad Pública*, SNSP (2011a) released a database of drug-related homicides only after receiving severe pressure from civil society organizations, public opinion, policy analysts and victims to provide information about the casualties associated with the war on drugs. Initially, the government released a database with homicide data presumably related to rivalries among criminal organizations between 2007 and 2010. This data was compiled at the municipal level on a monthly basis. After the release of the data, public opinion and analysts used the information to criticize the lack of effectiveness of the government's security strategy

in reducing violence. In an effort to reduce criticism, the Mexican government deliberately reduced the quality of the data by aggregating the information on a quarterly basis and eventually stopped updating the database of drug-related homicides. In addition to official counts, two newspapers, *Reforma* (<http://www.reforma.com/>) and *Milenio* (<http://www.milenio.com/>), and a prominent security analyst, Eduardo Guerrero (2010a), have undertaken the only private efforts to quantify the wave of drug violence in Mexico. Unfortunately, none of these private sources release their information for public scrutiny. Researchers interested on conducting quantitative analysis of drug-related violence in Mexico are thus restricted to using the data generated by the government.

There are two other government databases that researchers sometimes use to analyze violence in Mexico. One is the number of homicides counted by the Mexican Census Authority, *Instituto Nacional de Estadística y Geografía*, INEGI (2013b) and the health statistics of the Mexican Health Ministry *Sistema Nacional de Información en Salud*, SINAIS (2013). These databases have the advantage of having annual time series going back to year 2000. This is a characteristic that some researchers find useful for exploring the conditions prior to the onset of the Mexican war on drugs in 2007. However, these measures capture homicides of all kinds, including those which could be caused by crimes of passion, vehicle accidents, armed robbery, and all other causes. Therefore, these measures are too broad to accurately capture drug-related violence, and thus raise considerable concerns of measurement validity and measurement error. For this reason, these measures are not discussed in this research.

One of the empirical contributions of this research is to present the database “Organized Criminal Violence Event Data in Mexico 2000–2010.” This database overcomes several conceptual, methodological and scope limitations of previous efforts to quantify large-scale organized criminal violence. Conceptually, instead of using a body count approach as the other databases do, OCVED relies on an event

data approach to classify the interactions among and between a variety of actors carrying out diverse types of violent actions against each other. Methodologically, OCVED is based on a rigorous, transparent process of information gathering and automated event coding, discussed in Chapter 3. In addition, OCVED overcomes the temporal and spatial limitations of the other databases by systematically covering all the municipalities of the country on a daily basis between 2000 and 2010. OCVED thus constitutes an unprecedented effort for measuring and analyzing the wave of drug violence in Mexico from a quantitative perspective.

Before presenting the main trends of the different types of violence contained in OCVED, this section discusses the characteristics and main limitations of alternative measures of drug-related violence. As Table 4.1 shows, extant databases have several methodological problems and limitations with respect to the definition of their object of study, selection criteria, coding methodology, unit of analysis, spatial and temporal coverage, and information sources. All these efforts to quantify the wave of violence measure exclusively the number of homicides related to the war on drugs. This approach has several limitations. Death is certainly the ultimate expression of violence. However, it is not the only one. There is a wide range of violent actions that do not necessarily lead to a person being killed. For example, if the government security forces engage in an armed confrontation with organized criminals and the clash only leads to the detention of those criminals, but does not generate casualties on either side, such an event would not be coded in a homicide-based approach. In consequence, there much information on violence that is not captured by a body count database.

TABLE 4.1
 DATABASES OF DRUG-RELATED VIOLENCE IN MEXICO

	SNSP	<i>Reforma</i>	<i>Milenio</i>	Guerrero	Osorio
Object	Homicides	Homicides	Homicides	Homicides	Event Data
Selection criteria	Explicit	Not explicit	Not explicit	Not explicit	Explicit
Methodology	Explicit	Not explicit	Not explicit	Not explicit	Explicit
Spatial unit	Municipal	Municipal ^a	Municipal ^a	Municipal	Municipal
Spatial coverage	Most municipalities	Not explicit	Not explicit	All municipalities	All municipalities
Temporal unit	Quarterly ^b	Monthly	Monthly	Monthly	Daily
Temporal coverage	12/2006 - 12/2010	12/2006 - 12/2012	12/2006 - 12/2012	12/2006 - 12/2012	1/2000 - 12/2010
Observations	57,183	Unknown	Unknown	Unknown	9,860,840
Information sources	Explicit	Not explicit	Not explicit	Explicit	Explicit
Coding	Manual	Manual	Manual	Manual	Automated
Publicly available	Yes	No	No	No	Yes ^c

^a Not explicitly mentioned by these sources but it can be inferred from their reports.

^b Data initially released on a monthly basis but later on it became only available quarterly.

^c The database will be available after the its first peer-reviewed publication.

By focusing exclusively on homicides, body counts also miss a crucial characteristic of violence: its interactive character. After all, counting a body does not give any information on who killed the person, who was the target, or how the person died. Using a homicide-based approach to measure violence neglects key pieces of information such as who is using violence, what type of tactics are being used to conduct violence, or who is the target of violence. Neglecting this information severely compromises our efforts to understand the characteristics and dynamics of conflict processes. Drawing a simple analogy between sports and the measurement of violence, it is not possible to understand the outcome of a boxing match by merely seeing one boxer knocked out on the floor. In order to give an accurate account of the boxing match, an observer must carefully analyze the exchange of attack and defense moves made by both contenders. Similarly, simply counting homicides gives an overly limited view of the complexities of large-scale organized criminal violence.

Related to the homicide-based approach, extant databases do not provide a clear definition of the type of homicide being coded. Among the body count databases, only the government has an explicit definition of what is considered a drug-related homicide. The official database comprises information on “executions” and “deaths resulting from clashes and aggressions” (Sistema Nacional de Seguridad Pública, 2011*b*). Executions are defined by the SNSP as violent deaths in which the victim or murderer is presumably a member of a criminal organization and which are not the result of clashes or aggression. Official data also comprises counts of deaths caused by clashes between criminal organizations or attacks against government authorities. In contrast, none of the newspaper databases nor the database created by Guerrero explicitly define their object of study. This does not mean that they do not follow any coding scheme, it simply is not made public. Therefore, it is not possible to know what are they counting as a drug-related homicide, nor if the measure is valid for the object of study.

The government briefly explains its methodology for gathering data. The process consists of five steps: (i) the Army, Navy, Federal Police and the Mexican intelligence agency each supply information about drug-related homicides; (ii) specialists from each security agency verify whether homicides meet the criteria for being categorized as executions or homicides from clashes or aggressions; (iii) the Office of the Attorney General collects all the information into a database; (iv) the Attorney General checks for duplicates and updates; and (v) representatives of each agency meet periodically to validate the database. Unfortunately, due to the confidentiality of these official sources, it is not possible to replicate or validate this database, nor to evaluate its strengths, weaknesses or biases. Therefore, researchers using official data have no other option than to trust the government reports. Despite its methodological limitations, the government database is at least more transparent than the private databases, which do not make their methodology explicit or publicly available.

Government data is available at the municipal level until 2010 and covers most municipalities. A careful review of the official database showed that it contains information for only 1,167 out of the total of 2,456 municipalities in the country. Unfortunately, the methodology is not explicit whether there have been no drug-related homicides in those municipalities or if there is missing data in those locations. A systematic database should contain records for all municipalities, reporting zero counts for those with no homicides. Although Guerrero provides no explicit methodology or coverage for his database, he reported in a personal interview that his database comprises information at municipal level and covers all municipalities in the country. It is not clear whether *Reforma* and *Milenio* collect their data at municipal or state level, nor the scope of their coverage.

As mentioned above, the Mexican government initially released a database reporting events on a monthly basis. However, without proper methodological justification, state officials decided to aggregate the data on a quarterly basis. As mentioned by

Shellman (2004), aggregating data into larger time periods creates methodological problems, as it reduces the efficiency of estimates and is likely to induce bias. In consequence, the decision to aggregate the official reports severely undermined the quality of the data. The databases generated by *Reforma*, *Milenio* and Guerrero contain monthly data. Although the monthly periodicity of these databases represents an improvement with respect to the dominant country–year approach in the quantitative study of political conflict, this temporal aggregation still is inappropriate for analyzing the rapidly-changing dynamics of violence. Since monthly data compresses several actions and reactions among different parties in conflict into a single aggregated measure, using a month-by-month aggregation will not throw light on those interactions. Bundling a variety of different events into an aggregated monthly unit increases the chances of generating misleading conclusions and inefficient estimates. This problem is even worse for quarterly data, as all the interactions that took place within three months are lumped into a single aggregated measure.

All these databases start the count of drug-related homicides in December 2006 when President Calderón took office and declared a nation-wide crusade against criminal organizations. In total, the official database contains 57,183 municipality-months, while the number of observations of the private databases remains unknown. Unfortunately, none of these databases provides information about drug violence earlier than that date. The lack of data prior to the onset of the war on drugs creates a truncated data problem that is likely to generate bias in quantitative estimation (Geddes, 2003; King, Keohane and Verba, 1994). Without information about the trends and characteristics of violence before December 2006, it is not possible to analyze the structural causes and dynamic factors that preceded the escalation of violence. Moreover, if there is no information about the characteristics of drug violence before the onset of the conflict it is not possible to provide an evidence-based assessment of the official discourse arguing that drug violence was on the upsurge

before Calderón took office, nor the argument advanced by his critics who claim that the government crusade against drugs triggered the escalation of violence.

Finally, the methodology of the official database explicitly states that the information comes from reports gathered by the Army, Navy, Federal Police and the Mexican intelligence agency. Presumably these federal agencies have a presence in the entire country and the risk of coverage bias of these information sources is minimal. However, due to the confidentiality of their reports, their validity cannot be confirmed. Guerrero does not explicitly state the information sources used to build his database, mentioning only that the data are extracted from “19 national and local newspapers” (see footnote in Guerrero (Figure 1 2010a)). In consequence, it is not possible to assess coverage bias that might affect his database. Unfortunately, *Reforma* and *Milenio* do not report their sources of information. It is not clear whether they rely exclusively on their own journalists to provide information and coding data, or whether they systematically use other sources to complement their lack of coverage in certain regions of the country. Despite being national newspapers, *Reforma* and *Milenio* have a stronger presence in the north and central regions of the country than in other areas of the country. In consequence, there is a basis for suspecting coverage bias.

To overcome the limitations of extant databases of organized criminal violence in Mexico, this research introduces OCVED, a novel machine-generated database of daily event data on drug-related violence at the municipal level between 2000 and 2010. This database comprises detailed information on who did what to whom, when and where in the Mexican war on drugs. The last column of Table 4.1 shows the characteristics of OCVED that overcome the methodological shortcomings of previous efforts to quantify the wave of drug violence in Mexico. Instead of focusing on a narrow operationalization of violence based on homicides, this database relies on a more sophisticated conceptualization of violence based on the interaction among

actors conducting different types of actions against each other. Section 1.3 in Chapter 1 discusses the conceptualization of violent and non-violent actions by the state against criminal organizations, as well as violent retaliation from criminals against government authorities and violent competition between criminal organizations. This interactive approach of conflict is better reflected by event data than by victim counts. An event is composed by three elements: the *source*, which is the actor perpetrating an action; the *action* being carried out; and the *target* of such action. In other words, an event comprises information on someone doing something to someone else. This database considers actions undertaken by the state against criminal organizations, actions perpetrated by criminal groups against the state, and actions by criminal organisations against other criminal organizations. In addition, the menu of actions analyzed in this database goes beyond homicides and includes a broad range of violent actions with varying levels of intensity. Sections 3.5.1 and 3.5.2 in Chapter 3 report the list of actors and actions used for event coding.

This database provides additional improvements in terms of spatial and temporal coverage. The research covers all 2,456 municipalities of the country.¹ In contrast to monthly or quarterly aggregated information used in other databases, OCVED reports drug violence events on a daily basis. In addition, it covers a larger temporal horizon, as it starts on January 1, 2000 and runs to December 31, 2010, thus overcoming the problem of data truncation prior to December 2006 shared by the other databases. The spatial coverage (N=2,456 municipalities) and time coverage (T=4,017 days) leads to a large time series cross-sectional dataset (N×T) of 9,860,840 observations. As reported in Section 3.4.1 in Chapter 3, this database is built using reports from 105 sources which include both press releases from federal and state government agencies and news reports from national and local newspapers. Finally, in

¹Between 2000 and 2010, the federal government created 14 new municipalities. In order to keep the consistency of the panel database before the creation of those municipalities, I imputed information from the municipalities out of which the new ones were created.

contrast to the other databases, which relied on human coders to systematize information, this database has been created using a computer-assisted approach employing Eventus ID, the software for automated annotation of event data from text written in Spanish described in Chapter 3. In consequence, this unprecedented quantitative effort provides the first machine-generated database comprising detailed information on who did what to whom in the Mexican war on drugs on a daily basis in each municipality over an eleven-year period. The rest of this chapter describes the main characteristics of the components of drug-related violence contained in OCVED.

4.3 Main Trends of Organized Criminal Violence

This section presents the main temporal and spatial characteristics of the variables of violent and non-violent enforcement, criminal retaliation from drug trafficking organizations against the state, and violent competition among rival criminal groups. To discuss the data, this section is divided into five parts. The first subsection discusses the type of data contained in OCVED and presents the main descriptive statistics of the database. The second part takes a first look at the data at the national level and discusses the different components of violence on a monthly basis. The next segment provides a more disaggregated point of view by describing the different trends of violence at the state level. The following section discusses the characteristics of violence at municipal level on a daily basis. Finally, the last part relies on Geographic Information Systems (GIS) to show the spatio-temporal variation of violence.

4.3.1 General Description of Event Data

Based on the conceptual definitions of the components of large-scale organized criminal violence discussed in Section 1.3 in Chapter 1, this research uses the coding protocol of Eventus ID discussed in Chapter 3 to identify a set of law enforcement

activities conducted by the state against organized criminals, violence perpetrated by criminal organizations against government authorities, and violent events between rival criminal organizations. These different violent events constitute the core components of OCVED, the database used in this research for analyzing trends of drug-related violence in all Mexican municipalities on a daily basis between 2000 and 2010.

The set of law enforcement tactics used by government authorities can be divided into violent and non-violent enforcement. *Violent enforcement* includes events in which government authorities attacked, wounded or killed suspected members of criminal organizations or repelled an attack from them. Non-violent law enforcement includes four different types of events; arrests, seizure of criminal assets, drug interdiction, and seizure of weapons. *Arrests* refers to events in which government authorities detained suspected members of criminal organizations. To avoid double counting, the measure of arrests does not include events in which criminals are sentenced to prison; it only counts the event where they were arrested. *Seizure of assets* includes events in which government authorities seized criminal assets such as properties (e.g. mansions, safe houses, storage facilities) or any type of vehicle for land, water or air transportation (e.g. armored SUVs, speed boats, airplanes). *Seizure of drugs* includes events in which government authorities confiscated illegal drugs. The list of illicit substances considered for coding events of drug interdiction comprises an exhaustive inventory of drugs including cannabis, opiates (e.g. cocaine, crack, heroin) and non-natural hallucinogens (e.g. LSD, methadone).² Finally, the set of non-violent law enforcement actions includes *seizures of weapons* referring to events in which government authorities confiscated guns from members of criminal organizations. The list of weaponry covered in event coding ranges from pistols and

²For a list of illicit drugs and their scientific definitions see UNODC (2003)

semi-automatic weapons (e.g. AK-47 or R-15 rifles), to explosives (e.g. hand grenades) and anti-materiel rifles capable of piercing armored vehicles (e.g. Barret M82 rifle).

The measure of *criminal retaliation* consists of events in which members of criminal organizations perpetrated violence against government authorities. The list of actions included in criminal retaliation include attacks, ambushes, shootings, kidnapping, wounding, killing, torture and mutilation where the specific target of those actions is a government official or member of government security forces. The measure of *violent competition* between criminal organizations considers any of the actions listed above in which violence is perpetrated by members of a criminal organization against another criminal group.

Figure 4.1 shows the frequency of events of violent and non-violent law enforcement from the state against DTOs, events of violent retaliation from criminals against government authorities, and event of violent competition between rival criminal organizations. In total, the database contains 251,167 events of drug-related violence. The figure reveals that the state relies mostly on drug interdiction and arrests to fight criminals. These two types of non-violent events constitute 32.6 percent and 25.2 percent of the total number of events coded in the OCVED database. Other non-violent actions, such as seizure of criminal assets and weapons, comprise 8.1 percent and 6.8 percent, respectively. The figure also shows that violent law enforcement by the state is rarely used, constituting only 2.4 percent of the total events coded in the database. Violent competition among rival criminal organizations, in contrast, represents a substantial share of the number of events. Confrontations between criminals represent about 18.9 percent of all events coded in the data set. Finally, the figure shows that criminal retaliation against government authorities represents about 6 percent of the total events contained in OCVED.

The type of information contained in each variable in OCVED is event count data. Event counts are defined as non-negative integers I such that $I \geq 0$, representing the

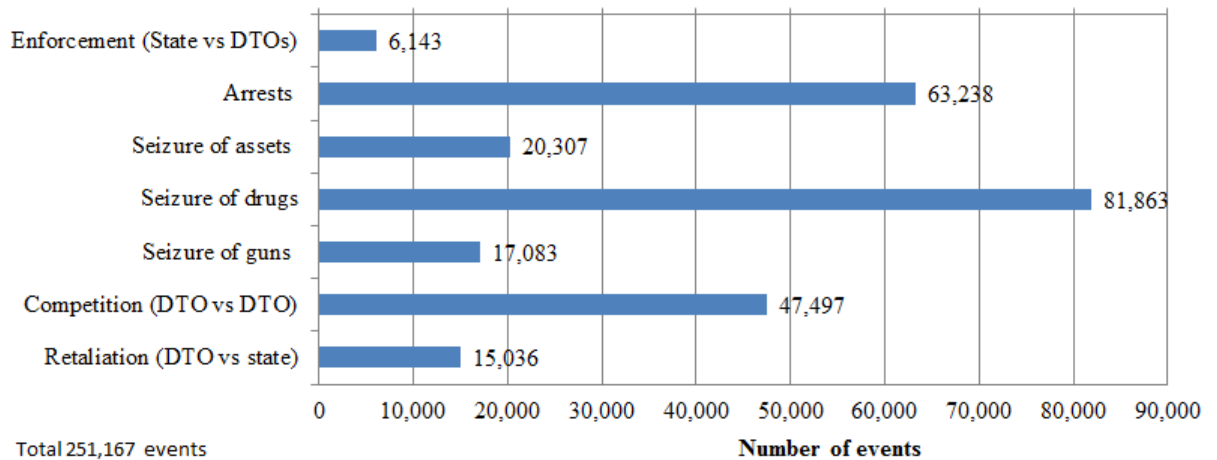


Figure 4.1. Frequency of events associated with drug-related violence by type of event

number of times an event occurs within the time span of observation (one day) and in the spatial unit of analysis (one municipality). Table 4.2 presents the descriptive statistics of the different components of violence counted in the Mexican war on drugs at the municipal level on a daily basis. The mean and standard deviation of each variable seem very small. This could suggest that these events are extremely rare events. However, readers must keep in mind that these descriptive statistics are calculated with respect to the total number of 9.8 million observations contained in the entire database.

The descriptive statistics in Table 4.2 show that violent law enforcement has a mean of 0.0006 events per municipality–day and ranges from 0 to 9 events of government violence against criminals. Putting the mean of violent enforcement in perspective, this average corresponds to 1.53 events of state violence each day in the entire country. The Table reports the following distributions for non-violent enforcement: arrests have a mean of 0.0064; the average number of seizures of assets is 0.0021 events; the mean number of drug interdiction events is 0.0083; and the aver-

age number of gun seizures is 0.0017 events. With respect to retaliation, the table indicates that the average number of criminal attacks against government authorities per municipality–day is 0.0015 events, and ranges from 0 to 11 attacks a day. The mean retaliation on a municipality–daymunicipality–day level is equivalent of observing 3.74 criminal attacks against government authorities every day across the country. Finally, the descriptive statistics show that, on average, there are 0.0048 violent events among rival criminal organizations on a municipal daily basis, and the number ranges from 0 to 36 events of violence a day. This corresponds to observing 11.83 events of violence among criminal organizations every day at the national level.

TABLE 4.2
 DESCRIPTIVE STATISTICS OF THE MAIN VARIABLES OF
 ORGANIZED CRIMINAL VIOLENCE AT THE MUNICIPAL LEVEL
 ON A DAILY BASIS

Variable	Observations	Mean	Std. Dev.	Min.	Max.
Violent enforcement	9,868,208	0.0006	0.0327	0	9
Arrests	9,868,208	0.0064	0.1210	0	60
Seizure of assets	9,868,208	0.0021	0.0561	0	16
Seizure of drugs	9,868,208	0.0083	0.1436	0	26
Seizure of weapons	9,868,208	0.0017	0.0582	0	20
Violent competition	9,868,208	0.0048	0.1141	0	36
Criminal retaliation	9,868,208	0.0015	0.0517	0	11

The graphs in Figure 4.2 show that all variables contained in OCVED are distributed according to negative binomial functions. This type of distribution is typical of event count data in which the vast majority of the data is concentrated around 0 and low event counts, with only a few observations with a high count. The negative binomial distribution is a special type of Poisson distribution, with the characteristic of being highly skewed towards the left. This high degree of skewness is known as “hyper-dispersion” and occurs when there is a small number of cases containing a substantially large number of events, thus making the distribution heavily skewed. This characteristic is clear in all graphs in Figure 4.2. The vertical axis in these graphs represents the frequency by municipality–days and the horizontal axis represents the number of events counted in each municipality according to every type of action included in OCVED. In all these graphs, the largest frequency of municipalities is concentrated at or near zero and there are a few cases with a large number of event counts. This indicates that there were no events of violence for most municipality–days, although there are a few municipality–days where a varying count of events were observed. These characteristics describe a long tail towards the right in each graph. In addition to visual analysis, the most straightforward quantitative diagnostic of hyper-dispersion is to compare the mean and the standard deviation of each variable. If the estimate of the standard deviation is larger than the mean, it is evidence of hyper-dispersion. This condition is confirmed in the descriptive statistics of all the variables reported in Table 4.2, where it can be seen that all standard deviations are larger than the mean of the respective variable.

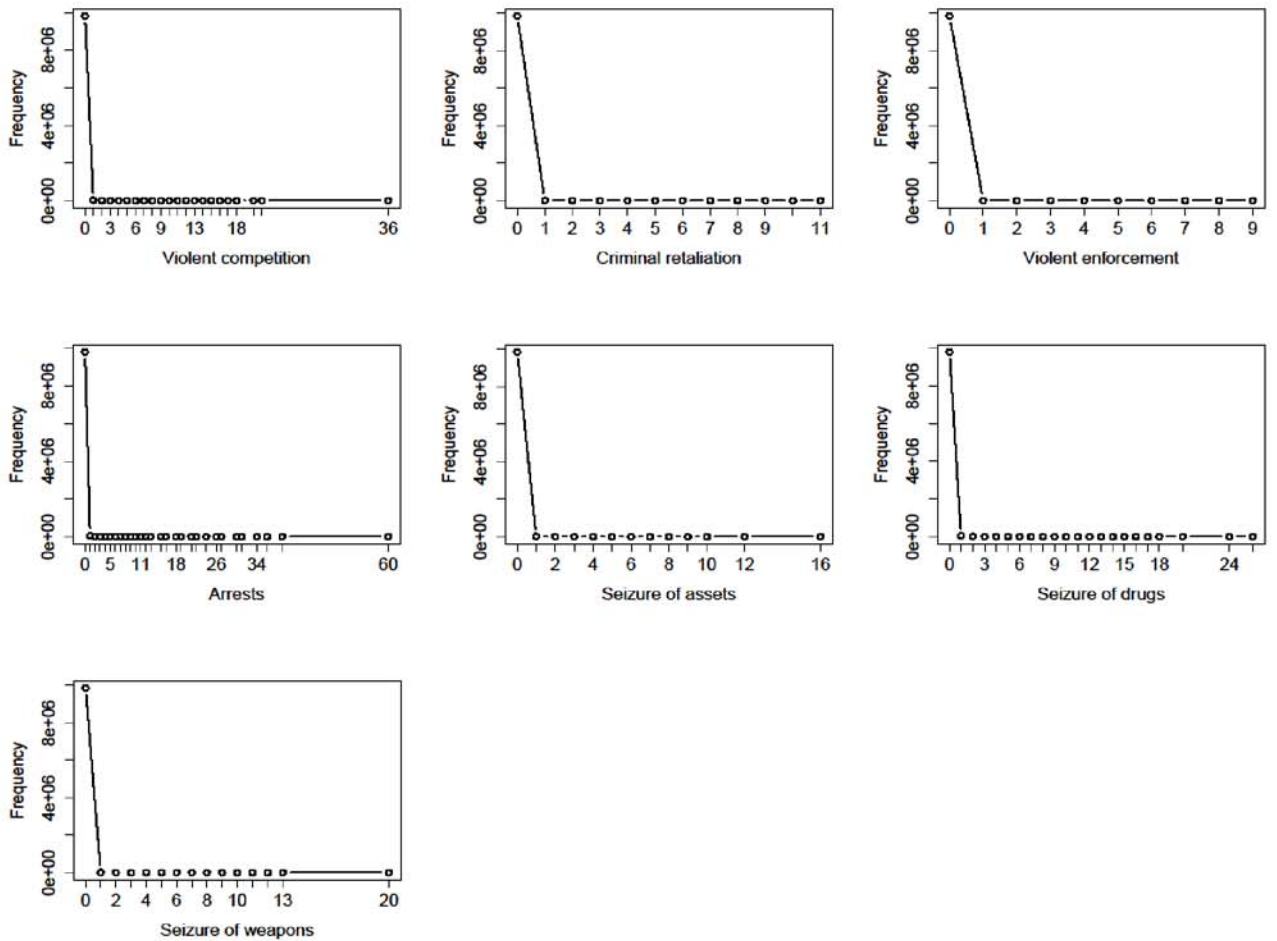


Figure 4.2. Frequency plots of the main variables of drug-related violence

4.3.2 Temporal Trends of Organized Criminal Violence

Figure 4.3 presents the main trends of drug-related violence between 2000 and 2010. This figure separates the distinct, but overlapping, trends of *violent law enforcement* conducted by the state against criminals, *retaliation* of organized criminals against government authorities, and *competition* among rival criminal organizations. For visualization purposes, data in this figure is aggregated at the national level on

a monthly basis. The trends of conflict show that clashes between criminal organizations contribute the largest share of violence. This time series is represented by the dashed line in Figure 4.3. The process of violence among DTOs can be divided into three periods. The first stage, between 2000 and 2004, is characterized by a “Pax Mafiosa” in which criminal organizations conducted their illegal activities without using significant violence against each other nor against the state. The second stage, denoted here as the period of “unrest,” indicates early signs of conflict between criminal organizations. This period lasts from 2005 to 2006, when violence among DTOs broke the long, stable trend of peace that had characterized previous years. The third stage, referred to as the “escalation,” is characterised by a generalized and sustained increase of violence among rival criminal organizations at unprecedented levels. This period lasts from 2007 to at least the end of data collection in 2010. In general, violent competition among criminal organizations constitute the largest proportion of violence when compared with the other time series. This indicates that the war on drugs in Mexico is mostly a war between rival criminal organizations.

The dotted line in Figure 4.3 represents the time series of criminal retaliation against government authorities or security personnel. The trend in this series can be divided into two stages. The first period goes from 2000 to 2006 and is termed the “acquiescence” stage. During this long time span, organized criminals did not commit systematic violence against state authorities. There is a slight increase in the number of violent events against the state in 2005 and 2006. However, these were not part of a sustained challenge against the state. A qualitative assessment of news reports during this period suggest that violent events against authorities were related to the period of “unrest.” The early signs of conflict between rival DTOs, were that some attacks against government authorities or security personnel were directed towards corrupt officials presumably collaborating with criminal organizations. The second period, termed “retaliation”, covers from 2007 to the end of data gathering, and is

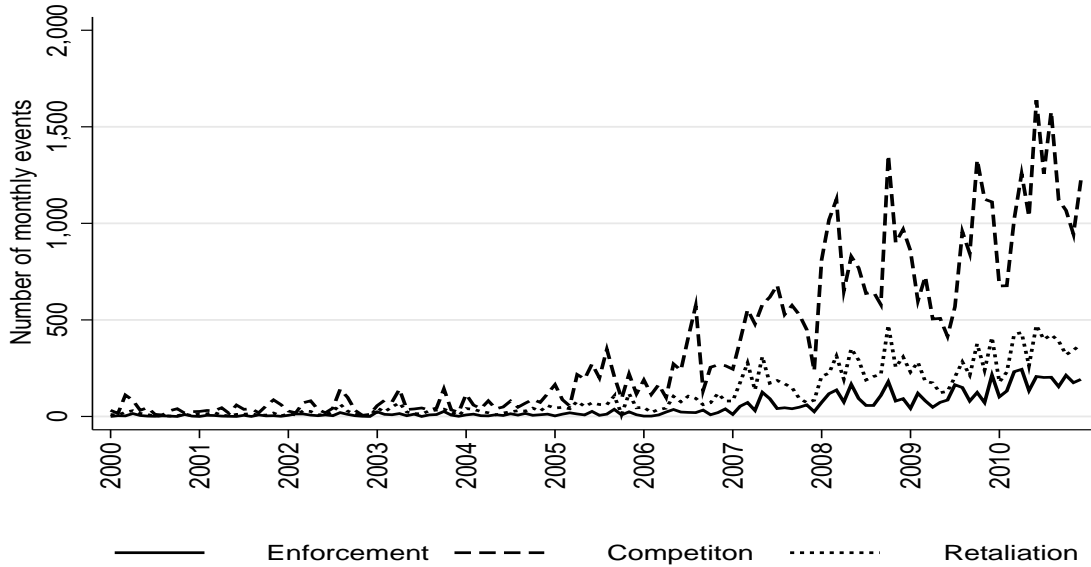


Figure 4.3. Main trends of drug-related violence in Mexico

termed a stage of “overt contestation” by criminal organizations against government authorities. During this period a sustained campaign of criminal violence against the state can be identified.

Finally, the solid line in Figure 4.3 shows the trend of violent law enforcement by the state against organized criminals. The time series of state violence can be divided into two stages. The first period goes from 2000 to 2007 and is termed “peaceful coexistence” between the state and DTOs. Although government authorities used certain other non-violent tactics to fight criminal organizations, violence was largely not commonly employed as part of the menu of tactics to fight crime. The second period ranges from 2007 the end of data gathering and is characterized by “overt belligerence” on the part of the state toward criminal organizations. In this stage the use of state violence against organized criminals shows a sustained and increasing trend. As Figure 4.3 shows, violent law enforcement constitutes the smallest share of violence when compared to the time series of retaliation and criminal competition. In

addition, the figure shows that criminal retaliation exceeds violent law enforcement. Members of criminal organizations perpetrate approximately 2.5 attacks against government authorities for every event of violent law enforcement conducted by the state against criminals.

Government authorities have a broad menu of security policies to fight crime. Figure 4.4 presents the trends of violent and non-violent law enforcement tactics used by government agencies between 2000 and 2010. The time series of violent law enforcement is the same as that presented in Figure 4.3 and is included here for illustrative purposes. When compared to non-violent tactics used against criminals, it is clear that violent law enforcement constitutes a small proportion (only 3.3 percent) of the actions used by government authorities to fight crime.



Figure 4.4. Violent and non-violent law enforcement

The analysis of counts of non-violent law enforcement tactics shows that arrests of suspected members of criminal organizations and interdiction of drugs are the

actions most commonly used to fight crime. Arrests represent 43.4 percent of the total number of state actions, and drug seizures account for 33.5 percent. These anti-criminal tactics were used extensively even before the onset of the war on drugs in December 2006, and remain the most used tactics in the war on drugs.

The time series of arrests in Figure 4.4 can be divided into two stages. In the first period, the administration of President Fox used arrests as a systematic tactic to fight crime. Between 2000 and 2006, the average number of arrests was 0.004 events per municipality–day. During this period, there was an increase in the number of arrests between 2001 and 2004. In 2003, the Mexican army arrested Osiel Cárdenas Guillén, the leader of the Cartel del Golfo, the most prominent drug trafficking organization at the time. As will be discussed later in Chapterchapter:zetas, this arrest is crucial for understanding the Mexican war on drugs. The detention of Cárdenas Guillén marked the split between the cartel’s armed wing, Los Zetas, a group of deserters from an elite Army special forces unit, and the rest of the Cartel del Golfo. The wave of arrests declined between the second half of 2004 and during 2005. Then there was another increase of arrests during the first half of 2006. This spike in arrests coincides with the increase of violence among criminal organizations identified in the period of “unrest” discussed in Figure 4.3.

The second period in the time series of arrests is characterized by a substantial and sustained increase in the number of detentions. Between 2007 and 2010, the average number of events where authorities arrested a member of a criminal organizations was 0.0107, which is 2.7 times greater than the mean during the first stage. This unprecedented wave of arrests had a significant disturbing effect on DTOs, as it dismantled their organizational structure by removing several of their key members. The systematic effort of government authorities to arrest members of criminal groups also signaled that these organizations were no longer protected by the cohesive corrupt agreements that they had had with the political elites.

The analysis of the time series of drug seizures in Figure 4.4 shows that interdiction of illegal drugs is the most frequently used tactic to fight drug trafficking organizations. The graph reveals a sustained effort by the Mexican government to stop drug shipments before they enter the U.S. market. During the Fox administration, government authorities largely used interdiction to fight DTOs; this tactic was used more frequently than any of the other violent and non-violent tactics in their repertoire. Between 2000 and 2006, the average of drug seizures was 0.006 per municipality–day. The analysis of the time series reveals an increase and later decline of drug interdiction between 2002 and 2005. This trend is comparable to the trend in arrests during the same period, thus suggesting that arrests and seizures are used as complementary non-violent tactics. After the announcement of the war against organized crime declared by President Calderón upon taking office in December 2006, there was a marked surge of drug interdiction. The number of drug seizure events dramatically increased during 2007 and 2008, with an average of 0.0146 per municipality–day, which corresponds to 2.5 times as many seizures as in the previous period. Later, in 2009 and 2010, the rate of drug seizures declined slightly, but remained relatively high with an average of 0.0103 events per municipality–day. The sharp increase and subsequent decline in drug interdiction suggests a change in the strategy implemented by government authorities in the war on drugs.

The time series of seizures of criminal assets and weapons in Figure 4.4 shows that these strategies are not widely used by the Mexican government to fight crime, although both series show a sustained increase starting on 2007. There is a clear change in the trend of seizures of criminal assets after Calderón took office. In the period 2000–2006, before Calderón was elected, the average number of asset seizures was 0.0012 events per municipality–day. In contrast, during the tenure of his administration from 2007 until the end of data collection in 2010, the average number of seizures of criminal assets was 0.0036 events per municipality–day, 2.86

times higher than in the pre-Calderó period. Gun seizures also show a clear increase after the war on drugs was launched. Between 2000 and 2006, the average number of gun seizures was 0.0007 events per municipality–day, but this increased about fivefold in the period 2007–2010 to an average of 0.0036 events per municipality–day.

In September 2004, the Federal Assault Weapons Ban (AWB) expired, ending a nation-wide restriction on the production and domestic sales of weapons with military characteristics³ that had been in force in the U.S. since September 1994. After the end of the AWB, the production of assault weapons in the U.S. increased rapidly. According to the Bureau of Alcohol, Tobacco and Explosives (2012), the annual production of assault weapons went from 1.3 million rifles produced in 2004 to 2.3 million in 2009.

4.3.3 Disaggregating the Trends of Violence at State Level

This section analyzes the main trends of violence at the state level on a monthly basis. Rather than focusing on all the different components of OCVED, this section is explicitly focused on analyzing the dynamics of conflict including violent competition among criminal groups, criminal retaliation, and violent law enforcement. Therefore, non-violent law enforcement tactics are not discussed. To facilitate the comprehension of the figures described in this subsection, readers can refer to Appendix A.4 which gives a list of Mexican states and their abbreviations.

Figure 4.5 reports the trends of violent competition between criminal organizations at state level on a monthly basis. The first group refers to the states where

³Assault weapons, also known as semi-automatic firearms, have several military-like characteristics. When fired, assault weapons automatically eject the spent cartridge casing and load another cartridge into the chamber for the next shot. However, these weapons do not fire automatically as machine-guns do. Assault weapons are also characterized by accepting detachable magazines with multiple rounds. Another set of characteristics for categorizing a firearm as an assault weapon include features that allow mounting a bayonet, attaching a grenade launcher or a flash suppressor, among others.

violent confrontations between criminal organizations are most intense. This group is led by the state of Chihuahua, followed by Coahuila, Michoacán, Nuevo León, Sinaloa and Tamaulipas. Among this group, Chihuahua reports the most dramatic and sustained increase of violence between criminal organizations. During the entire period, the average month in Chihuahua reports 67 violent events, and the count ranges from 0 to 347 events per month. Between 2000 and 2006, there were a few incidents of violence between criminal organizations in Chihuahua; the monthly average event count in this period ranged between 7.1 and 30.3 per month. These relatively low figures contrast with the rapid escalation of criminal competition between 2007 and 2010; the count ranges from 64.2 to 221.5 events per month in Chihuahua. The other states in this group also show high levels of violence between criminal organizations, although not as dramatic as in Chihuahua. The average number of violent events in these states per month during the entire observation period are Coahuila 24.8, Michoacán 28.9, Nuevo León 24.7, Sinaloa 35.9 and Tamaulipas 27.2.

The second group contains other states with high levels of violent competition between criminal organizations, yet not as intense as in the previous group. This set of states comprises Baja California, Durango, Jalisco, Estado de México and Sonora, and the trends of violence between criminal groups in all these states intensify after 2007. The average number of monthly events of violence between 2000 and 2010 in this group are Baja California 12.7, Durango 14.5, Jalisco 11.2, Estado de México 11.4 and Sonora 11.2.

There is a third group of states with low levels of violent confrontation between criminal organizations. This group includes the Federal District, Chiapas, Guanajuato, Guerrero, Morelos, Veracruz and Zacatecas. Monthly averages of violent events among criminal organizations between 2000 and 2010 are Mexico City 5.9, Chiapas 12.2, Guanajuato 7.9, Guerrero 8.6, Morelos 5.4, Veracruz 10.7 and Zacatecas 7.9.

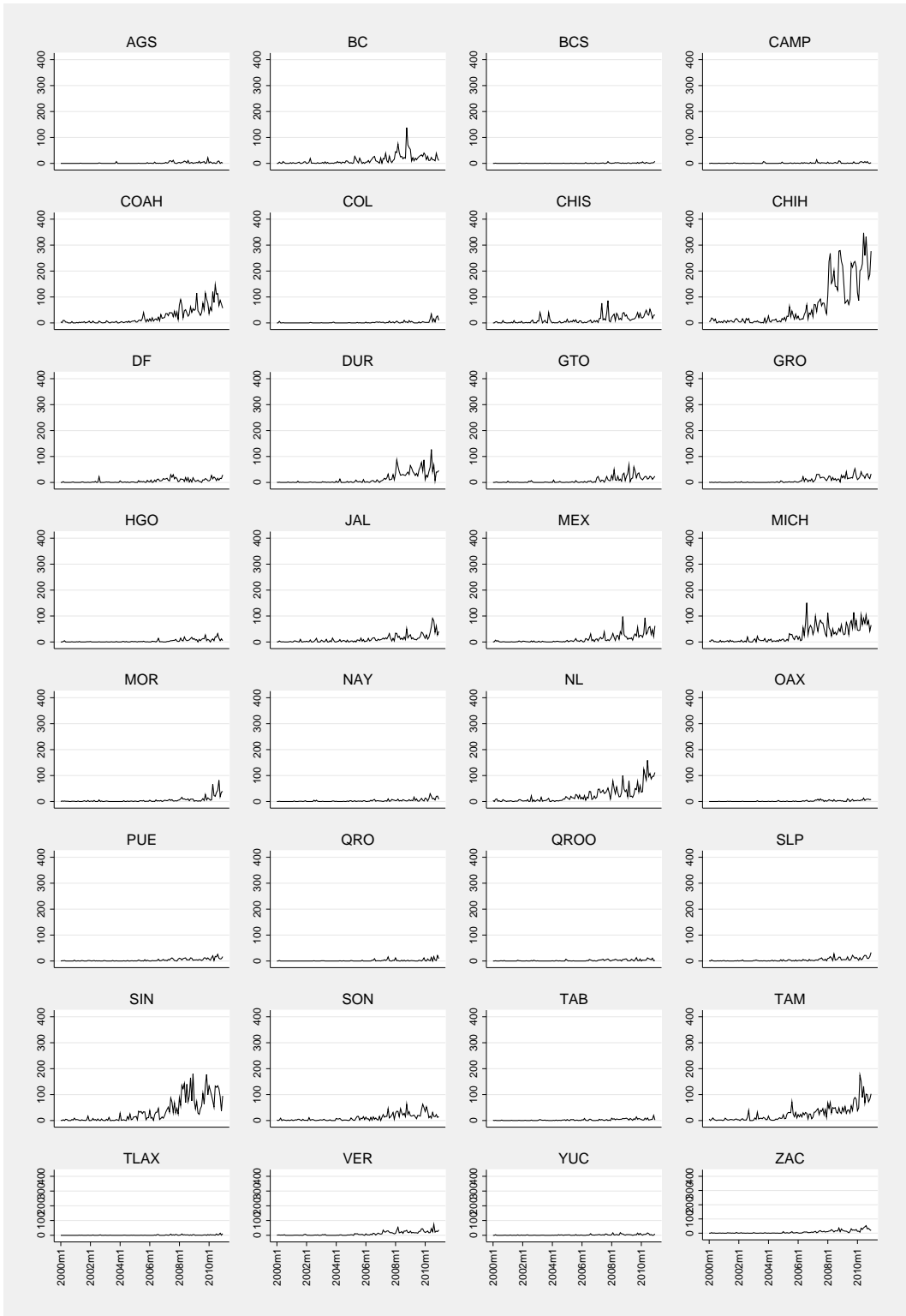


Figure 4.5. Violent competition among criminal organizations at state level on a monthly basis

Finally, there is a fourth set of states that have barely been affected by violence between criminal organizations. This group includes the states of Aguascalientes, Baja California Sur, Campeche, Colima, Hidalgo, Nayarit, Puebla, Querétaro, Quintana Roo, San Luis Potosí, Tabasco, Tlaxcala and Yucatán. The average numbers of events of violence between criminal organizations per month observed in these states are Aguascalientes 1.7, Baja California Sur 0.7, Campeche 1.3, Colima 2.1, Hidalgo 3.8, Nayarit 3.1, Puebla 3.4, Querétaro 1.5, Quintana Roo 2, San Luis Potosí 4.4, Tabasco 2.4, Tlaxcala 1.3 and Yucatán 2.6.

Figure 4.6 shows the trends of violent retaliation perpetrated by criminal organizations against government authorities at state level on a monthly basis. Based on the frequency of criminal attacks against the government, it is possible to divide states into three main groups. The first group comprises six states with the highest levels of violence against the state and includes Chihuahua, Tamaulipas, Nuevo León, Sinaloa, Michoacán and Coahuila. Among these states Chihuahua is the most dangerous place for authorities and security personnel. The average number of retaliation attacks in Chihuahua is 18.22 events per month in the entire period of observation. This general average ranges from 0.5 monthly events in 2001 to 57.9 events per month in 2010. The mean counts of retaliation against government authorities in the other states are Tamaulipas 11.90, Nuevo León 9.77, Sinaloa 9.45, Michoacán 8.37 and Coahuila 7.42. Among these sub-national units, Tamaulipas presents an unusual trend of violence against the state. In 2010 there is a remarkably high spike of aggressions against government authorities that generated an average of 43.8 monthly events that year.

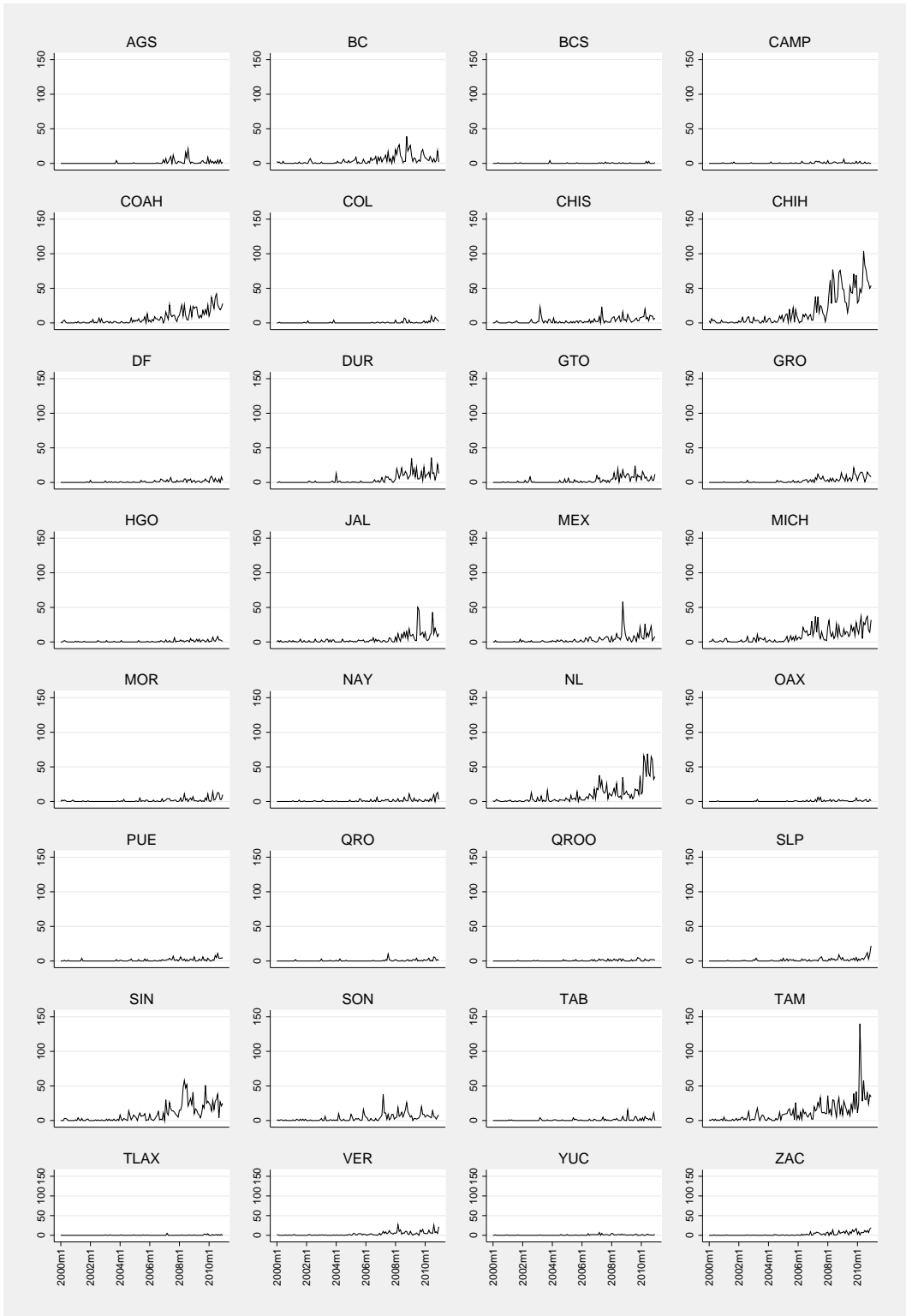


Figure 4.6. Criminal retaliation against government authorities at state level on a monthly basis

There is a second group of states which show only a few monthly events of criminal retaliation against government authorities. This group includes the states of Baja California, Durango, Jalisco, Sonora, Estado de México, Veracruz, Chiapas, Guanajuato, Zacatecas, Guerrero, Morelos, San Luis Potosí, Federal District, Aguascalientes, Nayarit and Puebla. The average number of attacks against government forces in this group ranges from 1.1 events in Puebla to 4.6 events in Baja California. Finally, there is a third group where the monthly average of retaliation events against the government is less than one per month. This group includes Tabasco, Hidalgo, Yucatán, Colima, Quintana Roo, Oaxaca, Querétaro, Campeche, Tlaxcala and Baja California Sur.

Figure 4.7 reports the main trends of violent law enforcement against criminal organizations at state level on a monthly basis. The first group of states includes those where the government deploys the most intense use of violence to fight criminals. This group includes the states of Chihuahua, Tamaulipas, Nuevo León, Michoacán, Coahuila, Sinaloa, Veracruz and Jalisco. The states of Chihuahua and Tamaulipas report the largest monthly average of violent law enforcement with 6.1 and 5.7 events respectively. However, the trends of violence are different in these two states. In Chihuahua, violent law enforcement shows a progressive intensification of government use of violence with some fluctuations, which reached a maximum of 37 events per month in 2010. The use of state violence in Tamaulipas is marked by a notable spike in 2010 that reached 103 events per month.

The second group is composed of states with 1 to 2 events of violent enforcement per month. The states in this group are Aguascalientes, Baja California, Chiapas, Durango, Guanajuato, Estado de México, Sonora and Zacatecas. Finally, the third group includes the remaining states which average fewer than one monthly event of violent law enforcement.

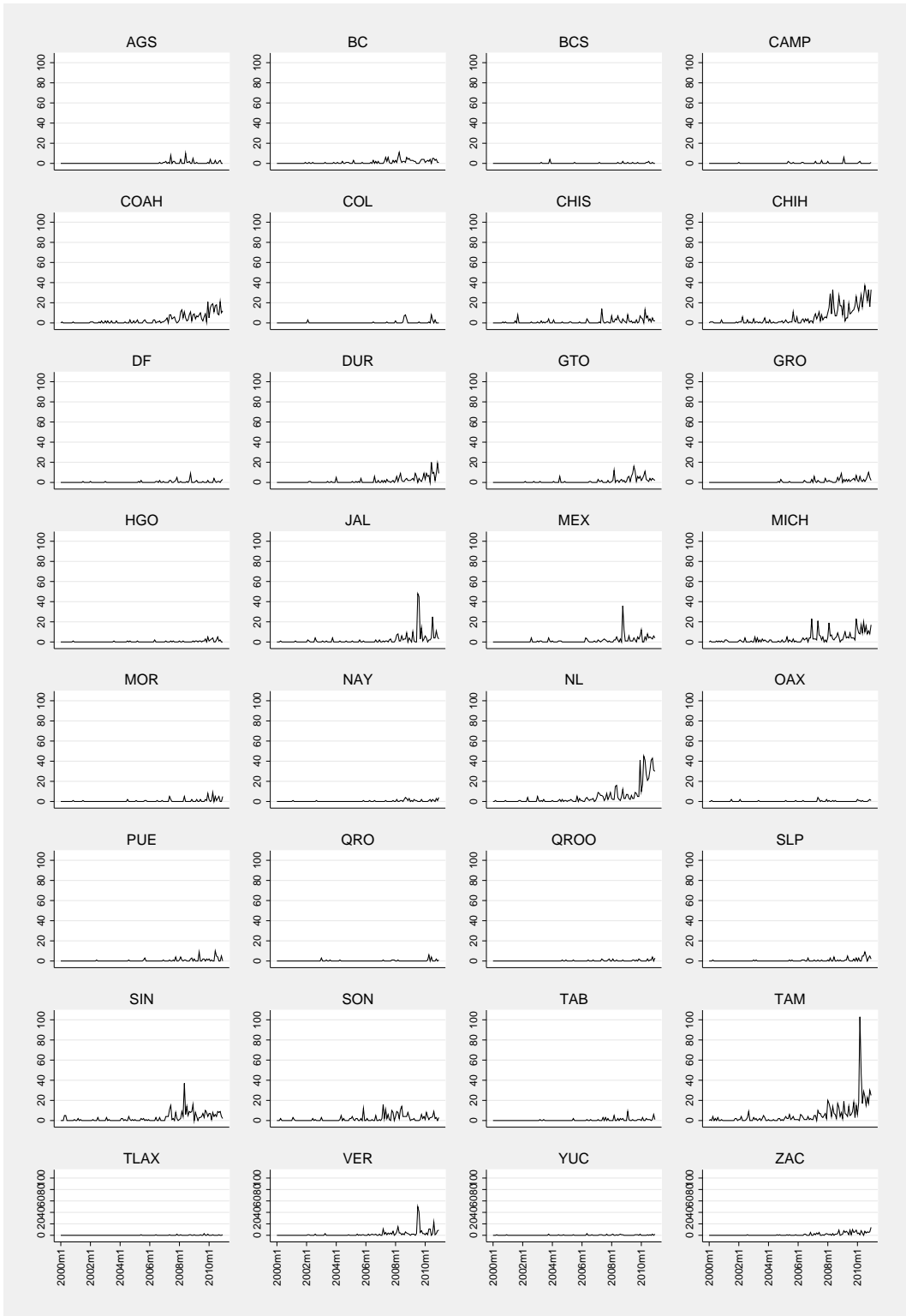


Figure 4.7. Violent law enforcement at state level on a monthly basis

4.3.4 Main Trends of Violence at Municipal Level on a Daily Basis

Figure 4.8 disaggregates the main trends of daily violent events at municipal level. The first panel shows the scatter plot of violent competition among criminal organizations by municipality–day. The second panel shows the daily distribution of criminal retaliation against government authorities at municipal level. Finally, the third panel presents the deployment of violent law enforcement against crime on a daily municipal level.

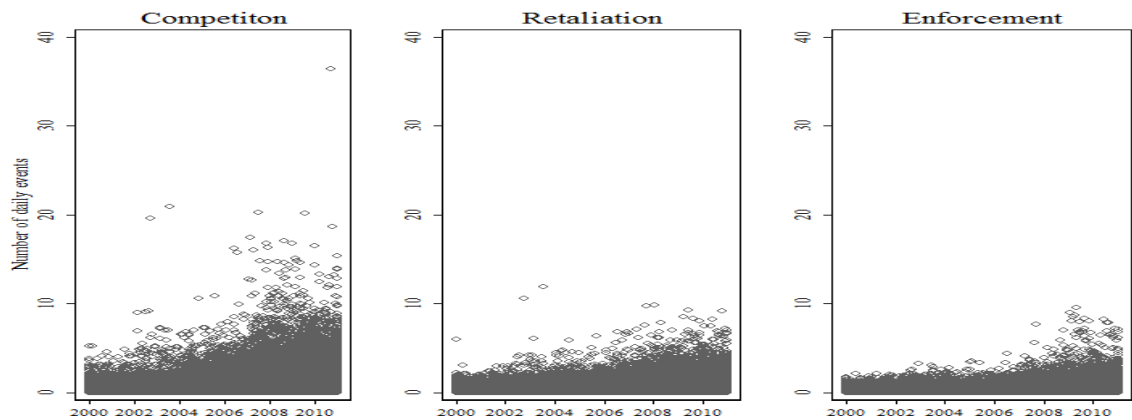


Figure 4.8. Main trends of violence at municipal level on a daily basis

The data illustrated in the figure confirms that violent competition among criminal groups constitutes the most substantial source of violence, in comparison to criminal retaliation and violent law enforcement. The first panel shows a massive increase in observations reporting higher numbers of daily events of violence among criminal organizations. Between 2000 and 2006, there is a slow but sustained incre-

ment in violence. During this period, the trend is pulled upward by a few outliers of more than five events of violent competition per day. However, after 2007 there is a large cloud of observations spreading towards higher levels of violence among criminal groups. In the last years of the observation period, the first panel shows a larger number of values with uncommonly high levels of violence between rival criminal organizations.

The second panel shows a steady but continuous increment in the number of municipalities reporting more intense criminal retaliation against government authorities. This panel indicates that there is only a handful of cases with more than five attacks perpetrated by criminal organizations against the state per municipality–day. Finally, the third panel shows that the trend of violent law enforcement consists of gradual slight growth in the number of observations where the state uses force to fight crime. The third panel also reveals that there is only a small number of municipalities where government authorities deploy the most intense use of violence against criminal groups.

4.3.5 Spatial Trends of Violence Between Criminal Organizations

The overview of spatial trends of conflict presented in this section is only focused on the dynamics of violence between one criminal organisation and another. Figure 4.9 shows the cumulative spatial concentration of violence between criminal organizations at the municipal level in 2000, 2005 and 2010.⁴ The maps indicate hotspots of violence identified through kernel density functions based on the concentration of geo-referenced data points within a range of 50 km. Kernel density functions assign higher values to areas where there is a higher concentration of data points. The ker-

⁴A three-dimensional animation of the spatial concentration of violence among criminal organizations is available at <http://www.youtube.com/watch?v=d80bscVMJmE>. The video shows the spatial and temporal dynamics of violent competition between rival DTOs from 2000 to 2010.

nel density functions are then integrated into a raster plot of continuous information that can be plotted in a three-dimensional space. A higher elevation in the raster plot indicates more intense violence between criminal organizations in that specific area. For visualization purposes, maps in Figure 4.9 show Mexico's political divisions at the state level, but the kernel density functions are estimated with data at the municipal level. To facilitate the identification of each state, readers may refer to Appendix A.5 showing the sub-national division of the country.

The spatial analysis of violence between criminal organizations in Figure 4.9 reveals two distinct but overlapping processes of intensification and spread of violence. The upper map in the figure shows that in 2000 there are hardly any significant clusters of conflict between criminal organizations. The map in the middle of the figure shows that in 2005 there are some areas with early signs of violence between criminal groups. Finally, the bottom map shows that by 2010 violent competition between rival criminal organizations had spread across the country at varying levels of intensity.

In 2005, violent competition between rival criminal organizations is concentrated in a few isolated hotspots scattered along the U.S.-Mexico border, the Pacific coast and some areas in the center of the country. Violence along the border seems to cluster in the northeast and affects the states of Tamaulipas, Nuevo León, and Coahuila. There are also some scattered spots of violence in the north-central region of the country affecting the state of Chihuahua. Additionally, there are some early signs of violence in the northwest, particularly in the state of Baja California. The 2005 map also shows some scattered spots of violence along the Pacific coast affecting the states of Sinaloa, Jalisco and Michoacán. There is another cluster of violence in the center of the country covering some areas of Estado de México, the Federal District, and Morelos.

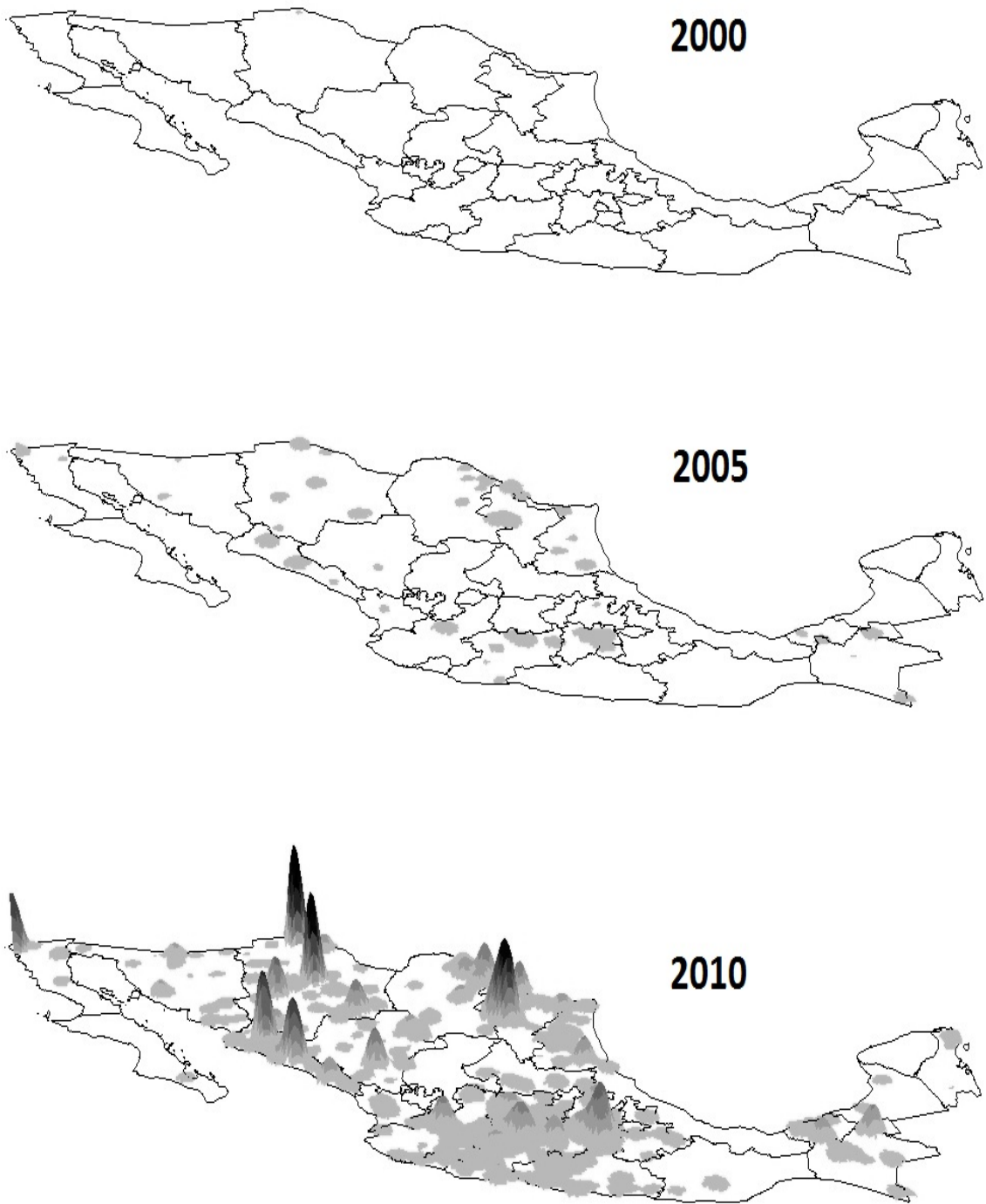


Figure 4.9. Spatial trends of violence among criminal organizations

In 2010, the wave of violence between criminal organizations has spread across the entire country. The prominent spikes of violence in the 2010 map in Figure 4.9 indicate that there are some areas with particularly high concentrations of conflict between criminal organizations in the north region and on the northern Pacific coast. Among those highly conflictive areas, it is possible to identify two trends. In Baja California and Chihuahua, specifically in Ciudad Juárez, violence intensifies without spreading to neighboring areas. In contrast, spikes of violence in Sinaloa and the northeast are characterized by both intensification and a substantial spill-over of violence to neighboring regions. In addition, the map shows that there are areas in the south and central regions of Mexico where violence between criminal organisations is widely diffused throughout the region, although not as intense as in the north. This spillover affects the states of Jalisco, Michoacán, Guerrero, Estado de México, Querétaro, Guanajuato, Hidalgo and Mexico City.

The maps presented in Figure 4.9 only show three different times separated by several years. Moreover, the 50 km. radius of the kernel functions may be useful for purposes of overall visualization of patterns in violence, but it obscures more specific variations of violence at a smaller scale. For that reason, these maps are limited for showing the more nuanced processes of violence. Nevertheless, they provide valuable insights for identifying broad trends of temporal and spatial dynamics of violent competition between criminal groups.

CHAPTER 5

THE EMERGENCE, CONSOLIDATION AND COLLAPSE OF ORDER

“Violence is the last refuge of the incompetent”

Isaac Asimov

5.1 Introduction

The formal model presented in Chapter 2 is based on a series of assumptions about the relationship between political actors and criminals. These assumptions serve as the building blocks for the mechanisms of the model, and are then used to derive a set of observable implications from the theoretical explanation, which must be tested on the basis of empirical evidence. One of the central implications of the theoretical model is that violence is the consequence of the collapse of order. Located within the Hobbesian tradition of conflict research, the argument indicates that in contexts of authoritarian regimes, the relationship between political actors and crim-

inals is characterized by peaceful agreements sustained on the basis of corruption and the stability of the political regime. But as democratization gradually erodes the foundations of the authoritarian regime, the system of incentives no longer favors political alliances with criminal organizations and motivates law enforcement against crime. As a result, the previous order collapses and leads to the escalation of conflict characterized by the state using violence against crime, criminal organizations responding with violence against the authorities and, most importantly, the escalation of a wave of violence among rival criminal organizations. Violence thus emerges from the collapse of the preexisting order.

The theoretical model analyzes the interactions between the state and criminal organizations in two different settings. The first scenario is characterized by the lack of law enforcement in an authoritarian regime and the peaceful coexistence between criminals and state authorities. The second scenario is defined by proactive law enforcement efforts against criminals, which trigger the escalation of drug related violence. The transition from one scenario to the other is represented by the central hypotheses about the onset of the war on drugs:

(H_1) Increased democratization is positively associated with higher levels of law enforcement against organized crime.

Why do politicians display different behavior towards criminals under an authoritarian rule than in a democratic regime? The central argument is that democratization disrupts the structure of political incentives favoring corrupt agreements under authoritarianism and motivates government authorities to enforce the law in a democratic setting. The process of democratization alters the the system of incentives by first eroding the feasibility of corrupt agreements and then by motivating the enforcement of the law against criminals. The erosion of corrupt agreements is caused by two factors. First, democratization increases the number of relevant political actors at different levels of government, thus increasing the difficulty of solving problems of col-

lective action necessary for establishing corrupt agreements. In a democratic regime, the plurality of political actors undermines the coordination necessary to establish pacts with criminals. Second, democratization facilitates the effective circulation of political elites and introduces uncertainty about the results of the electoral process, thus reducing the stability of corrupt agreements over time and increasing the costs of establishing new agreements in the future. In a democratic system, certainty about the limited tenure of political office and uncertainty about the next person in office reduce the duration and stability of corrupt agreements. This is particularly important for the Mexican case because the national constitution does not allow re-election for executive offices (president, governors and mayors), nor does it allow consecutive reelection of legislators.

Besides corroding the feasibility and sustainability of non-aggressive pacts between corrupt politicians and criminals, the most significant effect of democratization is to inculcate motivation for government authorities to fight crime. The process of democratic transition moves the prospects of political survival away from the decision of authoritarian political elites and places the likelihood of political success on the favor of broad sectors of the electorate, which depends on the provision of public goods. Under democracy, political actors have personal incentives to enforce the law as a form of public good. This incentive is stronger for new politicians who want to differentiate themselves from former politicians who might have alliances with criminals.

To test the argument, this chapter examines the Mexican case from a process tracing perspective. The historical assessment analyzes the process that favored the emergence of order out of the Revolution, the factors that contributed to its consolidation under an authoritarian regime, and the collapse of authoritarian order caused by the process of democratic transition. The chapter is divided into five segments.

The first section makes explicit the set of assumptions behind the hypothesis of democratization, thus improving the transparency of the argument and facilitating the identification of these factors in the subsequent segments. The second section analyzes the conditions that favored the emergence of political order out of the Mexican Revolution. This segment also identifies the domestic and international factors that facilitated the engagement of political actors in drug-related activities. The third section analyzes the consolidation of political order under authoritarianism. This section challenges mainstream explanations of non-aggressive agreements between politicians and criminals based primarily on corruption and selective enforcement. Economic motives and the use of coercion are certainly important but do not constitute a complete explanation. This section argues that political threats against the state characteristic of Cold War politics justified the involvement of the state security apparatus in the criminal underworld. Such involvement not only offered opportunities for personal speculation but, most importantly, it enabled monitoring of clandestine activities that could threaten the survival of the regime. In addition, the involvement of political actors in drug trafficking gave them a hold over criminals through a system of political incentives rather than relying on the use of force. The fourth segment analyzes the process of democratization based on the interaction between the electoral system and the party system. The analysis shows how minor electoral reforms enabled the operation of opposition parties, who in turn pushed for broader reforms. The protracted process of democratic transition undermined the hegemony of the authoritarian regime. Democratization increased the number of relevant political actors at all levels of government, introduced certainty about the electoral rules and uncertainty about election results. This generalized erosion disrupted the ability of the authoritarian regime to monitor criminals and to instill discipline through a system of political incentives. The precarious equilibrium conditions collapsed as the Mexican government intensified law enforcement activities,

thus triggering a wave of violence of all-against-all. Finally, the last section presents the conclusions.

5.2 Explicit Assumptions about Democratization and Law Enforcement

The central argument about the onset of the war on drugs indicates that democratization erodes peaceful configurations between corrupt politicians and criminals and motivates government authorities to fight crime. This argument is based on the following set of assumptions about the different behavior of political actors in the context of authoritarian regimes and under democratic rule.

Order under authoritarian regimes

The construction of order under authoritarian regimes is based on the following assumptions of the behavior of political actors and criminals:

Assumption 1. In the context of an authoritarian regime, political authorities coexist with organized criminals in a peaceful configuration.

Assumption 2. The political benefits for enforcing the law under authoritarianism are lower than the benefits of corruption obtained by collaborating with criminals. This is represented by the relationship $G < B$ discussed in Section 2.3.2, where G represents the political benefits of enforcing the law as a public good and B represents the benefits from bribes received for not enforcing the law.

Assumption 3. Order is maintained in part by the threat of coercion from an authoritarian state, but most importantly, by the political incentives generated throughout the hierarchical and centralized political structure of the regime.

Assumption 4. The small number of relevant political actors characteristic of authoritarian regimes favors peaceful arrangements between government officials and criminals.

Based on the theory of collective action advanced by Olson (1965), it is possible to extend the assumptions for a reduced number of political actors and their relationships with criminals in the following terms:

Assumption 4.a. A reduced number of political actors makes pacts more feasible because it reduces the transactions and information costs for bargaining with organized crime and reduces the costs of bribes that criminals have to pay.

Assumption 4.b. A smaller number of political actors facilitates the enforcement of the corrupt agreement within the structure of the state. It makes it easier for corrupt actors to coordinate between each other. It also makes it easier for them to detect defectors who might take bribes without the approval of the rest of the group.

Assumption 4.c. The cohesiveness of an authoritarian chain of command generates behavior similar to that of a reduced number of political actors, thus facilitating compliance by the lower ranks in the hierarchy to the terms of the corrupt agreement procured at the top of the hierarchy.

Assumption 5. The lack of effective circulation of the political elite provides extended time horizons for both criminals and political actors, thus generating credible expectations about the stability of the pact.

Based on the analysis of strategic cooperation made by Schelling (1960), this assumption can be further developed in the following terms:

Assumption 5.a. Extended time horizons reduce the costs of bargaining between criminals and corrupt politicians because once an initial agreement is achieved, actors are likely to keep cooperating if the expiration of the agreement is not foreseen in the short run.

Assumption 5.b. Extended time horizons increase the incentives for criminals to cooperate because the advancement of their criminal career and future economic benefits are likely to be conditional on their compliance with the pact in the present.

Assumption 5.c. Extended time horizons provide incentives for political actors at the top of the hierarchy to comply with the terms of the agreement because of the expectation of receiving economic benefits in the future without suffering sanctions from the electorate.

Assumption 5.d. Extended time horizons increase the incentives for political actors in the middle and lower ranks of the political hierarchy to comply with the commands of the political elite because the expectation of patronage and their future political career depends on receiving the favor of the elite.

Democratization and the collapse of the preexisting order

According to the theoretical model, democratization erodes the peaceful arrangements between corrupt politicians and criminals characteristic of authoritarian regimes. This argument is based on the following assumptions:

Assumption 6. Democratization erodes the non-aggression agreements between corrupt politicians and organized criminals that are likely to exist under authoritarianism.

Assumption 7. The political benefits for enforcing the law in a democratic regime are larger than the benefits of corruption obtained from non-enforcement. This is represented by the relationship $G > B$ mentioned above and discussed in Section 2.3.2.

Assumption 8. The decentralized and fragmented structure of political relationships in a democratic system does not favor the imposition of order on criminals based on political incentives.

Assumption 9. Democratization increases the number of relevant political actors, thus eroding the feasibility of peaceful arrangements between corrupt government officials and organized criminals.

This assumption can be further extended in the following terms:

Assumption 9.a. A larger number of political actors makes it more difficult to overcome problems of collective action by increasing transactions and information costs for bargaining with criminals and increasing the amount of bribes that criminals have to pay.

Assumption 9.b. An increased number of political actors makes it more difficult for corrupt politicians to coordinate between each other. It also hinders their capability to detect free riders who might take bribes privately without the approval of the rest of the group.

Assumption 9.c. Democratization fragments the chain of command across different levels of government, thus reducing the prospects of compliance with a corrupt agreement along the entire chain of command.

Assumption 10. Effective circulation of the political elite through electoral means increases the uncertainty about the winner of the next election (Przeworski, 1991), thus reducing the temporal horizons and stability of non-aggression agreements between corrupt politicians and organized criminals.

Assumption 10.a. Elite circulation reduces the duration of corrupt agreements and increase the costs of negotiating new agreements following the election of the new elite.

Assumption 10.b. Short time horizons reduce the incentives for criminals to establish corrupt agreements with the state because elite circulation reduces the certainty about their future economic benefits.

Assumption 11. Increasing political competition motivates politicians to enforce the law against organized crime.

Assumption 11.a. Increasing political competition motivates government authorities to provide public goods, including the provision of public security, in order to gain electoral support.

Assumption 11.b. Increasing political competition provides personal incentives for new politicians to fight crime as an effort to distinguish themselves from previous corrupt politicians.

Assumption 11.c. Increasing political competition generates incentives for politicians to avoid corrupt agreements with criminals because they can be sanctioned by the electorate.

5.3 The Emergence of Order out of the Mexican Revolution

This section analyzes the historical process that gave rise to the creation of political order after the prolonged violent struggles of the Mexican Revolution. In this perspective, order emerged as a political pact between the main actors capable of conducting organized violence. The main objective of the agreement was to terminate the recurrent bloody battles among revolutionary leaders. This political pact set the foundations for the creation of the Institutional Revolutionary Party (*Partido Revolucionario Institucional*, PRI) as the main mechanism for managing access and the peaceful exercise of power. To do so, the political pact recognized local strongmen and allowed them to enjoy a substantial degree of autonomy in their local affairs as long as they remained loyal to the political elite in the central government. The relative autonomy of the periphery gave local leaders the opportunity to reap the economic benefits from illicit markets created by prohibition laws in the U.S. at the beginning of the twentieth century.

The Mexican Revolution involved the mass mobilization of insurgents fighting for a variety of political and economic reasons. Starting with the November, 1910 uprising led by Francisco I. Madero against the long-lasting dictatorship of Porfirio Díaz, the Mexican Revolution soon combined several insurrections advancing democratic, socialist, anarchist, liberal, populist and agrarian demands (Knight, 1990*a,b*). During the Mexican Revolution, the primary way to access power was through the use of arms. The national political scene witnessed the rise and fall (often by bullets) of several presidents and strongmen. Local politics were characterized by similar dynamics. Revolutionary generals became governors due to their service in battle and loyalty to those higher up in the military and political structure, but they often fell in disgrace as fast as they had entered power. A sequence of presidential assassinations, military coups, and reactionary movements marked the instability of national politics. Such volatility also extended to the aftermath of the revolutionary war. Alliances emerged frequently and just as quickly dissolved under gunfire only to reappear in a different configuration. Due to the instability of politics in the heart of the country, generals who rose to power in the periphery enjoyed a substantial degree of autonomy from the central government.

Efforts to regulate the production and consumption of drugs and alcohol in the U.S. coincided with periods of volatile political conditions in Mexico. Under these circumstances, some governors, especially those in the northern part of the country, saw an opportunity of enriching themselves thanks to the profitable illicit markets opened by U.S. prohibition laws. Governing with the violent skills acquired during the revolution, these governors imposed political order within their domains and jealously controlled the main drug and alcohol smuggling networks on the Mexican side of the border.

Due to the recurrent sequence of violent confrontations among different factions, President Plutarco Elías Calles, a general who had emerged as the “maximum boss of

the revolution,” created the National Revolutionary Party, (*Partido Nacional Revolucionario*, PNR) in 1929. This party eventually became the Institutional Revolutionary Party (PRI), which managed to remain in power without interruption for more than seven decades. The party gathered together and incorporated all the main military and political forces of the country, including new and old generals who made it through the revolution, but also large sectors of peasants and workers that emerged as key political actors in world politics after the Russian Revolution. All the varied sectors contained within the party agreed to solve their differences through peaceful means. The party served as the central structure for regulating the use of and access to power. The PNR thus became the main political mechanism for halting the prolonged era of bloodshed of the Mexican Revolution and setting up the corner-stone for the process of state-making in modern Mexico.

5.3.1 Early Days of Drug Traffic in Mexico

Marijuana and poppy had been cultivated and trafficked in Mexico since at least the last quarter of the nineteenth century (1886) (Astorga, 2005). After the U.S. passed the Chinese Exclusion Act of 1882 prohibiting the legal immigration of Chinese male workers to the United States, Chinese immigrants went to Mexico in search of economic opportunities. They quickly settled in the northwest part of the country, in an area known as the North and South Territories of Baja California¹ and in the state of Sinaloa. There was another wave of Chinese immigrants who settled in Mexicali, Baja California, after the Great San Francisco earthquake in 1906. By 1910, Chinese had settled in almost every state but were mainly concentrated in the states located along the Mexican Pacific coast.

¹Baja California was a territory divided into two jurisdictions: the Northern Territory of Baja California, which became a state in January 16, 1952 under the name of Baja California, and the Southern Territory of Baja California, which joined the Mexican federation as a state in October 8, 1974 as Baja California Sur.

The Chinese immigrants were prosperous merchants in legal businesses but they also thrived as opium producers and traders. Of course, drug trafficking was not an activity exclusive to these immigrants. The local population also participated in the production and transportation of poppy and marijuana. Drug trafficking followed the same commercial corridors as legal trade along the Pacific states up to the border cities of Nogales, Mexicali and Tijuana into the U.S. According to Astorga (1999), those who participated in the cultivation and trafficking of marijuana and opium were known as “*gomerros*” and were regular members of their societies, usually living in small villages; they were not considered to be outlaws. Coexistence with drug producers and traffickers was acceptable locally because of the absence of drug use and abuse in Mexico. Opium and marijuana were produced for the market abroad, not for local consumption, except perhaps for a few people who may have used marijuana for medicinal or recreational purposes.

Between 1911 and 1919, in the midst of the Mexican Revolution, there were several xenophobic movements against the Chinese population in Mexico. The anti-Chinese campaign escalated in 1930s and led to the expulsion of the Chinese from Sonora and other states. By 1926, the Chinese comprised the second largest immigrant group in all of Mexico with more than 24,000 people. Ten years later, there were only 4,856 Chinese in the country (Chao Romero, 2010, 175). With the displacement of the Chinese, Mexicans took over the production and transportation of opium. According to Knight (2012, 124), just as with oil and mineral resources, drugs became an example of the old nationalist adage of “Mexico for the Mexicans.”

Colonel Cantú in Northern Baja California

After the Mexican Revolution broke out in 1910, a group of anarchists led by the Flores Magón brothers conducted a military campaign to control the Northern Territory of Baja California. In reaction, Francisco I. Madero sent Colonel Esteban Cantú to suppress the anarchists and recover control of the peninsula. Cantú secured

the territory in June, 2011 and remained there as military commander. Two years later, Victoriano Huerta led a successful conspiracy to overthrow and kill President Francisco I. Madero. After the assassination of Madero, Colonel Cantú quickly recognized the authority of Victoriano Huerta who allowed him to stay in command of the armed forces in Northern Territory of Baja California and declared him governor of the territory.

In December, 1914, the U.S. passed the Harrison Narcotics Tax Act. This law regulated and imposed a tax on opiates and their derivatives. The Harrison Act was the domestic expression of an international campaign led by the U.S. to control opium after the Shanghai Commission of 1909 and the Hague International Opium Convention of 1912 (United Nations Office on Drugs and Crime, 2008*a,b*). The prohibition of opiates on the U.S. side of the border created favorable conditions for illegal trade in drugs, and Colonel Cantú did not miss the opportunity to enrich himself. Taking advantage of his position of power, Cantú used his good relations with the Chinese community in Mexicali, Baja California to build a network of opium producers and traffickers. In this way, Cantú – reputedly an addict – became the first Mexican drug dealer (Astorga, 2003; Knight, 2012).

After the assassination of Madero, General Venustiano Carranza created the Constitutional Army to oust Huerta. Carranza joined forces with other prominent revolutionary *caudillos* (leaders) such as Emiliano Zapata, Francisco Villa and Álvaro Obregón. The Constitutional Army defeated Huerta and sent him to exile in 1914. To accommodate the new political configuration, Colonel Esteban Cantú recognized Carranza as president of the country, thus gaining his favor and managing to stay in his position of governor of Baja California.

The conditions for economic prosperity of Colonel Cantú improved in January, 1920 when the Eighteenth Amendment and the Volstead Act went into effect in the U.S. These regulations banned the sale, production and transportation of alcohol.

To enforce them, the U.S. federal government commissioned 1,520 police officers. However, Colonel Cantú did not manage to reap the benefits of the Prohibition era because of the assassination of President Venustiano Carranza in May of the same year. The incoming president, General Álvaro Obregón, discovered that Cantú was part of an attempt to detach Baja California as an independent state, and sent a military expedition led by General Abelardo L. Rodríguez to reaffirm the authority of the central government (Kenny and Serrano, 2012*a*; Maurer, 2012). After sending Cantú to exile, General Rodríguez expelled the Chinese community that he had protected from Mexicali.

After the Mexican government banned marijuana in 1920 and opium in 1926, drug traffickers needed more protection than they had before. This was not a concern for Abelardo L. Rodríguez because his loyalty to the central government won him the appointment of Military Commander of Northern Baja California in 1921 and the governorship of the state in 1923. With his position consolidated, Abelardo L. Rodríguez installed himself as a monopolist of the opium and alcohol trade to the U.S in northwestern Mexico, which enabled him to amass a substantial fortune (Kenny and Serrano, 2012*a*). He was later ratified as governor by President Calles and served as Minister of Industry, Trade and Labor as well as Minister of War for President Ortiz Rubio. The combination of wealth, astute political skills, military experience, and government performance at the local and federal levels led him to become president of Mexico between 1932 and 1934. Abelardo L. Rodríguez is considered the first Mexican president directly related with drug trafficking (Cruz, 2008; Muedano, 2011).

General Quevedo in Chihuahua

In 1932, General Rodrigo M. Quevedo Moreno, a close friend of President Abelardo L. Rodríguez, became governor of Chihuahua, a position that he held until 1936. During the early days of the revolution, General Quevedo had fought alongside Francisco I. Madero but later on participated in the coup that killed Madero. He managed

to navigate the turbulent waters of revolutionary politics and became the *cacique* (strongman) of Chihuahua and the central figure of the Quevedo political *camarilla* (clique). As governor, General Rodrigo Quevedo consolidated his family's position of power by imposing his brother, Jesús Quevedo, as mayor of Ciudad Juárez in 1932, where he took control of customs revenues, car theft from the U.S., prostitution and gambling on the Mexican side, and drug and alcohol smuggling to the U.S. Later, in 1936, General Rodrigo Quevedo installed another member of his family, José Quevedo Jr., as mayor of Ciudad Juárez.

As part of his administration as governor, General Quevedo appointed Francisco Rodríguez as Minister of the Interior, who also served twice as interim governor of Chihuahua 1932 and 1933. Before his appointment, Francisco Rodríguez had had a political career as mayor of Juárez between 1921 and 1922. However, he was forced to resign after a dispute with the governor of Chihuahua at the time and President Álvaro Obregón over the dispersal of funds from the city's gambling concession (Wasserman, 1993, 134).

After leaving the state governor's office, General Rodrigo Quevedo kept a firm hand on his nepotistic network and family business while serving as the chief of several military zones for more than twenty years (1936–1958). As part of his extended control over Chihuahua, General Quevedo imposed Carlos Villareal Ochoa as mayor of Juárez in 1947. Villareal was married to the daughter of former mayor José Quevedo, and he carried on the long-standing Quevedo family business and rule, using his experience as a federal policeman. As part of his operation, he even established a secret municipal police force dedicated to drug trafficking to the U.S. (Cruz, 2008; Kenny and Serrano, 2012*a*).

5.3.2 The Post Revolutionary Era

The cases of Colonel Cantú in Baja California and General Quevedo in Chihuahua are two examples of a large number of revolutionary leaders who consolidated enough political power to reap personal economic benefits from their strongholds. However, there was a key difference between Cantú and Quevedo that largely determined the diverging trajectories of these two actors. During the revolution, political survival depended not only on the generals' military abilities but perhaps even more on their skill for building and adapting political alliances in highly volatile circumstances. Colonel Cantú failed to adapt to the rapidly changing political conditions, which led to the end of his political career. In contrast, General Quevedo coped with instability and recognised a longer term trend towards the centralization of political power. Abelardo L. Rodríguez was perhaps even more skillful not only in identifying the trend of centralization but in actively contributing to its consolidation.

Revolutionary leaders defeated the dictatorship of Porfirio Díaz but they were trapped in a series of factional conspiracies that killed nearly all the *caudillos*. Mexico managed to overthrow the preexisting order in a way similar to the way the Chinese and the Soviet revolutions did. However, in contrast to these revolutionary paradigms, Mexico did not have a preexisting institutional structure capable of guiding the construction of the new order after the revolution. The breaking point in the establishment of a new political order in Mexico was the creation of the National Revolutionary Party (Partido Nacional Revolucionario, PNR) in 1929 (ten years after the end of the revolution). The central idea was to create a party to unify all members of the large "*familia revolucionaria*" (revolutionary family) in order to regulate access to power in a stable and peaceful manner.

The creation of the PNR did not follow the decentralized model of U.S. party conventions but the vertical, centralized national structure of communist parties. According to Medina Peña (1994), the organic configuration of these parties was

more effective for the purpose of unifying and instilling discipline in the unpredictable *familia revolucionaria*. The first proponent of the idea of a large unifying party was General Álvaro Obregón, who held the presidential office from 1920 to 1924, but was assassinated shortly after winning the presidential election for the second time in 1928. Obregón's Minister of the Interior, General Plutarco Elías Calles, followed the steps initiated by his predecessor and consolidated the creation of the PNR. Using his political stature as "maximum boss of the revolution," Calles convinced the political class that their interests and ambitions would be better served within a large alliance that would help curb the destructive tendencies brought about by factious struggles.

The statutes of the PNR centralized authority under the National Executive Committee (*Comité Ejecutivo Nacional*, CEN) but recognized State and Territorial Directive Committees and gave them autonomy "in every issue related to local affairs" (Medina Peña, 1994, 72). The most important characteristic of the party structure was the charge given to the National Executive Committee to "serve as harmonizer and arbitrator of the controversies and difficulties occurring among the organs of the Party" (Partido Nacional Revolucionario, 1929, Article 45, Fraction VII). This was the origin of the PNR, a party created as an alliance for peacefully managing and distributing power quotas at the national and local level. As a unifying structure, the party attempted to include all relevant political actors. In consequence, the PNR did not have a clear or concrete ideological platform but an array of broad political purposes to which all different groups would agree. The inclusiveness and encompassing character of the party did not tolerate opposition. If there was any, it was labeled a reactionary movement contrary to the unifying purpose of the party. This was sufficient to disqualify the opposition and to defeat it by the use of force.

The main innovation of the PNR was the creation of mechanisms of conflict resolution that permitted autonomy to local actors but imposed greater discipline and demanded greater loyalty towards the center. At the local level, these mechanisms

were implemented by the sub-national managing committees and at the national level by the National Executive Committee. However, the central guarantee of stability relied on a supreme arbitrator with the ability to dampen dissent or to impose consent if necessary; the president of the country. By this means, the institutional structure of the party gave the president *de facto* authority over the entire political system. The party became the cornerstone of state-building in post-revolutionary Mexico.

In 1938, General Lázaro Cárdenas incorporated the labor and peasant sectors into the PNR and changed its name to Party of the Mexican Revolution (*Partido de la Revolución Mexicana*, PRM). A few years later, his successor, President Manuel Ávila Camacho, gave the party its current name of *Partido Revolucionario Institucional*; PRI (Institutional Revolutionary Party) in 1946. Between the 1930s and the 1950s, the “revolutionary family” ruled with absolute hegemony while running a fairly stable and predictable political system.

Rodrigo Quevedo in Chihuahua and Abelardo L. Rodríguez in Baja California are key examples of politicians who knew how to navigate the waters of the new political pact. They ruled their respective strongholds with an iron fist and had sufficient autonomy in their own legal and illegal businesses, but at the same time they respected the new rules of elite circulation and remained loyal to the “revolutionary family.” After stepping down from their respective administrations as governors, they took care to carefully designate their successors and moved up in the political ladder. As skillful and respected members of the political elite, General Quevedo rotated positions as chief of several military regions for more than twenty years, and General Rodríguez climbed to the top of the power pyramid to become president.

During the revolution, the war devastated economy and the productive capacity of the country. The economic situation was further aggravated as the Great Depression of 1929 hit Mexico. The following decades were marked by slow economic reactivation. In this context, the post-revolutionary political arrangements allowed

local *caciques* to extract rents from all sorts of legal businesses such as oil companies, landowners, merchants, bankers, mining companies, workers unions, peasant organizations, newspapers, factories, and more. Illicit trades such as drugs, alcohol, prostitution, and gambling were simply another form of personal speculation available to strongmen. As stated by Knight (2012, 122), “drug income was there for the taking.” This source of wealth was particularly attractive in the northern part of the country due to the illegal markets created by prohibition laws in the U.S. Rents extracted from legal or illicit sources were also instrumental for politicians as they served as “cash cows” that helped finance election campaigns and political activities (Lupsha, 1995). Although effective competition from opposition parties was non-existent, PRI politicians still used these funds to mobilize mass support to boost their strength within the party and to buy the necessary sympathy from members of the higher ranks. This mass support was also crucial for the survival of the party, as it deterred prominent leaders from splintering away from the party (Magaloni, 2006). By the time Prohibition ended in December 1933, contraband networks were well established along the border. However, the illicit contraband business did not decline after the end of Prohibition because the U.S. passed the Marijuana Tax Act in 1937. U.S. efforts to control the transportation and selling of the marijuana gave another boost to drug smuggling from Mexico.

Although violence was ubiquitous during the revolutionary war, drug trafficking was not a violent activity. Astorga (1999) argues that “in small towns, it was more difficult, although not impossible, to resort to violence because almost all the inhabitants were related. There was room for everybody in the drug business, so it was not necessary to fight to death to get a share of the market.” In the post-revolutionary era, preventing violence was a priority. *Caciques* strongly enforced the *pax PRIísta* upon local criminals and drug traffickers. As noted by Knight (2012), the use of law enforcement was limited and selective, yet exemplary, employed merely to remind

drug dealers who was in charge. Sporadic episodes of occasional violence occurred as new criminals challenged old ones. Those who did not conform to the informal – yet clear – rules were severely punished. The sanction also served to make clear to other criminals that they were all “replaceable cogs.” Arrests of traffickers and drug seizures were also used to ameliorate diplomatic pressure from the U.S. on Mexico’s anti-drug enforcement. *Caciques* thus imposed discipline on criminal networks in the same way political discipline was imposed on them through the party structure. Every member of the “revolutionary family” had its place in the new political order.

A dark episode in the Quevedo family illustrates the type of selective discipline imposed by the political elite on non-compliers. After having been governor of Chihuahua, General Rodrigo Quevedo operated the political network in the state. As part of his network of nepotism, he installed Carlos Villareal, who had joined the Quevedo family by marrying the daughter of José Quevedo, as mayor of Juárez. Villareal took care of the family businesses of drug trafficking, contraband through customs, and car theft in the U.S. However, Villareal eventually tried to emulate the example of General Quevedo by designating his successor in City Hall. The nominee was Víctor Manuel Ortiz, who was mayor of Juárez from 1950 to 1952, but was not related to the Quevedo family. Together, Villareal and Ortiz started to take over control of the drug business. They felt safe because of their close friendship with Gustavo Díaz Ordáz, an emerging but strong politician from the state of Puebla. This protection gave Villareal the aspiration to become governor of Chihuahua. After spending more than twenty years as chief of several military regions, General Quevedo joined the Congress in two consecutive periods between 1958 and 1964. During his time in the lower house of Congress (the Chamber of Deputies), General Quevedo realized that Villareal and Ortiz were trying to take over the political structure as well as the customs and illegal business in Chihuahua. In February 1963, a gunman killed both Carlos Villareal and Víctor Ortiz in a bar in Ciudad Juárez. A year later, in 1964,

Gustavo Díaz Ordáz, the politician who had mentored Villareal, became president of Mexico. However, he did not take reprisals against General Quevedo, who became Senator that year. After all, General Quevedo was an old and well respected member of the “revolutionary family” who imposed discipline on those who did not comply with the political customs. Four years later, General Quevedo died of natural causes in El Paso, TX.

After the volatile conditions of the Mexican Revolution, a reduced number of strongmen created order by forging an alliance to regulate the peaceful use of and access to power through the mediation of a centralized party, the PRI. By appealing to their own interests, this agreement became the most effective way to encourage self-restraint on the part of those capable of organizing violence. The party then became the expression of the new order that emerged out of the Revolution.

5.4 The Consolidation of Order Under Authoritarianism

After the end of the Mexican Revolution, the PRI emerged as the main mechanism to manage disputes among the political elite in a peaceful manner. The party relied on local leadership and initially gave them a wide margin to maneuver for their political affairs as long as they remained loyal to the center. The PRI centralized power around the figure of the president, who used a set of informal rules to moderate disagreements and impose political discipline. The encompassing character of the party included a broad range of political groups, all integrated within the large “revolutionary family.” In this way, the party served as the main instrument for maintaining order. The autonomy of local *caciques* allowed them to engage in drug smuggling to the U.S. as a source of personal enrichment. Strongmen could run drug businesses and this did not represent a national security concern. However, the beginning of the

Cold War and the polarization of world politics created unprecedented new threats to the survival of the political regime. The hegemonic control of the PRI faced numerous challenges from subversive organizations motivated by left-wing ideologies. The regime immediately reacted by developing a highly centralized and brutally repressive security apparatus. In order to secure the survival of the regime, the PRI engaged in harsh repression against students, workers and political opponents. Some of these dissidents radicalized and engaged in urban or rural guerrilla movements, only to see the escalation of violent repression deployed by the state against them. In contrast to the severe treatment that government authorities gave to political dissidents, drug trafficking organizations enjoyed the complicity of politicians and security agents.

The difference in treatment lay in the distinct political nature of subversive groups and drug trafficking organizations. Dissidents represented a direct political threat to the survival of the regime; in consequence, they were severely repressed by government authorities. In contrast, drug traffickers not only represented a source of money for corrupt politicians but, more importantly, they did not represent a political threat to the regime. In consequence, they were not repressed by the state. Moreover, the involvement of security agents in the criminal underworld served authorities by enabling them to monitor the behavior of clandestine organizations that could attempt to acquire weapons to challenge the state or to engage in drug smuggling to fund their struggle.

This section describes how the international and domestic dynamics of the Cold War favored the development of a strong centralized security apparatus to protect the integrity of the state against subversive forces. The historical account also surveys the escalation of state repression of political dissenters over a more than twenty-year period. In contrast to the harsh repression suffered by political dissidents, efforts to counter the narcotics trade were modest. There were a few crackdowns, mostly motivated by U.S. pressure. However, not even the most significant of these anti-

drug operations generated a substantial escalation of criminal violence against the state nor against other drug organizations. This section also describes how the PRI political hegemony served as a key instrument for maintaining peace in drug markets without the need of using state coercion.

5.4.1 Cold War Politics and its Repressive Instrumentation

In 1944, during World War II, the Mexican Coast Guard stopped a U.S. private yacht while patrolling national waters in the Gulf of Mexico. The yacht was discovered to be transporting a shipment of opium and morphine. The drugs and the boat were taken to the military port of the state of Veracruz. A few hours later, the governor Veracruz, Miguel Alemán, showed up at the Coast Guard office and demanded that the boat and its crew be released. Officers refused the governor's request but then they received orders from Mexico City to release the boat (Astorga, 2003, 58). During his administration as governor, Alemán appointed Carlos Serrano as his chief of police. Serrano had a long criminal career that began when he was seventeen, smuggling rum from Cuba. Often relying on violence against minor competitors, Serrano used his position as chief of police to run an opium and morphine network to New York. Two years after the yacht incident, in 1946, Miguel Alemán became president of Mexico. Serrano was appointed leader of the Senate and Alemán kept him as one of his closest advisers. The president gave him the title of Colonel despite he never served in the military, and his violent reputation gave him the nickname of "The President's gunman" (*"El Pistolero del Presidente"*) (Cedillo, 2011).

By the time Miguel Alemán became president, the U.S. government already had reports of his participation in drug trafficking activities. However, with the end of World War II and the beginning of the Cold War, U.S. authorities were far more concerned about the communist threat than about drug trafficking. The strategic position of Mexico as the neighbour of the U.S. was of paramount importance for

containing a communist threat in Latin America. Mexico was quickly drawn into the global realignment of Cold War politics.

In step with aggressive U.S. foreign policy aiming to counter the expansion of communism in the region, President Alemán created the Federal Office of Security (*Dirección Federal de Seguridad, DFS*) in 1947, the same year that the U.S. created the Central Intelligence Agency (CIA). Since its beginning, the DFS received support, training and intelligence collaboration from the U.S. to assist Mexican authorities in their efforts to suppress subversive organizations. The DFS reported directly to the president and its main mission was to serve as a political police force to gather information and neutralize actual and potential subversive threats to the Mexican government. The first formal director of the DFS was Colonel Marcelino Inurreta de la Fuente. However, it is broadly recognized among historians that Colonel Carlos Serrano was the real man in charge of the DFS. The direct antecedent of the Directorate goes back to the Office of Political Information (*Oficina de Información Política, OIP*) created by president Cárdenas in 1939 at the start of World War II, which was used to conduct investigations into political opponents. The OIP was later transformed into the Department of Political and Social Investigations, (*Departamento de Investigación Política y Social, DIPS*). The same year as the DFS was founded, the responsibility for drug issues was transferred from the Ministry of Health to the Office of the General Attorney (*Procuraduría General de la República, PGR*), which had the Federal Judicial Police (*Policía Judicial Federal, PJF*) as its enforcement agency.

Due to the background of the people in charge of the DFS, the Mexican secret police were directly involved in illicit activities since the creation of the agency. According to Scott (2010), a confidential wire from the U.S. Embassy in Mexico sent on September 4, 1947 identified Senator Carlos Serrano, DFS head Marcelino Inurreta, and his subordinate Lieutenant Colonel Manuel Magoral as being directly involved in

drug trafficking. Serrano also controlled a high-level prostitution network in Mexico City where DFS agents took pictures their clients, which gave Serrano firm control over politicians, bankers, and businessmen (Astorga, 2003; Cedillo, 2011). Later, in 1951, a CIA agent based in Mexico filed a secret report indicating that DFS personnel abused their power to control illegal activities such as narcotics smuggling, and the directorate of the DFS was unscrupulously involved in these activities (Scott, 2010, 51).

DFS agents were not only involved in illegal activities themselves. Most importantly, the concentration of enforcement in close association with the highest levels of political power enabled them to forge connections with criminals all over the country. The DFS established a pyramidal mode of control with a high degree of concentration at the top but preserving the structure of the local criminal base (Kenny and Serrano, 2012a). In doing so, the DFS replicated the hierarchical and centralized power structure of the PRI in the criminal world. Just as the political elite concentrated power and gave autonomy to local *caciques* in exchange for their loyalty to the “revolutionary family” and compliance with its informal rules, the DFS managed an extended network of local drug dealers and concentrated its management at the top of the pyramid. In doing so, the DFS set the tone for the relationships between political power, law enforcement and criminal activities from the 1950s to the 1980s.

The close connections between DFS personnel and the political elite gave them absolute impunity in the event of any judicial accusation. In addition, the DFS recruited the most violent police officers they could find. As stated by Kenny and Serrano (2012a, 34), “their brutality was a service ready to be hired out.” The combination of extreme coercive power and political connections gave DFS agents the upper hand over common criminals and ensured that local government authorities would defer to their authority. In 1947, Lieutenant Colonel Maurice Holden, the Assistant Military Attaché of the U.S. in Mexico, indicated that DFS agents were a

law onto themselves with the power of life and death, “they were a GESTAPO by other name” (Astorga, 2003, 286).

There is no doubt that the direct engagement of the DFS in drug trafficking activities was a key source of personal enrichment for corrupt politicians and enforcers. However, historians and journalists studying the early days of drug trafficking in Mexico (Astorga, 2003, 2005; Cruz, 2008; Knight, 2012) have not sufficiently emphasized the importance of the political context to explain the involvement of the DFS in criminal activities. The strong coercive and political power of the DFS was developed in the context of the Cold War. The central concern for government authorities at the time was identification and neutralization of subversive political movements motivated by leftist ideologies, which were well underway by the 1950s. The development of the DFS as a political police force gave the Mexican government the ability to infiltrate and operate in the social and political underworld, an area certainly populated by criminals, but also likely to cultivate subversive organizations deemed as a direct political threat to the state.

The control of the DFS over criminal networks in the entire country not only gave enforcement agents the opportunity to reap economic benefits from illicit activities but, more importantly, it gave the political system the ability to monitor subversive political activities and, if necessary, strike an effective repressive blow. Clandestine political organizations trying to organize an armed struggle against the state were likely to approach gun traffickers in the criminal world if they needed weapons. Moreover, drug trafficking could be perceived as a tempting source of funding to sustain a political struggle, as demonstrated by the *Fuerzas Armadas Revolucionarias de Colombia* (FARC) in Colombia and other insurgencies worldwide (Bruce and Hayes, 2010; Fearon, 2004; Felbab-Brown, 2010; Youngers and Rosin, 2005). Due to the system of incentives implemented by the DFS, criminals had motives to inform their political bosses about any subversive political organizations they might detect.

The DFS could then coordinate with the Federal Judicial Police and the Army to crush them. In addition, the meeting points between insurgents and criminals in the clandestine world meant that the state could attempt to infiltrate subversive organizations using criminals as state-sponsored covert agents. The involvement of the DFS in criminal activities was not only supported by corrupt politicians for economic reasons but, more importantly, it was justified and encouraged for political reasons.

As discussed in Chapter 1, the primary economic motivation of criminal organizations does not represent a direct threat to the political survival of the state. For this reason, the existence of criminal networks was tolerated in the context of Cold War politics. In contrast, the Mexican government did not spare any effort to repress any potential political threat that could represent a fundamental challenge to the existing power structure. As mentioned earlier, the historical processes leading to the development of PRI's political hegemony gave no margin of tolerance to any opposition outside the party. For this reason, leftist movements inspired by communist or socialist ideologies represented a profound threat to the survival and stability of the political regime and were severely repressed.

The authoritarian nature of the Mexican state did not only have domestic origins. The coercive apparatus of the Mexican state developed with the direct support of the U.S. government. The foreign policy of the U.S. towards Latin America during the Cold War was marked by proactive and sustained efforts to prevent the expansion of the communist threat in the region. The U.S. provided both covert and overt support for authoritarian regimes throughout Latin America, and Mexico was no exception. U.S. security agencies provided training to Mexican military and law enforcement agents and facilitated information-sharing regarding political hazards. The containment of the communist threat in Mexico was of vital importance to the U.S. and often required that U.S. security agencies turn a blind eye to the involvement of Mexican political authorities and enforcement agents in drug trafficking.

5.4.2 Political Threats and Authoritarian Reaction

The creation of the DFS marked the beginning of a period of high levels of political repression and social unrest. During three decades, from the 1950s to the 1970s, the hegemonic party system systematically engaged in political repression and conducted anti-drug operations. The brutality of repression against political movements and dissident organizations seemed to have no limits. This period of Mexican history is known as the Dirty War (*La Guerra Sucia*). However, the frequency and intensity of repression and anti-drug efforts were not on the same scale: the implementation of anti-drug actions were primarily the consequence of U.S. pressure rather than a central concern to government authorities.

One of the first important acts of the DFS took place on May 1, 1952, Labor Day in Mexico, when a group of police agents coordinated by the DFS violently dispersed a demonstration organized by the Mexican Communist Party (*Partido Comunista Mexicano*, PCM) and charged its leaders with the crime of “social dissolution” (disturbing social order). After the incident, opposition labor organizations were not allowed to parade on Labor Day. Encouraged by the victory of the Cuban Revolution in 1992, the remaining leadership of the PCM organized a major strike of railroad workers from 1958 to 1959. The government reacted violently by cracking down on the strike, raiding the headquarters of the Railroad Workers Union (*Sindicato de Trabajadores Ferrocarrileros de la República Mexicana*, STFRM) and arresting thousands of workers. About 800 railroad workers spent several years in the infamous Lecumberi prison used for detaining political prisoners. In the early 1960s, the teachers’ union went on strike demanding higher wages but was repressed by the Army. Two years later, the Army repressed members of another teachers’ organization, the *Asociación Cívica Guerrerense* (ACG) in the state of Guerrero. After the crackdown, Genaro Vázquez Rojas, a rural teacher and member of the ACG, went underground to start a ru-

ral guerrilla movement in Guerrero, the *Asociación Cívica Nacional Revolucionaria*, (ACNR).

In January, 1965, Fernando Gutiérrez Barrios became the director of the DFS. One of his first actions was to mount a raid on the headquarters of the Mexican Communist Party. The same year, the police crushed a demonstration organized by the Mexican Doctors' Alliance (*Alianza de Médicos Mexicanos*, AMM) and took over several public hospitals and clinics. Hundreds of doctors were fired and replaced with military doctors.

The revolutionary movement in Latin America gained renewed enthusiasm after the meeting of the Latin American Solidarity Organization (*Organización Latinoamericana de Solidaridad*, OLAS) in Havana, Cuba. The OLAS had the central objective of exporting the armed revolution throughout Latin America. In 1966 and 1967, rural and urban guerrilla attacks intensified in Mexico. Guerrilla activities were mostly concentrated in the states of Guerrero and Chihuahua, although there were small armed cells in other states. In 1967, the government violently repressed another group of teachers in Guerrero. Lucio Cabañas, one of the survivors, radicalized and founded a guerrilla group named the Peasants' Execution Brigade (*Brigada Campesina de Ajusticiamiento*, BCA) and later on he founded a larger guerrilla organization known as the Party of the Poor (*Partido de los Pobres*, PdIP).

Several other non-violent social movements intensified their activities in Mexico City, Sonora, Puebla, Tabasco, Guanajuato, Querétaro, Tamaulipas, Quintana Roo and Michoacán. Some of the most prominent groups were *Grupo Popular Guerrillero* (GPG), *Movimiento Revolucionario del Pueblo* (MRP), *Grupo Popular Guerrillero "Arturo Gámiz"*, *Movimiento 23 de Septiembre* (M23S), *Movimiento Latinoamericano de Liberación* (MLL), *Ejército Revolucionario del Sur* (ERS), and the *Movimiento Revolucionario Marxista-Leninista Mexicano* (MRMLM), among oth-

ers.² Most of their members were gunned down by government security forces. Survivors were arrested, often tortured and some of them executed. Those who managed to escape radicalized further and continued the armed struggle creating new guerrilla cells or joining other organizations.

In 1968, the student movement in Mexico City took on unprecedented proportions. Led by students from the National Autonomous University of Mexico (*Universidad Nacional Autónoma de México*, UNAM) and the National Polytechnical Institute (*Instituto Politécnico Nacional*, IPN), the student movement gained the support of several other organizations all over the country and coordinated massive protests and strikes. In October 2, 1968, some ten thousand students gathered in the Tlatelolco Square in Mexico City. The Army dispersed the mobilization by indiscriminately firing over the crowd. The number of casualties of this event, known as the Tlatelolco massacre, remains undetermined (Poniatowska, 1971, 1980; Revueltas, 1978). In 1971, there was another, probably smaller, student massacre known as “*El Halconazo*.”

After the Tlatelolco massacre, several subversive organizations radicalized and engaged in guerrilla fighting. As stated by Cedillo (2009), these radical organizations largely relied on kidnapping businessmen, high-level government officials, politicians, and even foreign diplomats³ to finance their armed struggle. The primary use of kidnapping as a funding strategy is indicative that subversive organizations were not relying on drug trafficking to finance their struggle. Part of the reason for not

²One of the most exhaustive chronologies of the emergence, actions and subsequent repression of dozens of subversive organizations between 1943 and 1981 is provided by Castellanos (2007). In addition, Cedillo (2009) offers another succinct, yet detailed list of organizations and their activities.

³In October 1973, an armed brigade of the *Liga Comunista 23 de Septiembre* (LC23S) kidnapped the British Consul in Guadalajara, Anthony Duncan Williams and a local businessman named Fernando Aranguren in Guadalajara, Jalisco. The government refused to pay ransom and the LC23S executed Aranguren but released the consul. A few weeks later, the police arrested and tortured some members of the brigade. By December of the same year, the police had dismantled that brigade of the LC23S.

engaging in drug smuggling may be that this activity was contrary to the ideological principles of these highly indoctrinated groups, but also because dealing drugs meant venturing into a sector largely controlled by the DFS. In any case, the government reacted to increased guerrilla activity by intensifying repression, especially in the rural areas. In 1972, the Army killed Genaro Vázquez, the leader of the guerrilla group *Asociación Cívica Nacional Revolucionaria*. The Mexican government also conducted a massive operation, deploying some 16,000 soldiers in the mountains in Guerrero to hunt down Lucio Cabañas, leader of the guerrilla organization *Partido de los Pobres*. In December, 1974, the Army found the hidden camp of Lucio Cabañas and killed him thanks to information provided by a local drug producer⁴ and an agrarian leader (Guerrero Robledo, 2009; Redacción de El Universal, 2009; Rivera and Valdez, 2007).

Other non-radical opposition groups were also restricted or coopted by the state. Opposition parties were weak due to the limited competition opportunities allowed by the hegemonic party. The right-wing National Action Party (*Partido Acción Nacional*, PAN) founded in 1939, was maintained at the margins of political positions and elections were largely rigged by the Ministry of the Interior, the institution in charge of organizing the elections. Another political party, the Popular Socialist Party (*Partido Popular Socialista*, PPS) was founded in 1948 by the leader of the national labor federation most closely associated with the ruling party, the Confederation of Mexican Workers (*Confederación de Trabajadores de México*, CTM). In other cases, the government directly promoted the creation of “facade” parties such as the Authentic Party of the Mexican Revolution (*Partido Auténtico de la Revolución Mexicana*, PARM) just to keep up the appearance of competitive elections. The electoral

⁴The name of the presumed drug producer was Isabel Ramos Ruiz. Although some secondary sources identify Ramos as a drug producer or trafficker, his participation in criminal activities has not been historically confirmed. I thank the Mexican historian Ángeles Maldonado for pointing this out in a personal conversation.

system based on majority rule made it extremely difficult for opposition parties to secure seats in Congress. As indicated by (Medina Peña, 1994, 166), between 1955 and 1964 opposition parties had in total only 20 seats in the Chamber of Deputies out of 483 seats available in this period, thus holding only 4.14 percent of the seats. Later, in 1963, PRI granted a small electoral concession by allowing a party–deputy system (“*Diputados de Partido*”), a modest formula that slightly increased the space for opposition parties that received more than 2.5 percent of the vote. During the entire period between 1964 and 1970, the opposition held only 100 seats while PRI increased the number of seats in the Chamber of Deputies and controlled the other 557 positions, thus leaving only 15.2 percent to the opposition.

5.4.3 Counter Narcotic Efforts During the Dirty War

In contrast to the brutality of political repression launched by the Mexican state against politically motivated subversive organizations, the efforts of government authorities against drug trafficking were modest. A handful of significant anti-drug operations were caused by U.S. diplomatic pressure. But drug traffickers were by no means hunted down and punished by government authorities as the political opposition were.

Between 1945 and the end of the 1970s, the business of opium and marijuana trafficking in Mexico boomed due somewhat to soldiers returning to the U.S. after the end of World War II in 1945 but mostly during and after the Vietnam War. The increasing demand for drugs in the U.S. was met with increased opium and marijuana production in Mexico. The demand for drugs from Mexico increased further after the 1971 dismantling of the “French Connection,” a transnational heroin trade network from Turkey to France and then to the U.S. However, the Mexican authorities did not undertake substantial efforts to eradicate crops of illicit drugs nor to reduce their traffic.

During the 1940s, Harry J. Anslinger, the Commissioner of the U.S. Federal Bureau of Narcotics saw with frustration that drug enforcement agencies in Mexico were slacking. He managed to convince Mexican authorities to conduct some drug eradication campaigns and drug seizures in Sinaloa, Chihuahua, Sonora and Durango during the 1940s, 1947 and 1948 being the years with most activity. However, to Anslinger's dismay, the 1951 poppy and marijuana harvests were the largest recorded in Mexico over the previous decades. According to Astorga (2003), that year drug producers managed to cultivate individual fields of marijuana up to 20 acres (about 8.09 hectares) and the crop could be bought by the ton. The production of raw and processed opium was also very high. During the 1950s there were some isolated crackdowns on drug traffickers but no sustained or large scale enforcement efforts like those conducted against subversive organizations.

In 1969, two months after President Nixon took office, he established the Special Presidential Task Force Relating to Narcotics, Marijuana and Dangerous Drugs. The task force produced a report that singled out Mexico as the primary supplier of marijuana and a source for a large amount of other dangerous drugs, including heroin. This task force was one of the first steps of Nixon to fulfill his campaign promise to the "great silent majority" that he would take tough measures against drugs and other urgent concerns of U.S. society.

On September 21, 1969, President Nixon launched "Operation Intercept" which consisted of the deployment of about two thousand customs and border-patrol agents along the Mexican border to conduct detailed inspections of all trucks, cars, planes and people crossing the border by foot. Vehicles trying to cross the border were delayed up to six hours and pedestrians were stripped and body-searched. The amount of narcotics seized during the operation was minimum. As stated by Doyle (2003), the main objective of Operation Intercept was not to stop the flow of drugs into the U.S. but was to cause an unprecedented economic and social disruption on the border

that would force the Mexican government to devote more stringent efforts to drug eradication.

Operation Intercept was particularly shocking to Mexican authorities because it was planned in secret. Even when President Nixon and President Díaz Ordáz met on September 8, 1969, a few days before the operation, at the Friendship Dam on the border between Texas and Coahuila, Nixon did not tell Díaz anything about the plans for the operation. Operation Intercept remained active only for a few weeks. In October, Intercept was replaced by a new agreement between Mexico and the United States called “Operation Cooperation,” in which both countries agreed to cooperate to reduce the production of narcotics within Mexico and its movement across the border. The U.S. gave Mexico some air crafts, helicopters, remote sensing equipment as well as financial and intelligence assistance for eradication efforts (?). Operation Cooperation led to to a few arrests and the destruction of some illicit plantations.

At the time when guerrilla fighting reached its peak during the mid 1970s, the Mexican government launched “Operation Condor” (*Operación Cóndor*). According to Craig (1980, 347) “the Mexican government had decided to remove the kid gloves with drug traffickers.” In 1975 and 1976, the Mexican government conducted an unprecedented military operation consisting in the deployment of ten thousand soldiers under the orders of Brigade General José Hernández Toledo to eradicate illicit crops in Sinaloa, Durango and Chihuahua. Toledo was a experienced general who led the Parachute Battalion that had perpetrated the Tlatelolco massacre in 1968 and participated in other operations against students (Astorga, 2003; Department of Defense, 1968). Operation Condor also had the participation of the Office of the Attorney General, represented by Carlos Aguilar Garza, and the Federal Judicial Police (PJF) as its enforcement arm. Aguilar Garza eventually became a drug trafficker and ended up being assassinated in 1993 (Astorga, 1999).

Although the federal authorities initially declared that no chemical defoliants were going to be used for eradication, Pedro Ojeda Paullada, Mexico's Attorney General at the time, had an agreement with Sheldon Vance, Kissinger's special advisor on drug issues, on the use of aerial spraying of defoliants. Based on the U.S. experience in Vietnam, Operation Condor used Paraquat, also known as Agent Orange, a quick-acting non-selective defoliant already declared by the U.S. Surgeon General in 1971 to be harmful to humans. The large number of troops involved in Operation Condor was necessary because the program combined aerial and manual eradication. After plantations were sprayed from the air with defoliants, soldiers went into the fields to cut down opium and marijuana plants with machetes. The labor-intensive activity of manual eradication required significant personnel. Although DEA agents occasionally discovered that the Army sometimes used fertilizer instead of defoliants to spray over drug plantations (Toro, 1999), authorities declared Operation Condor a success. Between 1963 and 1970, government authorities had only eradicated 4,370 hectares of opium and 2,400 hectares of marijuana. In contrast, between 1970 and 1976, authorities eradicated 25,000 hectares of opium plantations and 13,300 of marijuana (Astorga, 2005).

Along with the methods used by security agencies during the Dirty War, the participation of military personnel was accompanied by human rights abuses. The Lawyers' Association of Culiacán, Sinaloa, denounced the usual methods of torture employed by PJF, DFS and the Army for conducting interrogation of presumed drug cultivators or traffickers which included beatings, electric shocks, burning, rape, and waterboarding (Astorga, 2005). In addition, the deployment of the Army and aerial fumigation generated a massive exodus of peasants to the cities. Hundreds of people were arrested, but not a single big boss was captured. As stated by Astorga (1999), the most important leaders of drug trafficking organizations moved to safer areas and continued their illegal activities. For example, Pablo Acosta Villareal, one of the

most prominent drug lords of the 1970s, controlled a substantial share of heroin and marijuana trafficking from Ojinaga, Chihuahua, and would later become a key figure in cocaine trafficking during the 1980s as the leader of the Juarez Cartel (*Cártel de Juárez*). Another prominent drug lord, Miguel Ángel Félix Gallardo, known as “The Godfather” (*El Padrino*), moved from Sinaloa to Guadalajara, Jalisco, and consolidated the Pacific Cartel (*Cártel del Pacífico*). Félix Gallardo was a former police officer in the Sinaloa state judicial police and served as bodyguard for the son of governor Leopoldo Sánchez Celis, with whom he developed a close friendship. The governor had a well known reputation of having close links with drug traffickers and gunmen (Aguilar Camín, 2009). By the behavior 1970s, another drug trafficker, Juan García Ábrego, began his career under the command of his uncle Juan Nepomuceno Guerra, leader of the Gulf Cartel (*Cártel del Golfo*), which operated in the north-eastern state of Tamaulipas. None of these actors were directly affected by Operation Condor nor by subsequent counter-narcotic efforts because they had the protection of high-level politicians and enforcers.

5.4.4 Maintaining Peace in Drug Markets

The previous sections describe the differences between the state’s behavior in its relationships with the opposition and with criminals during the Dirty War. The interaction between the state and subversive organizations was marked by highly repressive efforts by government authorities and direct challenges from radical political organizations who conducted massive protests and guerrilla actions against the state. In contrast, the interaction between the state and criminals was not characterized by sustained law enforcement efforts from the government, nor by sustained violence perpetrated by criminals against the state or against rival criminal groups. As illustrated by Operation Condor, there were instances in which government authorities flexed their muscle against drug traffickers. However, these law enforcement efforts

did not trigger sustained waves of violence against the state nor against rival criminal groups. There were some isolated events where criminals used violence against the state. Nevertheless, state–criminal relations were mostly non-violent. Scattered violent events between the state and criminals did not constitute sustained efforts of violence like those characterizing state–opposition interactions during the Dirty War and by no means resemble the wave of large-scale organized criminal violence experienced in the second half of the 2000s.

The lack of violence that prevailed for decades in Mexican drug markets is puzzling, especially because of the lack of sustained counter-narcotic campaigns conducted by the state that could have been used to suppress drug trafficking organizations. However, the puzzle is not only empirical, it is also theoretical. As accurately stated by Reuter (1989), the use of violence is a distinctive feature of illicit markets. The violent nature of these markets stems from the lack of access to the usual mechanisms of dispute resolution such as legal agreements and judicial processes. To enforce property rights, criminals cannot call on the police or go to court. Those engaged in criminal activities can only use violence or intimidation to resolve disputes or enforce agreements. In contrast to the theoretical expectations, the use of violence in illicit markets did not come to pass in the Mexican case. The key reason for the lack of drug violence is the concentration of political power that existed under PRI hegemony, which served as the key mechanism of dispute resolution and regulation.

As described earlier, the process of state formation in Mexico after the revolution was based on an agreement to peacefully channel the capacity of different actors for conducting organized violence. This process led to the concentration of political power in the president as the grand administrator of power and arbitrator of disputes. The entire political system grew as a symbiotic network of political relations and institutional arrangements favoring the concentration of power at the federal level and granting a relative degree of autonomy to sub-national power structures on their

local issues. This system worked on the basis of political incentives instilling discipline on the members of the “great *PRI*sta family.”

Arguments about state-sponsored protection rackets (Snyder and Duran-Martinez, 2009) and state-led regulation of criminal activities (Kenny and Serrano, 2012*a*) indicate that Mexican government authorities generally managed to maintain low levels of violence in illicit markets. These arguments primarily rest on the state’s coercive capability as a crucial element of their explanations. According to these perspectives, the certainty and severity of enforcement allows the state to impose order and peace in illicit markets. State officials refrain from enforcing the law against criminals or, alternatively, enforce the law in a selective manner in exchange for bribes. In contrast, “if the state lacks the power to enforce the law, illicit actors may prefer to bear the costs of haphazard and weak enforcement to paying off state officials to refrain from enforcement” (Snyder and Duran-Martinez, 2009, 255). As discussed in the previous sections, this argument does not meet the historical characteristics of counter-narcotic efforts in Mexico. For several decades law enforcement against criminal organizations was at best modest. Levels of enforcement could even be classified as minimal when compared to the severity of repression deployed by government authorities upon political opponents.

The role and level of the use of force is certainly important for an understanding of the maintenance of order in illicit markets in Mexico. However, emphasizing the centrality of the use of coercion against criminal organizations is an overstatement that obscures the complexities of the Mexican political system. State–criminal relations during this period were not characterized by the submission of criminal organizations to the mighty coercive power of the state. Instead, low levels of violence were mostly maintained by political means due to the centralized hierarchical control held by the *PRI* across all levels of government. This argument is congruent with the insightful analysis provided by Rios (2012*a*).

Rather than submission under force, the nature of state–criminal relations during the period of PRI hegemony is better characterized by a symbiotic coexistence between criminals and politicians. State actors and criminals were not separate or distinct actors; policemen often became drug traffickers and kept close connections with the political elite. Peace and order were maintained through political means in illicit sectors just as they were in other power spheres contained within the encompassing *PRIista* family. Opposition groups outside the political system faced ruthless repression from the government authorities, but there was no need to use such tactics against drug traffickers, since they were closely interwoven into the political system. After all, the party first emerged as an agreement favoring the peaceful resolution of differences among those with the power and ability to conduct organized violence. To pursue that goal, the party served the concentrator of an encompassing pyramid of power and political relations with the president at the top. The direct connection between the DFS and the president, later through the Ministry of the Interior, enabled the executive to maintain tight control of criminal networks. The degrees of access, use and discipline in these networks were managed primarily by political means rather than through the use of force.

There are several formal and informal characteristics of the political system that enabled peace and order in state–criminal relationships to be managed politically rather than by force. Since the positions of head of the executive and party leader were combined in the president, this gave him the power to designate the next PRI candidates for state governors, senators, representatives and mayors. Most importantly, the president had the power to designate his own successor. This procedure, known as “*el dedazo*” (the pointing of the big finger), was the key mechanism for managing a complex system of political rewards and sanctions (Langston, 2001, 2006). The president had the power to use this appointment prerogative at every level of government and in any area of the party and the public sector. With the approval

of the president, those below him were also allowed to use the same mechanism to appoint their lower ranks. The political system thus constituted a dense, hierarchical network of political relationships for managing the access and use of power in every political and bureaucratic structure.

The density and inter-connectivity of the political system during the era of PRI dominance provided timely, accurate information on the behavior of every political actor within the system. Individuals who did not carry out the commands of those above them in the hierarchy faced the possibility of suffering political sanctions. Punishment included removing the possibility of promotion to higher political or government spheres, being demoted from their current position, or even being expelled from the entire political or bureaucratic structure. Of course there was always the possibility of being arrested or killed as the price for serious mistakes or misbehaviour. But the use of force within the party was a rare anomaly. This system of incentives favoring discipline and compliance with informal rules is well depicted by the old PRI adage, “*él que se mueve no sale en la foto*” (the one who moves will not appear in the picture).

This system of incentives also extended to state–criminal relations. Those operating illicit activities such as drug production or trafficking would need approval and support from enforcement agencies and political actors. Obtaining approval – in the form of non-enforcement or proactive support – depended not only on the amount of bribe money that criminals could offer to their political bosses but, more importantly, on the non-aggressive behavior of criminals while conducting their illegal activities. A serious outbreak of violence among criminals or against the state could have jeopardized the political survival of those providing protection and support. Criminals thus had incentive to maintain low levels of violence in order not to lose their networks of protection. Those providing political support similarly had incentives to ensure low

levels of violence so they could continue extracting economic benefits from criminal groups while advancing their political careers.

As former governor of the state of Zacatecas Ricardo Monreal (2008) acknowledged, the structure of political incentives required criminals to adhere to a set of basic rules: (1) there should be no bodies left in the streets; (2) criminals were not allowed to sell drugs in the schools; (3) there should be no media scandals; (4) traffickers should allow periodic seizure of drugs and arrests of lower level traffickers; (5) drug traffickers must generate economic revenues for their communities; (6) there should be no proliferation of gangs; (7) traffickers should not make direct deals with formal branches of government (especially not with the police or the judicial bureaucracy); (8) mistakes are to be punished with imprisonment by the authorities, not with execution by rivals; (9) criminal groups must respect territorial boundaries; and (10) profits from illicit markets should be “reinvested” in Mexico. The operation of this informal code of conduct known as “The Decalogue” is recognized by other prominent analysts such as Guerrero (2009*b*).

The lack of effective political competition was crucial in the functioning of state-criminal relations. For decades, the PRI managed without interruption to hold the executive, impose hegemonic control over the Senate and the Chamber of Deputies, and secure all governorships and most municipalities. Although there were elections at these different levels of government, the electoral system imposed stringent conditions on opposition parties. In addition, the PRI perpetrated its rule by often engaging in vote buying, patronage, voter intimidation and election fraud (Greene, 2010; Magaloni, 2006; Schedler, 2002, 2006). Elections were thus not an effective mechanism for elite circulation, at least not outside the party.

The PRI hegemony had two important consequences for the maintenance order and peace in illicit markets. First, PRI dominance across the various levels of government made corrupt agreements easy to achieve and feasible to implement. To secure

protection, criminals only had to cut deals with a small number of political actors, usually among the political elite. Having support at high levels of power facilitated compliance by the lower ranks in the government structure with the terms of the agreement. In this way, the unified hierarchical chain of command characteristic of the era of PRI dominance served as a top-down mechanism to enforce the agreement. An order issued by the president, a general or a governor would mean that their subordinates must immediately comply with the instruction. This power structure also served as a bottom-up mechanism in which valuable and timely information about the behavior of criminal groups and their networks of support could be received and passed upward. If there was a problem to be solved, those at the lower levels would know whom to reach in the hierarchy. Such information was crucial for assessing the need to apply political sanctions or law enforcement without disrupting other agreements secured at higher levels in the political sphere. The DFS was well aware of this characteristic of the political structure and took advantage of it with infamous mastery. If a decision was made to apply a sanction, the order would come from the top and those below would be compelled to carry out the instruction. In the same way, if the decision was against applying any sanction, those daring to take the issue into their own hands would face the political consequences of disobeying orders from above.

Second, over time, PRI dominance also meant extended temporal horizons for both criminals and politicians. In contrast to the uncertainty about election results characteristic of well-functioning democratic systems (Przeworski, 1991), the designation of PRI candidates by *dedazo* during the period of party hegemony gave absolute certainty about the winner of each election at every level of government. The faith of political actors thus depended on their compliance with the party and not on retaining the favor of the electorate. The extended temporal horizons of the political elite favored the stability of corrupt agreements between criminals and politicians. The

expectation of a stable, long-lasting opportunity to extract economic benefits from illicit markets without being disturbed gave criminals incentive to comply with terms of the agreement, including refraining from the use of violence against their rivals or the state. The long term horizon of economic benefits also motivated authorities to maintain low levels of violence. Politicians aiming to advance their political career had to make sure not to upset those higher in the political hierarchy. Doing so would have meant the end of their aspirations. Those who failed to secure the favor of their superiors could expect to be cut off from access to the spoils of profitable government positions. It was therefore crucial to avoid violence because it represented a central concern for the political elite. The old generation of PRI politicians forged in the revolution was well aware of the deleterious consequences of violence. In addition, the new generation of *PRIístas* was already alert to threats of violence from politically motivated subversive organizations. Neither the old or the new leaders of the PRI family would tolerate violence within their ranks. Maintaining criminal violence at its minimum was thus a key requirement for the survival of political actors within the political system.

5.5 The Erosion of the Preexisting Order in a Democratic Context

The previous sections analyzed the emergence of order out of the violent struggles of the Mexican Revolution and told how the PRI consolidated its political hegemony through the use of a highly repressive security apparatus encouraged by the international and domestic pressures of the Cold War. The dominance of the PRI in the political arena also extended to the criminal underworld. The state security apparatus assembled a network of criminal organizations and used political pressure to instill discipline in illicit markets. However, the ability of the PRI to impose order

both on the political and the criminal spheres began to erode due to a convergence of three processes. The first is the increased strength of Mexican drug trafficking organizations, primarily caused by the surge in cocaine demand in the U.S. during the 1980s and the subsequent decline of Colombian cartels in the 1990s. The second process was the dismantlement of the political police after the end of the Cold War, which undermined the state's ability to monitor and control criminal organizations. However, the most important factor is the advent of democracy which unfolded after a protracted process of thirty years of gradual electoral reforms that strengthened the opposition and eroded the hegemony of the PRI. Democratization substantially altered the system of political incentives that had so long permitted and enabled corrupt agreements between government authorities and criminals. The disruption of the preexisting order was caused by the entrance of the political opposition at various levels of government as well as the recurrent and effective elite circulation by means of elections. The increased number of relevant political actors made it more difficult to achieve and sustain corrupt agreements. The diversity of party labels at the federal, state and municipal levels also broke the homogeneous chain of command that made them feasible. In addition, elections reduced the temporal horizons of pacts with criminals and introduced uncertainty about establishing such agreements with the next politicians in office. Most importantly, increasing political competition infused by democratization introduced personal incentives for government authorities to fight criminal organizations in an effort to gain citizen support.

5.5.1 Increasing Strength of Drug Trafficking Organizations

Beginning in the 1980s and extending through the 1990s, a series of changes took place in the international structure of drug markets, as well as a severe economic crisis and the liberalization of international trade between the U.S. and Mexico. These factors largely contributed to strengthening Mexican drug trafficking organizations.

The first and most important factor contributing to the consolidation of Mexican drug traffickers was the surge in cocaine demand in the U.S. As described by Gootenberg (2011), by the mid-1980s there were about twenty-two million cocaine users in the U.S. consuming various opium derivatives such as cocaine, freebase cocaine, heroin, crystal meth, and crack cocaine. The vast demand for drugs accompanied by a sharp decline in prices and increased availability turned this period into the “American crack epidemic.” The immediate beneficiaries of the cocaine boom in the U.S. were Colombian drug organizations based in Medellín, Bogotá and Cali. Colombian organizations initially relied on island-hopping through the Caribbean to send wholesale aerial and maritime shipments from South America to Miami. But the U.S. demand was so large that it also benefited Mexican drug organizations. Although it is hard to estimate the share of cocaine being transported from Mexico to the U.S., some estimates indicate that in 1989 one third of the cocaine for the U.S. market entered from Mexico, rising to one half by 1992 and reaching 75–85 percent by the late 1990s (Andreas, 2009; Astorga, 1995; Gootenberg, 2011).

The boom in drug production in Mexico at the time is well exemplified by the concentration of agricultural workers participating in drug activities in Sinaloa. Astorga (2005, 138) describes that during the 1983 crop season, vehicles with loudspeakers advertised to recruit peasants for “apple picking” in the Sinaloan highlands. The usual daily wage of agricultural workers was 600 pesos, but peasants were offered between 4,000 and 5,000 pesos per day for working on drug plantations. The exodus of peasants to the highlands led to a scarcity of agricultural workers in the valleys and landowners had to hire peasants from other states to work on regular farms.

In November 1984, Mexican authorities discovered a large facility for marijuana growing and processing in Chihuahua. The complex known as “Rancho el Búfalo” (Buffalo Ranch) located in the municipality of Allende, Chihuahua, was the property of Rafael Caro Quintero, a co-founder of the Guadalajara Cartel. The ranch

covered an area of about 12 square kilometers (7.4 square miles) and hosted more than 12,000 workers working on a plantation of 1,000 hectares of marijuana. The group of 450 soldiers who participated in the operation destroyed some 11,000 tons of marijuana and arrested 500 workers, yet no leader was captured (Astorga, 2005; Herrera, 2013). According to some accounts, peasants were held at the plantation as forced labor coerced by armed men, so they were later released.⁵ The size of *El Búfalo* is a clear example of the scale of operations conducted by Mexican drug trafficking organizations at the time.

One of the most prominent drug traffickers at the time was Amado Carrillo Fuentes, a former police officer. Carrillo served as the chief of security of Pablo Acosta Villareal, leader of the Juárez Cartel. After Acosta Villareal was killed in a helicopter operation conducted by the Federal Police, his second-in-command, former DFS agent Rafael Aguilar Guajardo, took over the organization. However, Aguilar was later assassinated by Carrillo Fuentes, which enabled him to take control of the Juárez Cartel. In any case, Carrillo Fuentes was not only famous for the violent way he worked his way up but also for operating a business of massive aerial transportation of cocaine into the U.S., which gave him the title of “*Señor de los Cielos* (Lord of the Heavens). In a Congressional hearing, DEA head Thomas A. Constantine stated that Carrillo Fuentes owned several airline companies with a fleet of 727 airplanes and an assortment of jets (Drug Enforcement Administration, 1995).

This period also witnessed the rise and consolidation of other criminal organizations, such as the Tijuana Cartel (*Cártel de Tijuana*) led by the Arellano Félix brothers in Baja California. During this period, the Tijuana Cartel had a close relationship with the Guadalajara Cartel (*Cártel de Guadalajara*) founded by Miguel Ángel Félix Gallardo, Rafael Caro Quintero and Ernesto Fonseca Carrillo. For several

⁵An excellent visual documentation of the *El Búfalo* counter-narcotics operation and the living conditions of peasants working in the plantation is available at: http://www.marcoacruz.com/esclavos/portada_imagenes.html.

years, Félix Gallardo served as a mediator between the main drug trafficking organizations in Mexico, which gave him the nickname “*El Padrino*” (The Godfather). Finally, another important criminal group that gained strength was the Gulf Cartel (*Cártel del Golfo*). Initially created in the 1930s by Juan Nepomuceno Guerra, the cartel consolidated under the leadership of his nephew, Juan García Ábrego. This drug trafficking organization dominated the northeastern part of the country and had its headquarters in the state of Tamaulipas.

This was the period when numerous small, geographically concentrated groups of drug producers and traffickers grew strong and consolidated into large “drug cartels”. Astorga (2003) points out that the term “cartels” does not correspond to the concept used in economics to define a market characterized by a reduced number of producers making agreements to restrict the supply or fix the price of a particular good. However, the term “cartels,” coined in this period, is indicative of the growth and consolidation that DTOs underwent during the 1980s and 1990s.

The enormous income derived from illicit markets gave Mexican drug trafficking organizations unprecedented power to corrupt law enforcers and government officials. Although is hard to find solid evidence on corruption activities, estimates suggest that the Tijuana Cartel was spending \$ 1 million dollars per week on bribes, and criminal groups in Mexico spending overall between \$260 and \$460 million dollars a year on corruption fees, twice the Attorney General Office’s budget (González Ruiz, López Portillo and Yáñez, 1994; Kenny and Serrano, 2012*a*; Serrano, 2007).

The relative position of Mexican drug trafficking organizations further improved towards the end of the 1990s with the crackdown on the Medellín and Cali Colombian cartels. After an unprecedented escalation of drug-related violence in Colombia, government authorities dismantled the Medellín Cartel when the Colombian National Police shot down the head of the organization, the legendary drug trafficker Pablo Escobar. In addition, by the mid-1990s, six of the seven leaders of the Cali Cartel

had been arrested and were later extradited to the U.S. After the demise of the two most prominent Colombian cartels, U.S. efforts focused on increasing surveillance of drug distribution routes in the Caribbean by means of the Joint Interagency Task Force South (JIATF). Mexican authorities indicate that U.S. monitoring of aerial and maritime activity in the Caribbean forced a shift of drug trafficking routes away from the water onto land – Mexican territory.

The first manifestation of the strength of Mexican drug trafficking organizations became evident on February 7, 1985, when DEA special agent Enrique Camarena Salazar and Mexican pilot Alfredo Zavala Avelar were kidnapped in Guadalajara. A few days later, Mexican authorities revealed that a group of gunmen commanded by Caro Quintero and Félix Gallardo were responsible for their disappearance. But then, a few days later, the chair of the DEA, Francis Mullen, declared that DFS agents had been directly involved, covering Caro Quintero as he fled from the Guadalajara Airport showing a DFS badge. In March of the same year, authorities found Camarena's and Zavala's bodies, bearing signs of torture. After the event, the DEA launched Operation Leyenda, the largest homicide investigation that DEA had ever undertaken abroad. DEA investigations in Mexico and other Latin American countries led to the arrest of high-level members of drug trafficking organizations involved in Camarena's assassination, including Rafael Caro Quintero, Ruebén Zuno Arce, Humberto Álvarez Machaín, Mario Verdugo and Ernesto Fonseca Carrillo (Drug Enforcement Administration, 2013*a,b*). However, Miguel Ángel Félix Gallardo, the most important leader of the Guadalajara Cartel remained at large. In one of the most detailed descriptions of the Camarena case and its aftermath, Astorga (2005, 139–150) states that the assassination of Camarena was committed in retaliation for his providing information that led to the dismantling of "*El Búfalo*". This version is broadly supported in other studies (Astorga, 2003; Kenny and Serrano, 2012*a*; Knight, 2012).

Another important factor for understanding the rise of Mexican criminal organizations during the 1980s and 1990s is the series of deep crises Mexico's economy suffered in 1982, 1987 and 1995. From its origins in the late 1920s to the early 1980s, the PRI was successful in generating economic growth through a number of development strategies; industrialization, import substitution models, and stabilizing development (see Medina Peña, 1994). Between 1978 and 1981, Mexico achieved unprecedentedly high rates of economic development with an annual average GDP of 8.5 percent. However, during the 1980s and 1990s a series of liberalization policies and macroeconomic mismanagement, along with recurrent election–budget cycles led to rampant hyperinflation, the government's declaration of financial insolvency, and a sequence of severe economic crises. According to Lustig (1990), the 1982 crisis severely impoverished the Mexican population by causing a 30 percent drop in real wages, a contraction of 10 percent in wage share, and a reduction of 19 percent in social expenditures. During the “lost decade” of economic hardship in Mexico, it is plausible to expect that some sectors of the population came to view drug trafficking organizations as an alternative option for employment in a collapsed economy; a profitable way to climb out of poverty. As documented by historians and journalists, drug lords were not only notoriously generous in distributing their wealth to individuals, but also provided public goods; they constructed schools, installed street lighting, built parks and churches, and held large parties for entire villages (Astorga, 1995; Campbell, 2009; Knight, 2012; Osorno, 2009; Ravelo, 2007*a*, 2009).

A third factor that contributed increasing the strength of Mexican drug trafficking organizations was the liberalization of trade between Mexico and the U.S. as part of the North American Free Trade Agreement (NAFTA). This trade agreement played a crucial role in dramatically increasing the flow of commercial exchange between the two countries, but the flow of Mexican goods to the U.S. became substantially larger than the flow of U.S. products entering Mexico. According to the United States

International Trade Commission, before NAFTA entered into effect in 1994, the U.S. trade balance with respect to Mexico (measured as the value of U.S. exports minus the value of U.S. imports) was \$1.3 billion dollars, meaning that the U.S. exported more goods to Mexico than the amount imported from Mexico. Two years after the beginning of the agreement, the U.S. trade balance had turned into a deficit of \$19.5 billion dollars; the U.S. was now importing more goods from Mexico it exported to Mexico. This trade deficit has continued, and by 2008 it had reached \$84.8 billion dollars (Villareal, 2009). Most of this massive commercial exchange is carried out by land transportation across the U.S.–Mexico border. The opening of the border for trade furnished Mexican drug trafficking organizations with unprecedented opportunities for smuggling drugs into the U.S. and weapons into Mexico.

In summary, during the 1980s and 1990s, the separate process of changes in the international drug market structure, recurring collapses of the Mexican economy, and trade liberalization converged to contribute to the consolidation and strengthening of Mexican drug trafficking organizations. The increasing demand created by growing drug consumption in the U.S. gave Mexican cartels the opportunity to obtain enormous economic rents from drug markets, especially after the collapse of Colombian cartels. The series of economic crises increased levels of poverty and inequality, thus generating a vast human reserve of cheap, available potential workers, many of whom saw drug trafficking activities as the only way out of poverty in an economic system that systematically frustrated social mobility through legal means. In addition, the reduction of trade barriers between Mexico and the U.S. and the liberalization of commercial exchange offered prime opportunities for smuggling drugs across the border to meet the U.S. demand. The structure of criminal organizations in Mexico was thus no longer populated by a plethora of small atomized groups engaging in small-scale production or transport of drugs. Instead, by the end of the 1990s, the

structure of the Mexican drug sector consisted of strong criminal organizations with the capability of producing and transporting drugs into the U.S. on a large scale.

5.5.2 Dismantling the Political Security Apparatus

The second important process that took place during the 1980s and 1990s was the dismantling of the political security apparatus that the government had employed in previous decades to monitor and repress the political opposition. The erosion of the coercive instruments of the state is part of a broader process of political liberalization discussed in the next section, but it is relevant enough to deserve a separate discussion here.

As mentioned above, the 1960s and 1970s were marked by harsh political prosecution by the state against any organization or individual considered a potential or actual political threat to the PRI hegemony. The state created the DFS as a sophisticated instrument of political repression and social control. The DFS extensively infiltrated almost every open or clandestine power structure, thus centralizing a vast network of information and political relations. The close connection between the DFS and the highest levels of the political elite enabled timely, precise information to be provided about potential threats and an effective repressive reaction to be immediately delivered by the state. Under the protection of political immunity, the DFS relied on a broad menu of coercive tactics including arbitrary detentions, forced disappearances, torture, mutilation, extortion and rape, among others (Castellanos, 2007; Doyle, 2006*a,b*; Montemayor, 2007, 2009, 2010; Poniatowska, 1980). In coordination with federal and local police forces as well as the Army, the DFS orchestrated vigilance, control and coercion of students, left-wing political organizations, teachers, labor unions, peasants and indigenous organizations, religious leaders, independent media and opposition parties, among others.

Following the sustained wave of political repression that was carried out throughout the 1960s and 1970s, the government had crushed most radical organizations; arrested, killed or coopted their leadership; scattered their members and supporters; neutralized urban guerrilla cells; and eliminated insurgents in the mountains. By the end of the 1970s, the remaining dissidents were too few and dispersed to represent a political threat to the regime. The coercive apparatus of the state had prevailed after twenty years of struggle against political dissidents. During this period, the DFS became deeply interwoven into criminal networks and directly participated in drug trafficking and other criminal activities. In contrast to the harsh repression suffered by political dissidents, criminals enjoyed the protection and often the direct support of the state security apparatus and the political elite.

When the PRI entered the 1980s, there were no remaining radical political threats capable of jeopardizing the hegemony or survival of the regime. The demise of domestic political threats was accompanied by the end of the Cold War. In the international arena, the political and economic liberalization carried out by Mikhail Gorbachev in Russia and the subsequent fall of the Berlin Wall marked the end of an era of international polarization. At the end of the 1980s, the termination of the Cold War also relaxed the pressure which the U.S. foreign policy had put on Mexico to prevent expansion of the communist threat. International factors and domestic politics converged during the 1980s to alleviate any concerns the PRI might have for its political survival.

In this context, President Miguel de la Madrid used his executive powers to disband the DFS in 1985. The dismantlement of Mexico's most feared political police initiated the crumbling of the state's security apparatus. Several authors indicate that one of the central causes of the end of the DFS was the deep involvement of its agents in the murder of DEA agent Camarena (Borjón Nieto, 2008; González Ruiz, López Portillo and Yáñez, 1994; Serrano, 2007). In addition, the last direc-

tor of the DFS, José Antonio Zorrilla Pérez, was arrested for the assassination of Manuel Buendía, a prominent journalist who conducted several investigations about the relationships between the DFS and drug trafficking organizations until his death in 1984. The purge of the DFS immediately resulted in the dismissal of 427 agents (Vasquez, 1985). The house-cleaning rapidly extended to the Federal Judicial Police and the Office of the Attorney General. According to Serrano (2007, 272), between 1986 and 1996, about 7,000 members of the security forces were fired from their respective agencies. Subsequently, 1,200 Federal Judicial Police officers and about 30 percent of the agents Attorney General's office were discharged between 1994 and 2000. The Federal Judicial Police was effectively dismantled in 1998 and substituted by the Federal Preventive Police (PFP). A few years after the closure of the DFS, in 1989, President Carlos Salinas created a new intelligence agency called *Centro de Investigación y Seguridad Nacional* (CISEN, Center of Investigations and National Security) and commissioned General Jorge Carrillo Olea to be the director of this new agency. At the time, the U.S. Drug Enforcement Administration became the most valuable source of information for Mexican authorities about the activities of their drug trafficking organizations.

The dismantling of the DFS and other federal security forces had two important consequences. First, after thousand of security agents had been discharged, a large proportion of them joined existing criminal organizations or created new ones; others joined local police forces in other states and kept doing business as usual; and others created their own private security firms. Those who joined criminal organizations took with them the deep and specific knowledge of the structure, operations, tactics and personnel of security agencies that they had acquired during their years of service. Their “know-how” and experience of state security operations became an asset for criminal organizations, thus improving their ability to elude law enforcement.

The second and most important consequence of the massive dismissal of security agents was the loss of a crucial instrument for controlling the criminal network. For four decades, the DFS had served as a mechanism of social and political containment and had held a strong grip on a complex system of criminal and political relationships. There is no doubt that the DFS abused its position of political impunity and engaged in criminal activities as licensed predators. However, they also served as a bridge that connected the political world with the criminal underworld and provided valuable information about criminal networks. Purging security agents who had close connections with criminal groups might have served to ameliorate the pervasive corruption in Mexican security forces but it also eroded the ability of state authorities to monitor and control criminal groups.

As discussed in the previous sections, government authorities did not primarily rely on the use of force to contain the inherently violent behavior of criminal groups. Coercion was not largely necessary because the state kept a close eye on criminal behavior and used timely, precise information to activate political mechanisms of discipline. However, by disbanding its security agencies and scattering their personnel, the political elite lost control of the large dense network of criminal–political connections. The dismantling of the DFS effected a huge loss in the state’s ability to impose political control on criminals. The strong U.S. pressure that followed Camarena’s assassination probably contributed to the President’s decision to purge the state’s coercive apparatus. In addition, due to the extermination of subversive organizations and the weight of the Cold War off his shoulders, he probably faced no direct political concerns or pressures that could justify maintaining the DFS or preventing its elimination.

5.5.3 The Process of Democratization in Mexico

During the 1980s and 1990s, Mexican drug trafficking organizations acquired substantial power due to the surge in drug consumption in the U.S. During this period, the removal of domestic and international Cold War pressures contributed to the dismantling of the political police. In consequence, the state lost a crucial instrument for monitoring criminals and instilling discipline through political incentives. However, the most important factor that eroded the preexisting order in drug markets is the advent of democracy in Mexico.

According to Brachet-Marquez (1992), the debate about the process of democratic transition in Mexico centres on two different processes: one citing democratization from top-down and the other one arguing that political change developed as a bottom-up process. As accurately claimed by Merino (2003), the best way to understand the process of democratic transition in Mexico is by analyzing the interaction between the electoral system and the party system. Both sides of the debate to be drawn together in order to provide an integrated explanation of bottom-up democratization pressures and top-down electoral concessions to facilitate political competition. In contrast to processes of democratization undertaken by political pacts at the elite level in other countries (Linz and Stepan, 1996; O'Donnell, Schmitter and Whitehead, 1986), the Mexican democratic transition is characterized by a gradual process of political liberalization. Despite the constricting political conditions imposed by PRI hegemony, opposition parties pushed for small electoral reforms that allowed them to secure some political positions, which in turn helped reconfigure the party system to allow opposition parties to push for further electoral reforms.

In the 1958 presidential election, the PAN accused the PRI of rigging the election results, and refused to take the seats that it had won in Congress. This opposition boycott called the legitimacy of the electoral process into question and forced PRI to make some small, but important electoral concessions. The result was the 1963

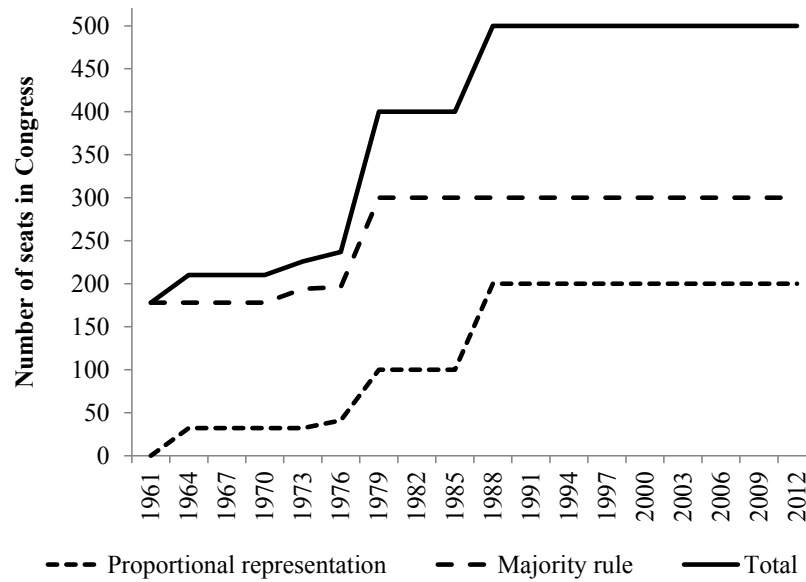
electoral reform that introduced the party–deputy system (“*Diputados de Partido*”), which awarded five seats to minority parties that reached a threshold of 2.5 percent of the vote. However, the reform included a safeguard for the PRI by stipulating that minority parties could not hold more than twenty seats. This might seem a small concession, especially for a Congress that had 210 seats overwhelmingly controlled by the PRI. However, it was an important first step for opening up the political arena that had been dominated by a single party since 1929. The party–deputy system remained in effect for ten years and, in 1973, conditions of electoral competition further improved with the reduction of the threshold of votes required from 2.5 percent to 1.5 percent. In that year, the maximum number of minority party seats also increased from twenty to twenty-five seats.

As discussed above, the 1960s and 1970s were marked by inexorable repression of leftist organizations and political parties. Student and labor movements were violently suppressed, as were left-wing parties such as the Mexican Communist Party. Those who radicalized and engaged in urban and rural guerrilla operations were ultimately neutralized by the mid-1970s. After twenty years of repression, the left was devastated. On the other side of the political spectrum, the right-wing opposition represented by the conservative PAN had not been severely repressed, but was nevertheless marginalized from power by systematic electoral fraud. Instead of employing radical contestation, the PAN decided not to run a presidential candidate in the 1976 election. It was not a deliberate decision to boycott the election; rather, internal struggles prevented the PAN from nominating a candidate. In any case, the lack of contenders exposed the unbearable political conditions imposed by the PRI, which presented José López Portillo as the only candidate for the presidential election. As indicated by Merino (2003, 23), “the election campaign of López Portillo was an absolute contradiction: the PRI was at its peak of hegemonic power, but had no electoral legitimacy.”

Violent contestation from the left and the electoral boycott from the right forced the PRI to improve the conditions for electoral competition. The result of this process was the 1977 electoral reform, which introduced proportional representation (PR) in Congress. The reform increased the number of seats in Congress to 400, opening 100 seats for plurality rule and the remaining 300 for majority rule. As shown in Figure 5.1, increasing the number of seats, especially the proportional rule seats, increased the availability of positions for minority parties.⁶ Another important characteristic of the reform was the reduction of barriers for forming and registering political parties. The barriers to obtaining “definitive” registration were lowered, and small parties were allowed to obtain “conditional” registration that would become “definitive” upon their receiving at least 1.5 percent of the national vote. As stated by Molinar Horcasitas and Weldon (2003), this concession allowed the Mexican Communist Party to return from the shadows and gain legal registration. The electoral reform was part of a broader effort to bring the leftist opposition back to the electoral arena as the government passed a Federal Amnesty Law in 1978 to exonerate members of subversive and guerrilla organizations who were in prison (Congreso de la Unión, 1978).

The 1977 reform was the turning point that marked the opening of the political system. The electoral concessions did not break the hegemony of the PRI; the party was still winning with large margins of victory. But the reform allowed the opposition the possibility of amplifying their representation in Congress by winning access to more seats. More importantly, the system of proportional representation created incentives for opposition parties to build local constituencies at the state level so they could access PR seats. In addition, the electoral reform allowed county councillors (*regidores municipales*) to be elected by proportional representation, also reinforcing

⁶Data from 1951 to 1997 is from Lujambio (2000), the remainder is from Instituto Federal Electoral (2013).



Source: Made by the author with data from Lujambio (2000)

Figure 5.1. Number of seats in Congress by type of electoral rule

the incentives to develop electoral support at the local level. The incentives towards the development of decentralized electoral support planted the seeds for a process of “democratization from below,” through which opposition political parties gradually increased their strength on the periphery (Lujambio, 2000; Merino, 2003). The effect of the 1977 electoral reform is clear in Figure 5.2, which shows the share of votes per party in Congressional elections for the Chamber of Deputies.⁷ The figure shows that after the 1977 reform, the PRI’s share of votes in Congress declined while the opposition parties blossomed. This trend of declining PRI control over the Congress continued in subsequent elections.

The electoral reform and its consequences opened up the first cracks in the strong centralist control that the PRI exercised over the periphery. As the opposition started building support at the local level, the cracks grew deeper and eroded the PRI’s abil-

⁷Data for this figure comes from Instituto Federal Electoral (2013) and Shirk (2005).

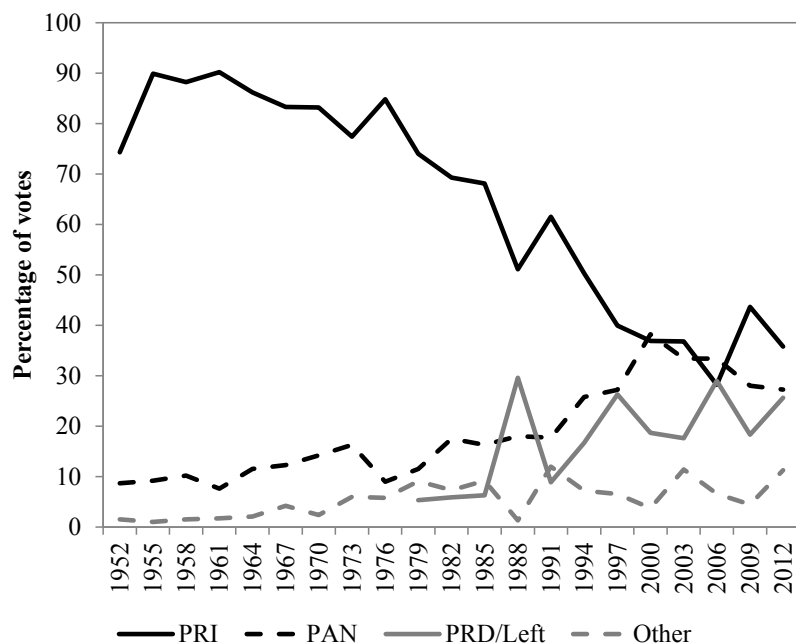


Figure 5.2. Percentage of votes for Congressional elections

ity to monitor local politicians and enforce discipline on them. The conservative PAN began gaining increasing support in the north. Mexico's northern states were more industrialized than the rest of the country and they also had a politically active Catholic community – features that coincided with the ideological profile of the PAN and characterized the party's core constituency (Loaeza, 1994). The northern states already had a long presence of drug trafficking organizations, which benefited from the increasing strength of the opposition to the detriment of the PRI as it meant a looser grip from the centralized control of federal authorities. An example of this political decentralization process was the PAN victory in the Ciudad Juárez, Chihuahua municipal election in 1983, which marked the end of the PRI's protracted political control in that municipality. Another example is Baja California, which became the first state governed by an opposition party when PAN candidate Ernesto Ruffo Appel defeated the PRI candidate in the election for governor in 1989. There

is no evidence of the Juárez Cartel being involved in the PAN victory in Chihuahua nor the Tijuana Cartel in Baja California. However, after the opposition victory in their local governments, these drug organizations certainly benefited from a less strict control by the PRI in the center of the country.

The opposition began gaining strength at the local level. Increasing competition led to a series of electoral conflicts at the state level after the PRI rigged the results of local elections in the early 1980s. The most competitive states were in the north, including Sonora, Baja California, Chihuahua and Nuevo León, the most distant from the centralized PRI control in Mexico City. Civil resistance in Chihuahua escalated after the overt electoral fraud committed in the 1986 election. In addition, social unrest went widespread in the country due to the discontent caused by the severe economic crisis of 1982 and the feeble government reaction to aid the population after the earthquake that devastated Mexico City in 1985. In response, President de la Madrid advanced a new electoral reform in 1986, increasing proportional representation in Congress from 100 to 200 seats while keeping the number of seats allocated by majority rule at 300. The increase in PR seats in 1986 is clear in Figure 5.2. However, in order to prevent losing control of Congress, the PRI allowed itself to also benefit from the increased number of PR seats, which were no longer reserved for the opposition. Besides increasing the potential for opposition representation, the reform allowed the creation of electoral coalitions among parties for the first time. The possibility of creating electoral alliances proved crucial for making inroads on the PRI's dominance in the 1988 presidential election.

In 1987 a group of PRI politicians led by Cuauhtémoc Cárdenas, son of General Lázaro Cárdenas who was president from 1934 to 1940, challenged the PRI's traditional selection of the presidential candidate by "*dedazo*," and proposed a democratic selection mechanism based on direct voting of party members. President de la Madrid interpreted this as a blatant challenge to the presidential powers that had

long been mandated by the unwritten party rules and imposed Carlos Salinas de Gortari as the official PRI candidate. The decision caused a split between Cárdenas and other prominent PRI members from the party. Based on the recently passed electoral reform that allowed the creation of electoral coalitions, a group of leftist minority parties coalesced into the National Democratic Front, (*Frente Democrático Nacional*, FDN) and proposed Cárdenas as the leftist candidate. Six months after the election, the FDN coalition became the Democratic Revolutionary Party (*Partido de la Revolución Democrática*, PRD). Cárdenas was put forth as a serious contender to run against the PRI in the 1988 presidential election. In a matter of few months, his candidacy provoked vibrant enthusiasm and won massive electoral support from broad sectors of the population. The left managed to channel social discontent with the political system, critiques of a series of neoliberal policies that had started in the 1980s, and generalized frustration with the fall in living standards caused by the severe economic crisis of 1982 (Bruhn, 1996).

On election day on July 6, 1988, the first results favored the FDN; as the day drew on, the distance between the PRI and FDN became narrower. Panic seized the PRI political elite and the Minister of the Interior – who also headed the Federal Electoral Commission – ordered the computer system used for counting the votes to be shut down. The PRI claimed that the system had inexplicably collapsed, and declared a victory for PRI candidate Carlos Salinas with 50.7 percent of the vote, awarding second place to the FDN candidate, Cuauhtémoc Cárdenas, with 31.1 percent of the votes. The “collapse of the system” raised serious doubts as to the legitimacy of the election and unleashed massive protests and demonstrations on the streets (Bruhn, 1996; Loaeza, 1999). As illustrated by Figure 5.3, the 1988 election marked a dramatic increase of votes for the opposition and accentuated the decline of the PRI vote share.⁸

⁸Data for this Figure comes from Instituto Federal Electoral (2013).

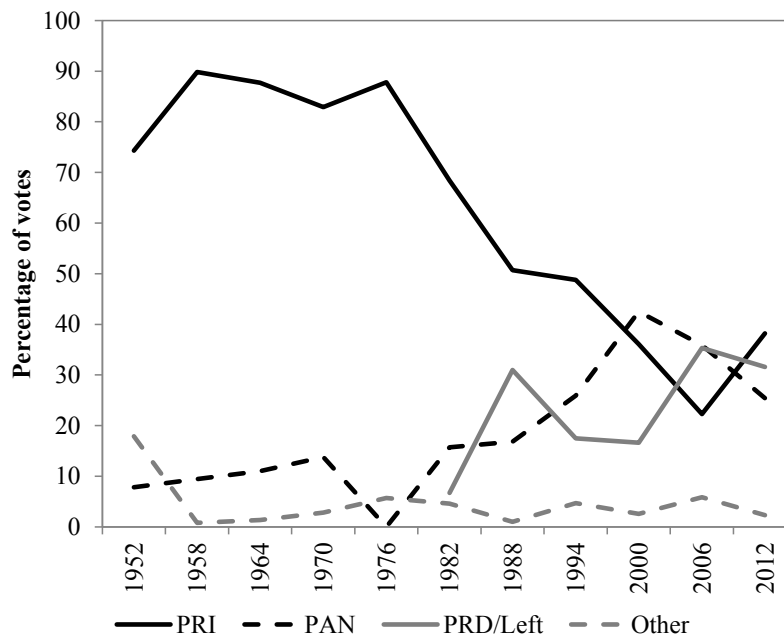


Figure 5.3. Percentage of votes for Presidential elections

One of the most insightful analysis of Mexican politics under authoritarianism is provided by Magaloni (2006). She accurately argues that the PRI suffered splits in 1940, 1946, 1952 and 1988, all of which occurred as prominent politicians objected to the presidential nomination process.⁹ The case of Cárdenas in 1988 was an exception; the PRI managed to recover from all other previous splits because it enjoyed huge margins of victory. The PRI placed a great deal of emphasis on mobilizing voters to the polling booths as a key strategy to deter elites from splitting off, even when elections were not competitive. In contrast to the first three splits, Cárdenas managed to split off and successfully challenge the hegemony of the PRI because the

⁹According to (Magaloni, 2006), the most important splits were those initiated by General Juan Andreu Almazán in 1940, who opposed Manuel Ávila Camacho as the presidential nominee; Ezequiel Padilla Peñaloza in 1946, who rejected the nomination of Miguel Alemán Valdés; Miguel Henríquez Guzmán in 1952, who stood against the appointment of Adolfo Ruiz Cortínez as presidential candidate; and Cuauhtémoc Cárdenas in 1988, who protested against Carlos Salinas as nominee.

electoral reforms in 1977 and 1986 created favorable political conditions for winning substantive electoral support outside the PRI.

In December, 1988, Salinas de Gortari took office as president. One month later, in January, 1989, the Army arrested Joaquín Hernández, also known as “*La Quina*”, the leader of the the state oil company *Petróleos Mexicanos* (PEMEX) labor union. This was a crucial power move because *La Quina* had begun to challenge the neoliberal policies favored by Salinas, and leftist candidate Cárdenas won a considerable vote share in districts populated by PEMEX workers. The event known as “*El Quinazo*” was hailed as the end of the old-time union bossism. In addition, it was broadly recognized that *La Quina* was a scapegoat sacrificed to legitimize Salinas’s government following the electoral fraud. “*El Quinazo*” came to symbolize an iconic power move in Mexican politics that signalled a rupture with past corrupt agreements tolerated by previous administrations. Another important power move to legitimize his government was the arrest of Miguel Ángel Félix Gallardo in April, 1989, only four months after Salinas took office. The long-standing leader of the Guadalajara Cartel was directly associated with the murder of DEA agent Camarena and had managed to elude Mexican and U.S. efforts to capture him for more than a decade, until arrested by Salinas. The press celebrated the capture of Félix Gallardo as “a major political accomplishment for President Carlos Salinas” (Rother, 1989).

The social unrest and political polarization caused by the electoral fraud in 1988 forced President Salinas to make further electoral concessions in 1990. The most important element of this electoral reform was an effort to dissipate doubts about the legitimacy of future elections through the creation of the Federal Electoral Institute (*Instituto Federal Electoral*, IFE), an autonomous institution in charge of organizing elections. The reform also included the creation of a professional bureaucracy with the mandate of implementing clean and transparent elections. Although the electoral administration was no longer under the jurisdiction of the Ministry of the Interior

but of the newly created IFE, the PRI did not lose absolute control over the electoral bureaucracy, as the Minister of Interior was still the head of the IFE electoral commission. Later, another electoral reform in 1993 gave the IFE the power to limiting campaign expenditures. This placed an important constraint on the PRI's use of public funding and government infrastructure at the federal and local level.

1994 was a turbulent year for Mexico marked by the return of political violence. On January 1, 1994 – the very day the NAFTA agreement went into effect – the Zapatista National Liberation Army (*Ejército Zapatista de Liberación Nacional*, EZLN) burst onto the political scene in the southern state of Chiapas. The Zapatista uprising was dampened by the Mexican Army in a matter of a few days. However, their ideological stand found deep resonance in broad sectors of the population and triggered massive non-violent demonstrations in support of the EZLN (Hayden, 2002; Womack, 1999). A few months later, in March, 1994, the PRI presidential candidate was assassinated during a campaign rally in Tijuana, Baja California. The assassination was a major shock for the Mexican political elite because no major political figure had been killed since the aftermath of the revolution and the creation of the party in 1929 (Aguilar Camín, 2004, 2006). Later that year, José Francisco Ruiz Massieu, the president of the PRI was assassinated in Mexico City. In the voice of the media, Mexico was “bordering on chaos” (Oppenheimer, 1996).

The reaction of the political elite to the violent events was the approval of a major electoral reform in May, 1994, barely two months before the presidential election. The reform created the figure of Citizen Counselors (*Consejeros Ciudadanos*) who were selected by Congress from a pool of citizens without partisan affiliation. Citizen Counselors were part of a collective decision-making board chaired by the Minister of the Interior. This was the first step in the creation of a truly independent electoral authority outside the political control of the government apparatus and the PRI (Peschard, 1995). The second and definitive step came in 1996.

The 1996 electoral reform finally removed the Minister of the Interior from the board of directors of the IFE and gave complete administrative and decision-making autonomy to the board controlled by non-partisan citizens, now called Electoral Counselors (*Consejeros Electorales*). The reform also included an increase of seats in the Senate, which grew from 62 to 128 seats. There were several other changes that improved the conditions for electoral competition under fair and transparent rules. The 1996 electoral reform represented the culmination of a protracted process of institutional development. It took three decades to completely erode the longstanding *de facto* control held by the PRI over nominations at the federal and local levels; the result was an independent, solid institute in charge of regulating electoral competition (Becerra, Salazar and Woldenberg, 1997, 2011). The creation of an autonomous electoral institute supported by a strong body of laws and regulations finally consolidated the two most important elements of a democratic political system: the certainty of electoral rules and the uncertainty of electoral results (Przeworski, 1991).

The 1996 electoral reform had a profound impact on the reconfiguration of the political scene in Mexico. As reflected in Figure 5.2 reporting the vote share for Congressional elections, for the first time since its foundation the PRI lost its majority in the Chamber of Deputies in the 1997 election. The reform also contributed to the momentum of political decentralization at the sub-national level. By 1998, seven states had already had governors from a party other than the PRI; Baja California, Chihuahua, Guanajuato, Jalisco, Nuevo León, Querétaro and the Federal District (Mexico City). According to Lujambio (2000), the distribution of power in the local legislative assemblies also underwent a substantial process of political pluralization: in 1974, the PRI controlled 97.8 percent of all 369 legislative seats available at the local level; by the end of 1999 the PRI was left with only 49.6 percent of the 1,108 local legislative seats in the country. The number of divided governments – in which the governor is from a different party than the one controlling the majority of the local

legislative assembly – increased from one (the first) divided government in 1989 to fifteen experiences of divided government by 1999. The diversification of the political scene also extended to the municipal level. By 1998, more than half of the state’s capitals were governed by opposition parties: 15 state capitals belonged to the PAN; 3 were controlled by the PRD (including Mexico City); one more was controlled by the PT; and the remaining 13 state capitals remained under PRI control (Merino, 2003, 40). Between 1978 and 1980, the opposition controlled only 34 municipalities. In contrast, between 1996 and 1998, the number of municipalities governed by the opposition increased to 510 (Eisenstadt, 2003). Most of these changes at municipal level occurred in urban areas concentrating a large proportion of the population.

Finally, the most important effect of the 1996 electoral reform is that it paved the way for the 2000 electoral process in which the PRI lost the presidency for the first time. July 2, 2000, is marked as a critical inflection point in Mexican politics when a majority of voters brought to an end the world’s oldest hegemonic party regime, which had remained in power for more than 70 uninterrupted years. On that day, the PAN candidate, Vicente Fox, won the election by a comfortable margin of more than 6 percent over the PRI candidate, Francisco Labastida. As reflected in Figure 5.3 showing the percentage of presidential votes obtained by each political party, the share of votes for the PRI had been declining since 1982 until the dominant party was finally defeated in 2000.

There is a broad range of explanations attempting to account for why the PRI lost the presidential election in 2000 (see Brachet-Marquez, 1992). The most convincing explanation is offered by Magaloni (2006) who argues that the PRI lost power because of two factors: it failed to offer sufficient material rewards and access to government office to the many ambitious politicians within the party; and it failed to mobilize voters in sufficient numbers to win with the wide margins of victory that could have generated a strong message of invincibility. Greene (2007) offers a similar

view, also based on a twofold argument. One factor in the defeat of the PRI is that the party lost the resource advantage of limitless spending on campaigns, in which it used to supplement policy proposals with patronage and vote buying. The other factor was the PRI's diminished ability to impose participation costs on the opposition by increasing opportunity costs or employing violent intimidation. Additionally, Dominguez and Lawson (2003) offer another explanation, namely that the PRI lost the election because of the effectiveness of short-term effects of the 2000 election campaign.

Figures 5.2 and 5.3 presented above show that after the 2000 election, political competition increased in the Chamber of Deputies and at the presidential level. In addition, as reflected in Figure 5.4, after the 2000 presidential election, political diversity in Mexico became well rooted in the national political scene.¹⁰ The Figure reports the effective number of political parties (ENP) at the federal level calculated according to the formula provided by Laakso and Taagepera (1979). The most diverse political sphere was the Chamber of Deputies, thus reflecting the plurality of political parties with different strongholds at the sub-national level that had been increasing between 2000 and 2010. The figure also shows that there was a marked increase in the effective number of parties in the Senate and in the 2006 presidential election. In general, federal political spheres are characterized by the presence of at least three effective political parties, the PRI, PAN and PRD. The ENP in the lower house of Congress has a larger value due to the diversity of minority parties with seats in the Chamber.

Finally, Figure 5.5 reports the effective number of political parties at the local level from 2000 to 2010.¹¹ The figure shows that the PRI did not have hegemonic control

¹⁰Electoral data comes from Instituto Federal Electoral (2013) and the ENP is calculated by the author using the Laakso and Taagepera (1979) formula.

¹¹Election data for both types of elections come from Instituto Federal Electoral (2012) and the ENP is calculated by the author using the Laakso and Taagepera (1979) formula.

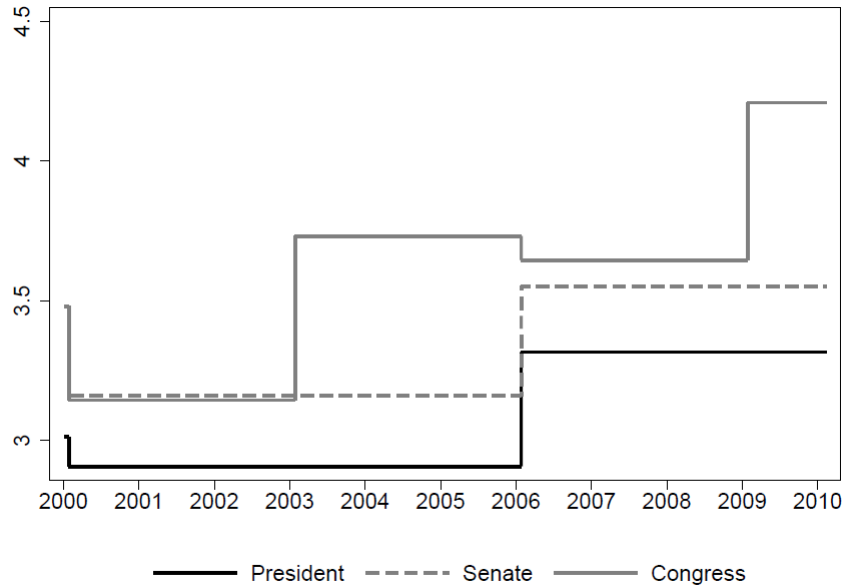


Figure 5.4. Effective number of parties (ENP) at the federal level

over political positions at either the state or municipal level. Panel (a) reports the box plots of ENP for governorships for all 32 states. The figure shows that the yearly averages of ENP for governors range from 2.2 to 2.6 effective parties. This indicates that state politics were mostly defined by bipartisan competition, usually PRI vs PAN or PRI vs PRD. In addition, Panel (b) reports the ENP for municipal elections. The average effective number of political parties for the election of mayors ranges from 2.8 to 3.6 political parties. In addition, the figure shows that some municipalities had higher than average ENP. This indicates that municipal elections are substantially more competitive than the state or federal political spaces. In general, these plots show that political diversity was well entrenched at the sub-national level.

As discussed above, the sustained interaction between the electoral system and the party system over a period of thirty years led to a gradual process of democratization that eroded the PRI's hegemonic control at all three levels of government. By the beginning of the 2000s, the Mexican political scene was characterized by a plurality

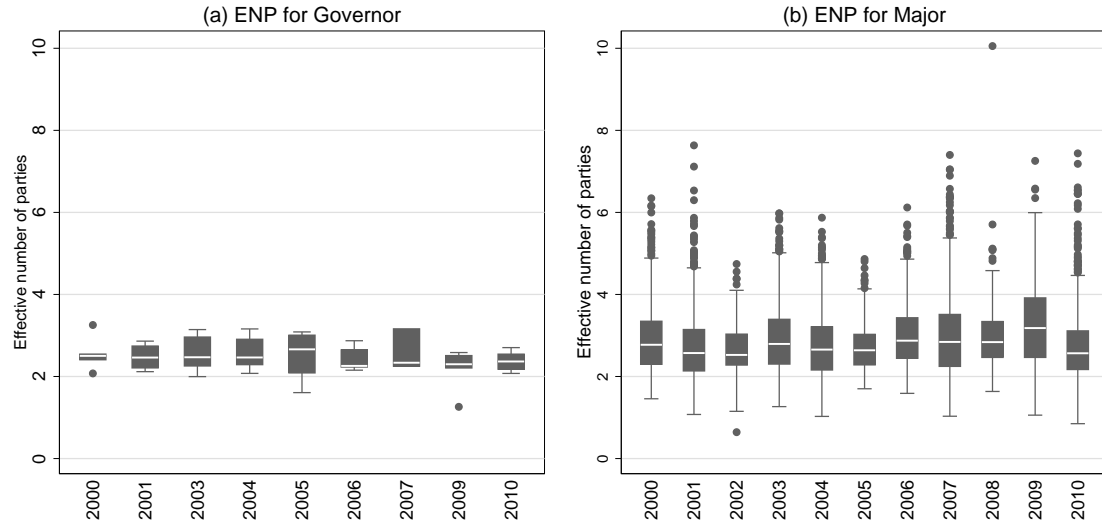


Figure 5.5. Effective number of parties (ENP) at the local level

of actors with strong roots at the sub-national level and with an active role at the federal level. In 2000, the hegemonic party that had ruled Mexico for seven decades finally lost the presidency for the first time, thus ending a long period of political dominance. But even well before the presidential election of 2000, the map of political diversity gave a picture of firmly rooted plurality. The presidential alternation of 2000 was the climax of thirty years of effort to open up political competition in Mexico. This process of democratic transition was characterized by the gradual evolution of electoral reforms that managed to increase the certainty of the rules of electoral competition while generating democratic uncertainty about the winner of the competition.

5.5.4 Not All Good Things Come Together

The gradual process of democratization in Mexico dismantled the hegemonic-party autocracy imposed by the PRI for seven decades. Although there are certainly

key aspects of the Mexican democratic system that need to be improved, there is no doubt that the democratic transition brought substantial opportunities for political liberalization and economic development. Several of these pending tasks constitute what researchers have called an “incomplete,” “diminished,” or “delegative” democracy (Bartra, 2013; Felsen, 2009; Laurell, 1992; O’Donnell, 1994; Rodríguez Araujo, 2009; Rubio and Kaufman, 2006; Tuckman, 2012). Regardless of the “adjectives” used to describe the performance of the Mexican democracy (Collier and Levitsky, 1997), the process of democratic transition enabled voters to “kick the rascals out” not only from the presidency but from several states and municipalities. Democratization entailed a fundamental realignment of political forces. It replaced a hegemonic political system rooted on a centralised, hierarchical political structure, where the only way to access power was through the party, with a system that allows political diversity on the basis of solid electoral rules. Democratization thus subverted the lack of division of powers imposed *de facto* by the informal rules of the PRI hegemony and activated a genuine system of checks and balances in which the PRI was reduced to being one of three major parties on the political scene.

With the collapse of PRI hegemony, democratization also eroded the feasibility and sustainability of corrupt pacts between political actors and criminal organizations. The PRI no longer held the reins of a hierarchical chain of command that reached from the office of the president to the most remote municipality in the periphery. In this way, the president lost its capability to impose political discipline on the bureaucracy and party members at lower levels. The political capacity to enforce discipline also broke down in the criminal sphere. This argument is consistent with the effect of democratization on the war on drugs described by Knight (2012) and Rios (2012*a*). However, based on the premises of the theoretical model, this chapter offers a more detailed discussion on the mechanisms operating behind this relationship.

The erosion of the political capacity to impose discipline on criminals was caused by three essential characteristics of democracy: an increased number of political parties, effective elite circulation through electoral means, and political incentives for enforcing the law in order to gain popular support. The first two factors erode corrupt pacts between criminals and political actors, but do not necessarily lead to the escalation of violence. In contrast, the third factor, referring to the incentives to enforce the law, is a crucial factor for the escalation of drug-related violence.

The increased number of political parties is particularly important in the Mexican case due to the single-party system that had characterized the political scene for many decades. The diversity of political actors that accompanied democracy increased the difficulty in overcoming problems of collective action that could facilitate the implementation of corrupt agreements. During the era of PRI hegemony it was enough to establish an agreement with a few members of the political elite to implement a pact. Under democracy, such attempt would require bargaining with a diverse array of actors probably including the president, a few generals, and several governors down to a multitude of mayors, all of which may have different party affiliations. Even if an agreement is achieved, actors from different political parties have incentives to denounce the agreement in order to expose the other parties, making the agreement inoperable.

The entrance of new political actors at every level of government also disrupted the hierarchical chain of command that had facilitated the implementation of corrupt agreements. The advent of democracy augmented the number of cases of governments divided across political branches or levels. In several instances, the party of the president was no longer the same as the party holding the majority in the Senate or the Chamber of Deputies. Often, neither the party of the governor nor the mayor coincided with the party of the president. This rupture prevented the top-down instrumentation of presidential orders. The political survival of government officials or

party members thus no longer depended on compliance with the will of the president or other members of the political elite. Actors from different political denominations had their own incentives to align with the will of those above them in their own party structures or with the preferences of their electoral constituencies. This meant a fundamental change in the structure of political incentives now operating in a democratic setting.

In addition, the rupture in the hierarchical chain of command broke the mechanism enabling the bottom-up information flow. This problem became more salient after the dismantling of the DFS and the purge of other security forces. The state could no longer count on having its political police agents deeply infiltrated into the criminal underground and keeping a close eye on criminals as they had during the heyday of PRI dominance. This severely undermined government authorities' ability to monitor the behavior of criminal organizations and to impose political discipline. This situation is clearly illustrated by Knight (2012, 129), who argues that "a call from Los Pinos, the presidential palace, could no longer help settle political disputes or narco turf wars; Los Pinos no longer called, or, if it did, there was no answer."

Arguments about state-sponsored protection rackets (Duran-Martinez, 2012; Snyder and Duran-Martinez, 2009) claim that violence in drug markets emerges when political actors providing protection or selective enforcement can no longer mount a credible coercive threat to impose discipline. Along with this argument, a broken chain of command undermines the ability to coordinate law enforcement between federal (e.g. Army and Federal Police) and local security forces (e.g. state and municipal police). Although state coercion might be relevant as a method for deterring violent criminal behavior, the most important consequence of a broken chain of command is the erosion of the state's capability to impose discipline through political sanctions and to collect precise and timely information about criminal operations.

The second factor eroding the sustainability of corrupt agreements is the effective circulation of political elites through elections. During the era of PRI hegemony, elections were not only tainted by electoral fraud but, as accurately stated by Magaloni (2006), mass mobilization of voters served as a key mechanism to deter splits from the party. Both electoral fraud and voter mobilization served to send a clear message that the prospects of political success outside the PRI were non-existent. This system helped the PRI to perpetuate itself in power at all levels of government for seven decades. Elections were a democratic facade that only facilitated elite circulation within the PRI. Once the presidential nominee was selected by *dedazo*, there was absolute certainty among citizens and politicians that the winner of the election was going to be the designated PRI candidate. The same system operated in the other tiers of government. This characteristic motivated Nobel Laureate Mario Vargas Llosa (1990) to characterize PRI-ruled Mexico as “the perfect dictatorship.” And then, with the advent of democracy, the system collapsed.

As discussed above, the process of democratization in Mexico evolved by means of a sequence of electoral reforms that gradually made room for opposition and increased the legitimacy of the electoral authority. The main achievement of the opposition was to extract the organization of elections out from under the PRI’s control and to create an autonomous, trustworthy institution capable of organizing fair, transparent, competitive elections.

Under democracy, elections serve as a key mechanism for the effective circulation of political elites between the different parties and across all levels of government. The certainty about a PRI victory in the next election broke down. In consequence, any longterm expectations politicians might hold for political careers under the PRI also evaporated. Today, political survival and prospects for political ascent no longer depend on elite decisions in favor of “well-behaved” party members. Elections provide no certainty that those on top will remain there in the future to deliver any promised

benefits or to apply guaranteed sanctions. The system of incentives that allowed the PRI to instill and impose discipline is no longer in operation. Just as democratization eroded political discipline within the PRI, the relationships between criminals and political actors collapsed in disarray.

Elections place an expiration date on agreements between criminals and corrupt political actors. There is no longer certainty that the pacts will be maintained after an election for the simple reason that democracy introduced uncertainty about the election result. The system of incentives no longer rewards drug trafficking organizations for complying with the code of conduct imposed by the government. Political protection for “well-behaved” criminal groups is irrelevant in the long run. Corrupt political actors only guarantee protection or non-enforcement *from their own* security forces during the tenure of their administration. Even if they do so, they cannot guarantee that the security forces of *other* government authorities operating at different levels of government will adhere to the agreement. Criminal groups seeking protection from the authorities now have to bargain with a plurality of political actors with diverse party labels across different tiers of government. Even if criminals manage to obtain a non-enforcement agreement, political actors operate according to the electoral clock and such an agreement is likely to expire. Moreover, the stability of such a complex agreement – if ever achieved – is contingent on the absence of rival criminal organizations trying to operate in their area. The introduction of competitors trying to secure agreements with government authorities increases the volatility of an already unstable and uncertain situation. Devoting time, effort and resources to trying to secure an overarching and stable non-aggression has become a futile exercise.

The direct implication for the uncertainty of receiving protection from government authorities is that criminal organizations will try to find the way to ensure their own security. As also indicated by Rios (2012a) and Snyder and Duran-Martinez (2009),

drug trafficking organizations could try to acquire the necessary weaponry and men to protect their drug shipments from government crackdowns and to secure their borders against rival criminal groups. This situation could easily lead to a security dilemma and a subsequent arms race among rival criminal organizations (Posen, 1993). Moreover, as indicated by Lessing (2012), criminals could use the threat of violence against government authorities to ensure protection by offering them the choice between “*plata o plomo*” (silver or lead).

These incentives can certainly lead to a precarious equilibrium in which rival criminal organizations would increase their military capabilities to protect their territories. These mechanisms are plausible due to the high stakes of drug trafficking since the 1980s and the availability of military-style weaponry since the expiration of the U.S. Federal Ban of Assault Weapons in 2004. However, this does not mean that criminal organizations will unilaterally engage in violence against the state or against other criminal groups. In this respect, the initial upgrade in military capability serves a defensive purpose – not an offensive one – with the main objective of protecting their drug shipments and areas of operation. In other words, the original reason to enhance their own security is *to maintain* the status quo, *not to challenge* it for expansionist purposes.

The third effect of democratization on eroding the political-criminal relationships refers to the system of incentives it creates for politicians to enforce the law in order to gain popular support. Under democracy, the prospects of a successful political career no longer depend endorsing the political elite in control of the party but on securing the favor of the electorate. Democratization improves the responsiveness of political actors by giving them motivation to satisfy the demands raised by their constituency, thus favoring the delivery of public goods.

Augmented responsiveness from Mexican government officials motivated an increase in law enforcement to meet citizen demands for public security during the

1980s and 1990s. At the time, crime was becoming an increasingly important concern for the population. There is no systematic public opinion data about the magnitude of this concern during those years, but the official mortality statistics show a substantial increase in homicides over the 1980s and 1990s. Figure 5.6 reports the annual number of homicides at the national level from 1938 to 2011.¹² Although these data include all types of homicides¹³ – thus, they should not be interpreted exclusively as the outcome of criminal behavior – it is possible to argue that a substantial portion of the number of homicides during these two decades were caused by criminal violence. Many of these homicides were related to armed robberies, and there are indications that a wave of kidnappings that often ended in the murder of the victim were conducted by former police agents disbanded from their organizations in the early 1980s (Kenny and Serrano, 2012*b*). However, the *modus operandi* of criminal violence in the 1980s and 1990s was not characterized by the brutality and overtness of organized criminal violence that would be seen a decade later (see the large spike of homicides in Figure 5.6 towards the end of the time series). In any case, the increase of violence generated a substantial demand for public security that motivated government authorities to enforce the law.

¹²Homicide data are from mortality statistics issued by the Mexican census bureau and the Ministry of Health. Data from 1938 to 1975 are from several issues of the *Anuario estadístico de los Estados Unidos Mexicanos* (Annual Yearbook of Mexican Statistics) (Instituto Nacional de Estadística y Geografía, 2013*a*). Data from 1975 to 1989 are from Secretaría de Salud (2013). Data from 1990 to 2011 are from Instituto Nacional de Estadística y Geografía (2013*b*). The methodology for collecting information on homicides from 1939 to 1975 is not clear from the official reports issued by the government. Therefore their validity might be questionable. However, these are the only data available for the period. Fortunately, the data and data collection since 1975 are reliable as they conform with the standards of the International Classification of Diseases (ICD) issued by the World Health Organization (World Health Organization, 2010*a*). A recollection of this data is available at <http://www.mexicomaxico.org/Voto/Homicidios100M.htm>

¹³The Instituto Nacional de Estadística y Geografía (2008) provides the following classification of homicides: *homicidio calificado* (first degree murder) refers to any murder that is willful and premeditated; *homicidio culposo* (second degree murder or involuntary manslaughter) is a murder that is not willful or premeditated; *homicidio por riña* (third degree murder) is an intentional killing that involved no prior intent or premeditation, also known as a “crime of passion;” *homicidio por razones de piedad* refers to a mercy killing, such as euthanasia.

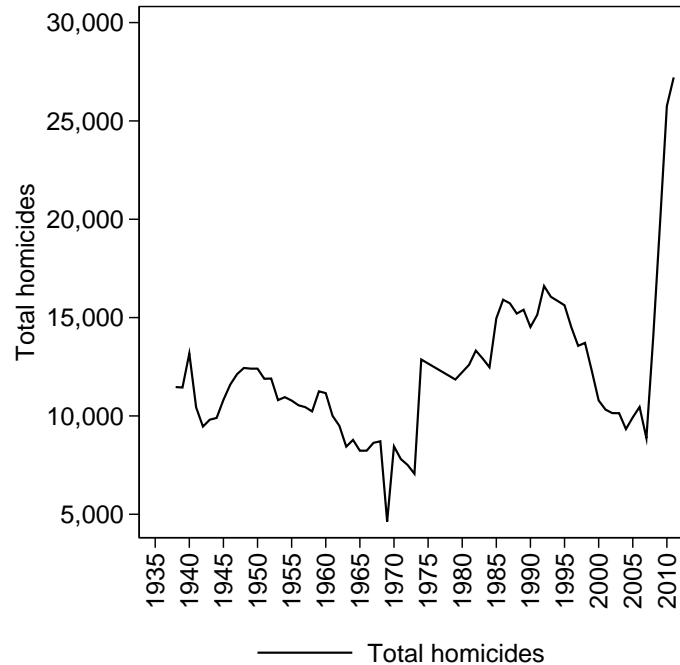


Figure 5.6. Annual number of homicides in Mexico 1938-2011

The obscure shadow of corruption and links between PRI members and criminal organizations provided enough material for new political actors to launch accusations against the PRI. Electoral competition motivates new politicians to break with the corrupt practices of the past and to differentiate themselves from old politicians deeply involved in corruption and criminal activities. New politicians advance with an anti-corruption discourse that appeals to the social interest of having honest government authorities. This does not mean that new politicians will be absolutely clean and free from corruption or relations with criminal organizations, but democratization gives them incentives to publicly denounce competitors engaged in these kinds of practices, as they will benefit from the electorate's disapproval and sanction of the corrupt old politicians. Public denunciation can also put pressure on judicial institutions to arrest corrupt politicians, thus clearing the way for their rivals. In this way,

democratization reconfigured the incentives for a new generation of political actors to enforce the law to signal their distinctiveness from previous corrupt politicians.

5.5.5 The Collapse of Order

By the beginning of the 2000s, three different processes that evolved during the 1980s and 1990s finally converged to shape a new political scenario. First, Mexican drug trafficking organizations underwent a process of growth and consolidation thanks to the surge in drug consumption in the U.S. and the subsequent decline of the Colombian cartels. Second, the highly repressive security apparatus of the Mexican government was largely dismantled after the domestic and international pressures of the Cold War had waned. In consequence, the state lost control of the connections between the secret police and the criminal underworld, thus inhibiting its capability to control criminal behavior and to instrument political discipline. The third and most important factor is that democratization subverted the hegemonic dominance of the PRI, thus overturning the political structures that had facilitated the imposition of political control over criminal organizations and generating a system of incentives favoring law enforcement. The convergence of these three factors generated a precarious equilibrium in which government authorities coexisted with strong criminal organizations already showing signs of animosity, and the state did not have the mechanisms for monitoring and imposing political discipline on them nor the ability to effectively repress them.

This precarious balance broke down when the government intensified its effort to enforce the law. The last high level protector of drug organizations was General Jesús Gutiérrez Rebollo, ironically the main commander of the National Institute to Combat Drugs (*Instituto Nacional para el Combate a las Drogas*, INCD), who was arrested in 1997. Gutiérrez Rebollo was in charge of leading the national counter-narcotic strategy and he had the reputation of being tough on drug organizations,

but the investigations revealed that he was tough only on the rivals of his boss Amado Carrillo Fuentes, *El Señor de los Cielos*, leader of the Juárez Cartel. After the Gutiérrez Rebollo scandal broke, the U.S. reinforced its pressure on Mexican authorities to capture Carrillo Fuentes. However, *El Señor de los Cielos* never went to prison, as he died in hospital during plastic surgery to change his appearance in July, 1997. The arrest of General Gutiérrez Rebollo and the death of Carrillo Fuentes were serious blows for the Juárez Cartel, which suddenly lost both its government protection and its infamous leader. Although Vicente Carrillo Fuentes, the brother of *El Señor de los Cielos*, took over the organization, the weakening of the Juárez Cartel increased the animosity the Sinaloa Cartel and its ambition to move in on Juárez territory.

After the PRI lost the presidency in 2000, newly elected president Vicente Fox ordered high-profile apprehensions of certain prominent drug leaders. However, these arrests destabilized the delicately balanced geographic distribution of criminal organizations in Mexico. The first blow was against the Juárez Cartel with the arrest of Mario Villanueva Madrid, the governor of the state of Quintana Roo, in May 2001. According to Ravelo (2007*b*), Villanueva Madrid later confessed that his arrest had been prepared by the last PRI president, Ernesto Zedillo, because of his insubordination towards the party and it was left for Fox to finally effect the detention. “Fox was determined to bury that party and Mario Villanueva, with his obscure background, was a good instrument for further discrediting the PRI and the priístas” (Ravelo, 2007*b*, 198). In 2001, Fox also increased law enforcement efforts in Tijuana, which was already the scenario of confrontations between the Arellano Félix brothers, leaders of the Tijuana Cartel, and Ismael “El Mayo” Zambada, one of the leaders of the Sinaloa Cartel. According to Blancornelas (2002), early eruptions of violence in Tijuana took place after a group of *sicarios* (hitmen) sent by the Arellano Félix brothers failed to assassinate “El Mayo” Zambada for refusing to pay a toll for transporting

drugs through their territory. In February 2002, Ramón Arellano Félix, the chief enforcer of the Tijuana Cartel, was killed in a shootout with authorities in Mazatlan, Sinaloa. One month later, the Army arrested Benjamín Arellano Félix who was hiding in the state of Puebla, one of the remaining strongholds of the PRI at the subnational level. The third brother, Eduardo Arellano Félix, remained the leader of the weakened Tijuana Cartel. Another important blow against Mexican DTOs was delivered through the apprehension of Osiel Cárdenas Guillén, leader of the Gulf Cartel, who dominated drug trafficking operations in the northeast of the country until his arrest in March, 2003. One of the key strategic moves made by Cárdenas Guillén was to recruit a group of elite forces from the *Grupo Aeromóvil de Fuerzas Especiales* (GAFES) of the Mexican Army (Osorno, 2012; Ravelo, 2009). Initially deployed to hunt down criminals, this group of elite military personnel switched sides and became the feared enforcers of the Gulf Cartel known as Los Zetas. The arrest of Cárdenas Guillén in 2003 caused a rupture between Los Zetas and the rest of the Gulf Cartel.

Initial attempts by President Fox to enforce the law against drug trafficking organizations were obscured by a major scandal. On January 19, 2001, Joaquín Guzmán Loera, known as *El Chapo*, escaped from a high security prison where he had been held since 1993 on a twenty-year sentence. The official version of his escape was that *El Chapo* received assistance from two prison guards who helped him to escape hidden in a laundry basket (Osorno, 2009, 193–198). Further investigations led to the interrogation of 71 officers who had collaborated in the escape (Procuraduría General de la República, 2001*a,b*). However, the veracity of this account is questionable. A different version claims that the escape occurred during a cursory visit to the prison by Jorge Tello Peón, a high level security officer, to investigate allegations of corrupt security guards. During the visit, Tello Peón ordered *El Chapo* and two other inmates to be moved to different cells which generated a disordered mobilization of

various police officers inside the penitentiary. Later that night, *El Chapo* walked out of the maximum security prison wearing a police uniform (Hernández, 2011, 290-293, 321-322). Following the scandal, no major authorities were arrested. Eight years later, *El Chapo* appeared in the Forbes list of billionaires (Bogan, 2009).

After the escape, *El Chapo* consolidated his leadership in the Sinaloa Cartel. Following the arrest or killing of several leaders of the other drug trafficking organizations, *El Chapo* took note of the weakened position of his main competitors and began a large scale operation to dominate drug trafficking routes in Mexico. The Sinaloa Cartel had already had run-ins with the Tijuana Cartel due to the rivalries between “El Mayo” Zambada and Ramón Arellano Félix. The Sinaloa Cartel intensified their trespasses into Tijuana Cartel territory. *El Chapo* also sent one of his chief enforcers, Arturo Beltrán Leyva, and a group of *sicarios* to conduct some initial incursions into the territory of the Gulf Cartel in the states of Tamaulipas and Nuevo León. The armed branch of the Gulf Cartel, Los Zetas, responded in kind and began conducting operations in the state of Michoacán, south of Sinaloa. Later, *El Chapo* also aimed his guns against the Juárez Cartel. The first hot-spots of violence between criminal organizations emerged in mid-2005 in the northeast part of the country and in the state of Michoacán (refer to the second map in Figure 4.9 in Chapter 4). In June of the same year, president Fox launched Operation “Safe Mexico” (*Operativo México Seguro*) to fight criminal organizations (Presidencia de la República, 2005).

During the first half of 2006, media attention was distracted from the early indications of violence emerging between criminal organizations and focused on the presidential election campaign. Competition was tight between the PRD candidate, Andrés Manuel López Obrador, who was mayor of Mexico City and the PAN candidate, Felipe Calderón. The PRI candidate remained in third position. The failed legal attempt of president Fox to topple López Obrador from his position as mayor of Mexico City set the tone for the electoral race. The media and the PRD made

repeated accusations against the overt support of Fox in favor of Calderón that resembled the old *PRI*ista selection by *dedazo* (Espinosa, 2011; Martínez et al., 2007; Notimex, 2006; Zárraga, 2006). López Obrador campaigned by advocating for redistributive policies while Calderón campaigned by presenting himself as “the president of employment”; The debate focused mainly on economic issues and security was barely mentioned in the agenda. The political atmosphere became more polarized after López Obrador raised the tone of his economic statements and conservative business sectors moved in to conduct negative campaigning against him.

On July 2, 2006, Felipe Calderón won the election by an unprecedentedly close margin of victory of 0.56 percent. Due to the narrow margin of victory López Obrador launched fierce allegations of election rigging. The ghost of electoral fraud characteristic of the PRI era hovered over the 2006 election. The doubt about the election jeopardized the achievements of the thirty-year struggle for democratization. This election represented the most profound political crisis in the short democratic history of Mexico. Followed by thousands of supporters, López Obrador immediately went to the central square of Mexico City, where he encouraged the crowd to defend his victory and called for a recount of the entire result under the slogan “*voto por voto, casilla por casilla*” (vote by vote, ballot box by ballot box) to clear away the doubts that clouded the election result. López Obrador launched a campaign of civil resistance and thousands of protesters rallied on the streets in several parts of the country to demonstrate against the electoral result. As a sustained effort of protest, López Obrador and his supporters closed the main avenue of Mexico City for a three-month period with a sit-in (British Broadcasting Corporation, 2006; McKenley, 2006).

The crisis reached its peak on December 1, 2006, when the PRD took over the stage of the Chamber of Deputies to prevent Calderón from taking the oath of presidential office. Outside the legislative building, about a thousand security forces, primarily from the Army and the secret service, placed barricades on the streets to

prevent protesters from entering Congress (Osorno, 2009, 301). Secret service offers had to punch through the crowd to rush Calderón onto the stage so he could take the oath. The entire “ceremony” lasted 10 minutes. There was no inaugurational speech, no applause, no celebration; only condemnation, catcalls, and clamor. The electoral crisis of 2006 is broadly identified by political analysts as severely damaging the legitimacy of President Calderón from the beginning of his administration (e.g. Álvarez Béjar, 2007; Castañeda, 2012; Castañeda and Aguilar, 2010; Pacheco, 2006).

A few days after taking office, on December 11, Calderón declared a full-scale offensive against organized crime and launched *Operativo Conjunto Michoacán* (Joint Operation Michoacan) consisting of the deployment of about 7,000 soldiers to conduct counter-narcotic activities in his native state of Michoacán. The next day, Calderón launched another operation for the states of Nuevo León and Tamaulipas on the northeast of the country. As indicated by several journalists, scholars and political analysis (e.g. Castañeda and Aguilar, 2010; Guerrero, 2010*a,b*, 2011*b*; Kenny and Serrano, 2012*b*; Osorno, 2009, 2012), during the campaign, Calderón had dropped no hint that security would be his top priority; his decision was forged in the heat of fierce allegations of election fraud and showed a narrow understanding of the precarious equilibrium among drug trafficking organizations. In the several interviews conducted in Mexico as part of this research, testimonies gathered from members of security forces, political actors, scholars, activists and political analysis broadly agreed that Calderón launched the war on drugs without a careful assessment of the capabilities of criminal organizations to retaliate; nor the judicial, military and intelligence capabilities of the Mexican security forces to meet the challenge; nor an attentive review of successful counter-narcotic strategies in other countries; and most importantly, there are no indications of a rigorous assessment of the different consequences that a full-fledged military campaign would have in terms of violence and insecurity for the population. Instead of a careful analysis based on accurate

information, it seems that the decisions was taken without necessary planning and in the midst of a political crisis.

Table 5.1 reports the total number of military operations conducted by the Mexican Army between December 2006 and December 2010 on the basis of data provided by (Secretaría de la Defensa Nacional, 2012). The Table indicates that Calderón deployed an unprecedented number of interdiction and harassment operations (IHO) to fight criminal organizations as well as several eradication operations (EO) to destroy plantations of illicit drugs. During this period, the Army conducted a total of 173 IHO and 91 EO operations, many of which were implemented during several months over various states. Calderón had declared a generalized war against *all* criminal organizations in the country (Presidencia De La República, 2010). This military mobilization had no precedent in modern Mexican history. The Army went out the barracks to conduct policing activities all over the country to fight an elusive, heavily armed, financially well-supplied and largely unknown enemy. The Mexican government had entered into a non-conventional war.

In addition, Figure 5.7 presents the annual budget for the different security agencies and programs used to fight organized crime in Mexico between 2000 and 2010. As the figure shows, the Army and the Ministry of Public Security (*Secretaría de Seguridad Pública, SSP*) which comprises the Federal Police experienced an unprecedented budget increase in 2007. In the period prior to the Mexican war on drugs between 2000 and 2006, the Army received an average annual budget increase of 4.2 percent and the SSP had an average increase of 8.8 percent in its annual budget. In contrast, after the onset of the war on drugs, the average budget increase between 2007 and 2010 for the Army was 14.3 percent and the SSP had a substantial increase of 39.3 percent in its average annual budget. The figure also shows that the Navy had an important increase in its budget, although it is less marked than the one of

TABLE 5.1

MILITARY COUNTER-NARCOTIC OPERATIONS CONDUCTED BY
THE MEXICAN ARMY BETWEEN DECEMBER 2006 AND
DECEMBER 2010

Starting year	Type of military operation	
	Interdiction and Harassment	Eradication
2006	2	0
2007	7	21
2008	26	32
2009	72	24
2010	66	14
Total	173	91

the Army and the SSP. Between 2000 and 2006, the average rate of annual budget increase for the Navy was 2.5 percent. In contrast, between 2007 and 2010, the average annual budget increase of the Navy by a rate of 15.3 percent. This indicate that the war on drugs launched by president Calderón in December 2006, largely relied in federal security forces, specially on the Army and the Federal Police. In contrast, a program to provide financial aid for security forces at state level known as *Fondo de Aportaciones para la Seguridad Pública* (FASP) reveals that the role of local security forces was marginal in the war on drugs. The time series of this program presented in the figure shows that FASP received the lowest allocation of financial resources. The average annual increase of FASP between 200 and 2006 was 7.4 percent and between 2007 and 2010 it had an annual increase rate of 8.8 poercent.

Perhaps, one of the clearest indicatives of the punitive strategy launched by Calderón is the lack of allocation of financial resources to the Office of the Attorney General (*Procuraduría General de la República*, PGR), responsible for the investigation and prosecution of federal crimes. As indicated in Figure 5.7, between 2000 and

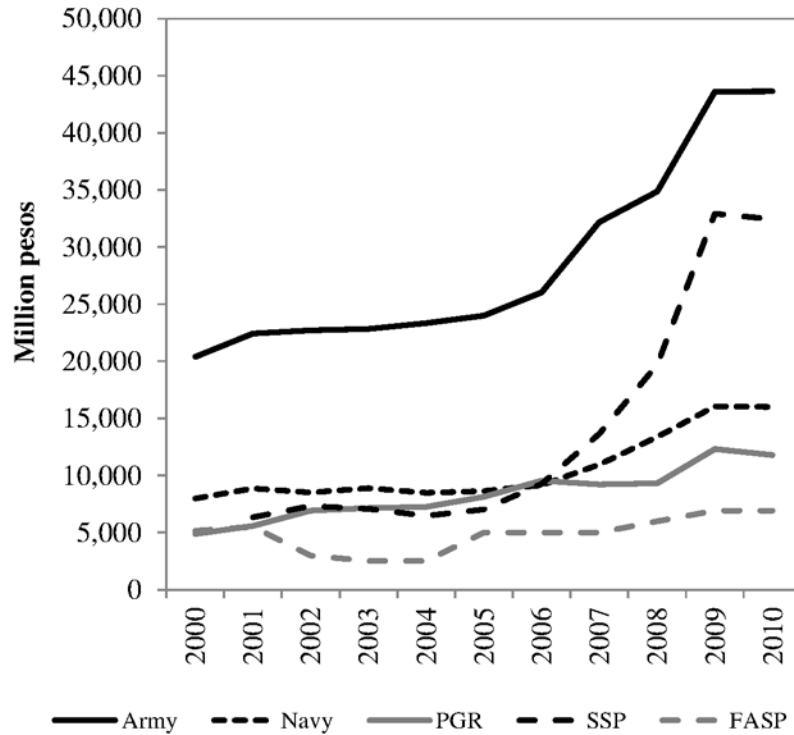


Figure 5.7. Annual budget for security agencies in Mexico 2000-2010

2006, the PGR had an average annual budgetary increase of 12.1 percent under the Fox administration. In contrast, between 2007 and 2010, the average budget increase of the PGR was of only 6.4 percent during the administration of president Calderón. Instead of launching an encompassing effort to fight crime by enforcing the law and having criminals trialed and sentenced, federal security forces went about using force to kill or arrest presumed criminals and to seize their properties without having them being properly processes by the judicial system. It seems that the punitive strategy prioritized “the law of force” over “the force of the law”.

It is hard to solid evidence about the counterfactual that if Calderón had won the election by a comfortable margin of victory without allegations of electoral fraud he would have not launched a full-fledged military campaign against criminal orga-

nizations. Similarly, it is hard to sustain the claim raised by some critics (Castañeda and Aguilar, 2010; Osorno, 2009) arguing that the paramount reason for launching the war on drugs was the legitimacy crisis at the outset of the administration. In any case, due to the magnitude of such decision, it is surprising that there are no reliable and robust documents, reports, analysis, evidence or testimonials justifying the characteristics, scale and scope for the security policies implemented by Calderón.

However, there are good theoretical and empirical reasons to claim that the electoral crisis of 2006 played a role – probably an important one – in motivating the massive deployment of the Army to fight crime. As discussed in Section 2.3.2 of Chapter 2, Goldstein (1978) provides a theory for understanding the decision of political leaders to engage in coercive behavior during political crisis challenges. According to his argument, increasing levels of political strain and social dissent are perceived by authorities as threats to their legitimacy, thus increasing their disposition to repress. The adoption of repressive policies is facilitated by the presence of *scapegoats* as suitable target groups who can be readily repressed due to lack of opposition from political elites. In addition, the well-known “rally-around-the-flag” effect proposed by Muller (1970) argues that politicians usually reap political benefits from deploying aggressive policies and displaying an image of strong leadership and resolve, which helps to boost their approval ratings. The theoretical insights proposed by Goldstein and Muller can provide an understanding of why Calderón reacted with an exceptional display of force in the midst of an exceptional legitimacy crisis. Certainly drug trafficking organizations showed early signs of violence and public insecurity was becoming an important concern for the population. In this context, they could readily be used as *scapegoats*, as fighting crime would be approved by the public and there would be no opposition from other political parties. Moreover, public security was not an issue that was polarized along party lines. Combating criminal organizations would thus provide a public good highly rewarded by the population and would have

the advantage of not further polarizing the already critical political scenario in the aftermath of the electoral crisis. Launching a crusade against crime “like never before” would also improve his approval rankings by enhancing his image as a clean political actor. Calderón immediately saw the political benefits of deploying the military in Operation Michoacán as the public opinion polls revealed that 80 percent of respondents supported the move (Kenny and Serrano, 2012*b*, 73). Calderón repeatedly portrayed himself as a committed leader taking a moral stand in a matter that previous administrations had not. In addition, by deploying the Army, Calderón would be using one of the most respected and trusted political institutions of the country, thus reaping some benefits from the good image of the Army.¹⁴ In any case, the deployment of the Army was also indicative of the failure of considering other strategies to control criminal organizations. As elaborated earlier, the alternative of imposing order and discipline on criminals through political incentives was no longer feasible in a democratic context.

The unprecedented military mobilization ordered by Calderón had a massive disturbing effect on the already precarious equilibrium among criminal groups. The recurrent attacks from the state security forces against criminal organizations triggered a wave of violence against government forces. Groups of heavily armed men attacked municipal and state police officers, as well as Federal Police and Army troops. Mayors were also targeted (Rios, 2012*b*) and *sicarios* also killed the leading candidate for governor of Tamaulipas (Camarena, 2010).

The most dramatic eruption of violence took place in battles between rival criminal groups. The trends of drug-related violence described in Chapter 4 show the massive escalation and diffusion of violence between drug trafficking organizations. In congruence with the theoretical expectations discussed in Chapter 2, the disrupt-

¹⁴Public opinion studies consistently report that the Army is the second most trusted institution in Mexico, just after the Church (Mitofsky, 2012; Moreno, 2010; Parametría, 2012).

ing effect of counter-narcotic operations weakened some criminal organizations and indirectly empowered their rivals, thus motivating the invasion of their territories. The full-fledged military campaign launched by Calderón against all criminal groups generated an enormous wave of violent competition among criminal organizations fighting to control strategic territories. During this period, the number of criminal organizations also increased. Guerrero (2011*b*) states that before Calderón launched the crusade against drugs there were only six main cartels and about 30 minor criminal groups in the country; by the end of 2010, the number of cartels had risen to 12 and the number of local organisations proliferated to 114. Confrontations between criminal groups not only became more frequent; the brutality of their tactics also increased. As stated by Duran-Martinez (2012), the old *modus operandi* of drug-related killings consisting of discrete executions and silent disposal of the bodies was replaced by an overt flaunting of brutality relying on torture, mutilation, decapitation and public display of human remains.

The arrests and killings of prominent drug lords destabilized the structure of criminal groups, thus generating internal struggles. Lower ranks tried to shoot their way up as those above them also employed violence to impose discipline. Victory by either side often triggered bloodshed within the organization. If no group managed to impose on its rivals, the situation usually led to the split of the organization. Those splits generated overt confrontations in which some criminals forged alliances with their previous rivals to fight against their former partners. Following the old proverb “the enemy of my enemy is my friend,” the map of criminal organizations became highly unstable with the emergence and fracture of criminal groups that expanded and contracted their territories while creating and breaking alliances.

The escalation of violence also generated a terrible social cost. Armed clashes occurred in public streets during peak hours, in shopping centers, in front of schools and universities, in bars and music festivals. Innocent bystanders were killed in the cross-

fire between security forces and criminals as well as in confrontations among criminal groups. But civilians were not only killed randomly. The wave of violence came accompanied with a wave of kidnappings as criminal organizations took advantage of the general mayhem to collect ransom. Kidnappings were initially targeted against prominent businessmen (Duarte, 2008) but later extended to the middle class. Even illegal immigrants from Central America trying to make their way up to the U.S. became targets of mass kidnapping and extortion. The large sums of ransom income were also complemented by money from day-to-day racketeering affecting up to 36 percent of the economy (American Chamber, 2013). The escalation of drug violence showed other features characteristic of large humanitarian crises such as the forced displacement of about 160 thousand people from their communities due to violent confrontations between criminal groups (CNN-Editor, 2012; Notimex, 2012). Journalists conducting investigations into drug-related violence were severely targeted by criminal organizations, putting Mexico above Afghanistan at the top of the list of the world's most dangerous countries for journalists (Article 19, 2013). However, civilians not only suffered by the hand of criminal organizations. The deployment of the Army for conducting policing activities also opened the door for systematic violations of human rights that remain largely in impunity (Daly, Heinle and Shirk, 2012) and leading to accusations of negligence against government authorities for not taking action on this issue (Human Rights Watch, 2011). An obscure consequence of the escalation of violence against civilians is the dramatic number of disappearances, which finally attracted the attention of the United Nations Human Rights (2011) and Human Rights Watch (2013), which exercised pressure on the Mexican government until government authorities finally acknowledged the disappearance of up to 25,000 people during the Calderón administration (Torres, 2013). It is still unknown what proportion of these disappearances were conducted by members of criminal organizations or by government security forces. What is known is that this figure of

disappearances is comparable to the number of forced disappearances undertaken by military dictatorships in South America in the 1970s, yet there are no precedents of such horrific figures in contemporary democratic regimes in the region.

The historical process tracing analysis conducted in this chapter shows that the long decades of political control imposed by an hegemonic party capable of maintaining order and peace among criminal organizations are gone. The failure to impose order through political mechanisms and the deleterious consequences of generalized, punitive operations against drug trafficking organizations led to a Hobbesian state of war of all-against-all.

CHAPTER 6

UNDERSTANDING DRUG VIOLENCE IN MEXICO

6.1 Introduction

The previous chapter analyzed the historical process that favored the emergence, consolidation, erosion and collapse of order and specifies the circumstances that led to the onset of the Mexican war on drugs. This chapter provides the main quantitative assessment for the expectations derived from the theoretical model about the escalation and geographic concentration of violence among rival criminal organizations. The central dependent variable of this section refers to the levels of violent competition among criminal organizations.

The first section of the chapter surveys extant explanations of organized criminal violence mostly emphasizing the relevance of macro-structural factors. The statistical assessment evaluates the analytical leverage offered by these structural determinants. The results reveal that with the exception of territorial variables and economic factors, other macro-structural explanations offer limited explanatory power or are wrong. In

general, the structural model of conflict provides limited insights to understand the wide and rapid variation of violent competition among criminals at the micro level.

The second section evaluates the main hypotheses derived from the theoretical framework. Based on the conflict interactions between the state and criminal organizations specified by the theory, the empirical assessment incorporates an “interactive approach” to reflect these relationships. To do so, the statistical analysis builds on the set of structural explanations and includes additional variables of law enforcement and criminal retaliation in the model of violent competition among criminal groups. To overcome the challenges of endogeneity generated by distinct, yet overlapping types of violence, the identification strategy relies on an Instrumental Variables (IV). This approach allows to generate reliable estimates of the effect of law enforcement on violence among criminals that overcome the problem of reciprocal causation. The research design considers measures of democratization and political strain as instrumental variables capable of generating a plausibly exogenous variation of the levels of law enforcement, which then generates an effect on the levels of violent competition among criminals. This quasi-experimental research design not only represents a plausible identification strategy, but also conforms with the process of conflict specified by the theoretical framework, thus favoring the alignment between the ontology of the theory and the methodology used for testing it.

Results indicate that the measures of democratization and political strain increase the levels of law enforcement, which then have a profound disrupting effect and trigger waves of violent competition among rival criminal groups. These results are consistent across different model specifications evaluating the effect of violent and non-violent tactics on the levels of violence among criminals. The statistical analysis also reveals that criminal violence tends to cluster around strategic territories favorable for the reception, production and international distribution of illicit drugs.

6.2 Structural Factors

This first section analyzes the explanatory power of structural factors for understanding the escalation of violent competition among criminal organizations. As discussed in Section 2.2, the literature on political violence, criminology and economics has identified several structural variables as determinants of violence, including degree of economic development, levels of corruption, characteristics of drug markets, and social structures. In addition, the theoretical model presented in Chapter 2 emphasizes the relevance of drug-valuable territories as key structural factors for understanding the dynamics of violence among DTOs. The theoretical explanation also indicates the relevance of criminals' ability to inflict military damage on their rivals and their ability of recovering from it. These factors are also incorporated in a baseline model to analyze the effect of structural factors on the dynamics of violent competition among criminal organizations.

6.2.1 Hypotheses and Operationalization

Perhaps one of the most important factors associated with criminal behavior and political violence is poverty. There is a broad consensus between rationalist and sociological theories of crime, as well as among conflict scholars that low levels of economic development are associated with higher benefits for engaging in crime or political violence (Becker, 1968; Collier, 2000; Collier and Hoeffler, 2004; Fajnzylber, Lederman and Loayza, 2000*b*; Fearon and Laitin, 2003; Hirschi, 1969; Merton, 1938, 1957; Weinstein, 2007). There are competing explanations about how and why poverty is associated with criminal and violent behavior, but the empirical relationship is remarkably robust. This can be stated in the following hypotheses:

(H_9) Low levels of economic development are positively associated with violent competition between criminal organizations.

The operationalization of poverty is based on two measures. The variable *poverty* measures the level of economic development at the municipal level on a yearly basis as reported by Consejo Nacional de Evaluación de la Política de Desarrollo Social (2012). This measure is a multidimensional index of thirteen indicators including income, education, health, social security, living environment, service provision, food access, and other multidimensional measures of poverty.¹ This poverty indicator is the most robust and fine-grained variable used to measure the level of economic development in Mexico. High values of the variable indicate high levels of poverty at the municipal level. The second variable used for measuring poverty is the yearly *Gross Domestic Product (GDP) at state level* measured in Mexican pesos as reported by Instituto Nacional de Estadística y Geografía (2011*c*). In order to improve the fit of the model, the statistical analysis uses the natural logarithm of state GDP. High values of GDP indicate higher levels of economic development at the state level.

Corruption is another important factor associated with violence. However, as discussed in the literature review, the relationship between corruption and violence between criminal organizations is not clear. Some argue that high levels of corruption are associated with low levels of violence among DTOs because it means the organisations have a peace agreement with the state. Others argue that corruption leads to criminal violence because it allows DTOs to operate with impunity. These two arguments can be stated the following terms:

($H_{10.1}$) High levels of corruption are positively associated with violent competition between criminal organizations.

($H_{10.2}$) High levels of corruption are negatively associated with violent competition between criminal organizations.

Since corruption takes place in secrecy, it is difficult to observe it in a systematic way. In order to measure the levels of corruption, the empirical strategy relies on

¹For a detailed description of the indicators and the methodology of aggregation, see Consejo Nacional de Evaluación de la Política de Desarrollo Social (2010).

the National Index of Corruption and Good Governance provided by Transparencia Mexicana (2012), the Mexican chapter of Transparency International. This index of corruption is based on a large national survey, representative at the state level, asking respondents about their experience of corruption victimization in a wide variety of public services.² The specific variable of *corruption* used in this research is the estimated percentage of the population that reported being asked for a bribe by police in order to prevent being arrested.³ Higher values of this variable are associated with high levels of corruption.

Researchers on the economics of crime broadly agree that criminal organizations are mostly driven by the enormous economic benefits of illicit markets (Gambetta, 1993; Reuter, 1989; Schelling, 1971). The profits are so large that criminal organizations are willing to use violence to protect or expand their access to those rents. In particular, Reuter (1989) argues that the threat of violence is a key element for enforcing agreements in illegal markets because, by definition, these economic sectors are not protected by legal institutions of conflict resolution. This relationship can be expressed in the following way:

(H_{11}) The high value of drug markets is positively associated with violent competition between criminal organizations.

Although the intuition behind the economic motivation of using violence is straightforward, it is not easy to measure the size or profitability of illegal drug markets. The two key ingredients for determining the size of a market are the quantity of goods being traded and their price. Some efforts have been made to measure the size of the illegal drug market in the U.S. to collect information about the value of this market.

²This survey was conducted in 2001, 2003, 2005, 2007 and 2010 in each state of Mexico. I interpolated each of the measures to give year-by-year values for the complete 2000–2010 time range analyzed in this research.

³For a robustness check, I used other measures of police corruption related to avoiding getting a ticket for transit violations or preventing a car from being towed. These alternative questions led to similar results as that used in the rest of the chapter.

Unfortunately, there are no reliable measures of the amount of drugs being smuggled into the U.S. from Mexico. Official estimates suggest that drug revenues of Mexican DTOs range from \$18 billion to \$39 billion dollars (U.S. Department of Justice, 2008). However, as indicated by Kilmer et al. (2010) and Kilmer and Liccardo Pacula (2009), these figures should not be taken seriously because they do not survive basic methodological scrutiny or validation checks. Perhaps, the most transparent and accurate estimate of the profits made by Mexican DTOs ranges from \$1.5 billion to \$2 billion dollars (Kilmer et al., 2010). However, despite the methodological rigor used in constructing this estimate, the calculation is based on too many assumptions to be reliable. In addition, it is not possible to use this estimate in the context of this research because the estimation is not available for the time span analyzed in this research.

In order to assess the value of drug markets in a more objective and reliable way, this research uses two variables. One measure is based on the price of drugs in the U.S. market collected by the U.S. government. The Office of National Drug Control Policy has been measuring the retail price and purity of various drugs since the 1980s. In general terms, the methodology consists of using covert agents to buy drugs such as marijuana, cocaine, crack cocaine, heroin, and methamphetamine in several U.S. cities. After measuring the quality of each drug in specialized laboratories, the data is used to generate an estimate of the average price per pure gram (Office of National Drug Control Policy, 2004). This research uses the most up-to-date time series of the price of cocaine reported by the Drug Enforcement Administration (2012). The variable *cocaine* provides information about the price of a gram of pure cocaine in U.S. dollars between 2000 and 2010.⁴

⁴The measure of cocaine is preferred over other drugs because according Kilmer et al. (2010) the largest share of revenues of Mexican DTOs come from cocaine, and not from marijuana. According to these authors, about 80 percent of the cocaine consumed in the U.S. enters the country from Mexico, which represents an estimated export revenue of about \$3.4 billion dollars for Mexican DTOs.

A second measure of the value of drug markets is focused on the levels of local drug consumption. Assessing drug consumption in Mexico is crucial because President Calderón broadly justified launching the war on drugs indicating that there were worrying levels of drug prevalence in Mexico. This official discourse was reflected in a national awareness campaign using the slogan “To prevent drugs from reaching your children” (*“Para que las drogas no lleguen a tus hijos”*) (Secretaría de Salud y Secretaría de Desarrollo Social, 2009). The core message of the campaign is that Mexico has such a severe problem of drug consumption that it causes of the wave of violence between criminal organizations and erodes the social fabric. However, the available data does not support this claim. According to the latest National Survey on Addictions conducted by the Health Ministry in 2011, only 1.2 percent of the population reported using marijuana at least once in the previous year, 0.5 percent reported using cocaine, 0.1 percent crack and 0.2 percent methamphetamine (Secretaría de Salud, 2012*b*). These estimates are so small that they fall completely within the overall statistical error of the survey, calculated at 3.27 percent. Moreover, the methodological report of the National Survey on Addictions warns that “. . . this study is not designed for estimating low prevalence, which can occur when measuring very rare events.” Farther on, the document recommends that readers should be cautious about estimates smaller than 2 percent, because they are not distinguishable from the design error of the survey. Therefore, based on the government’s own data, it is not possible to conclude that Mexico has a significant domestic problem of drug consumption.⁵ Besides the 2011 survey, there are other two other National Surveys on Addictions conducted in 2002 and 2008. With data from only three years, there are too few data points and their estimates are so small that it is not possible to use

⁵Despite the official discourse justifying the war on drugs by claiming a substantial increase in drug consumption, the evidence does not support the claim. In fact, the media often criticized the government for delaying and even hiding the results of the National Survey on Addictions 2011 (Service, 2012).

these measures to assess levels of drug consumption in Mexico in a systematic and reliable way.

This research thus relies on an alternative measure based on the records of hospitalizations due to consumption of illegal drugs. The intuition behind this measure assumes that higher levels of drug consumption should generate more cases of drug intoxication. Of course we cannot observe individual drug consumption systematically, but we can measure the number of hospitalization cases caused by drug poisoning. Using this proxy relies on the plausible assumption that observed cases of intoxication and unobserved drug consumption are equally distributed. This data is reported by the National Health System (Secretaría de Salud, 2012a) and has been used by other authors as the most reliable proxy of drug consumption in Mexico (Madrazo and Guerrero, 2012; Rios, 2012a). The variable *drug markets* measures the total number of hospital discharges from the morbidity statistics in which the patient was diagnosed with intoxication by narcotics.⁶ The data is collected by all state clinics and hospitals across the country and reported monthly at the municipal level. The diagnostic is based on the International Classification of Diseases (ICD-10) of the World Health Organization (2010a) and uses the F10–F19 codes for mental and behavioral disorders due to the use of psychoactive substance including opioids, cannabinoids, cocaine, hallucinogens or volatile solvents (World Health Organization, 2010b). Figure 6.1 shows the total number of hospital discharges by type of drug between 2000 and 2010 at the national level. The measure of *drug markets* used in this research aggregates the number of hospital discharges caused by all drugs at the municipal level on a monthly basis. This figure only presents the disaggregated data by drug type for illustrative purposes. The trends indicate that the use of drugs in Mexico is

⁶Hospitalization discharges occur when the patient leaves the hospital dead or alive. If the patient is still alive at the time of leaving the facility, the event is recorded under the morbidity statistics. If the patient is dead when leaving the hospital, the case is recorded under the mortality statistics. The measure used in this research uses only morbidity statistics.

remarkably stable. Ironically, as the wave of violence increased in 2007, the number of hospitalization cases due to cocaine use declined. There is a stable trend at low levels in intoxication caused by opium, cannabis, hallucinogens and solvents. The only time series showing a marked spike in 2010 is the use of multiple or other drugs. Appendix A.8 shows that this spike is concentrated in Mexico City, but does not constitute part of a generalized trend of increased drug consumption in the country. Based on the most reliable indicators of local drug markets, there is no evidence of a substantial increase of drug consumption in Mexico as the official discourse claims.

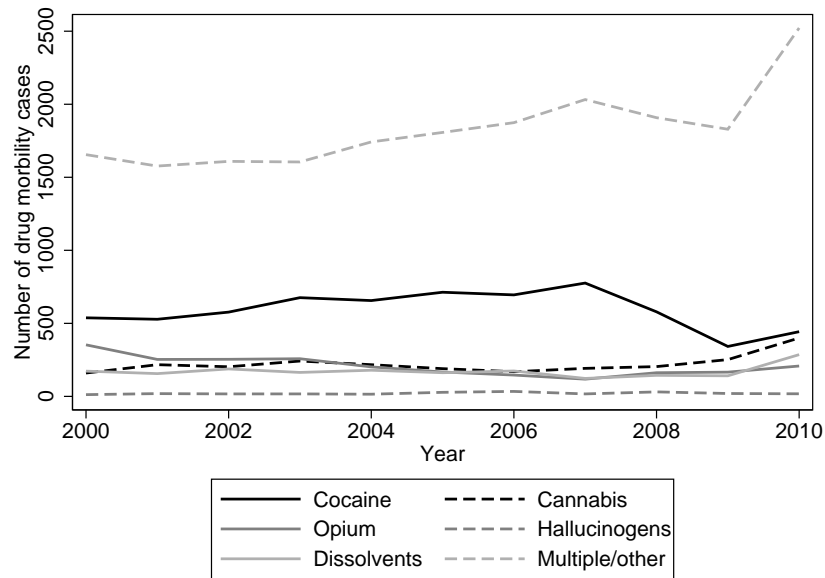


Figure 6.1. Drug markets in Mexico: hospital discharges diagnosed with intoxication by narcotics

The erosion of the social fabric has been proposed as another factor leading to criminal behavior. According to Putnam (1993), social capital is defined as the system

of trust, norms and networks that improve the efficiency of society by facilitating coordinated actions. As discussed in the literature review, there is a broad consensus that low levels of social capital are associated with higher rates of crime. The following hypothesis formulates this relationship:

(H_{12}) The erosion of social structures is positively associated with violent competition between criminal organizations.

Despite the appealing intuition behind social capital, it is difficult to measure such a broad concept in a systematic and reliable way. Putnam himself uses dozens of structural and behavioral indicators to capture his concept (Putnam, 1993, 2000). For example, in order to assess the relationship between crime and social capital, Paras (2007) uses public opinion data to measure the social capital based on questions about individual trust, trust in government institutions, organizational membership, changes in behavioral patterns, and attitudes towards democracy. Unfortunately, in Mexico there are no surveys measuring these concepts in a comparable and systematic way between 2000 and 2010 with data representative at the state level. Instead of focusing on a broad concept such as social capital, the operationalization of this hypothesis relies on two narrower aspects of social capital associated with changes in the traditional family structure. Variable *divorces* measures the annual number of divorces registered at the municipal level between 2000 and 2010 reported by Instituto Nacional de Estadística y Geografía (2011c). According to the conservative perspective proposed by Hirschi (1969), divorce constitutes a change in the traditional family structure that might hinder the instilling of traditional norms of self-control in their members, which may be conducive to engagement in criminal behavior. The second variable used to operationalize this hypothesis is *young motherhood*. This variable measures the proportion of females between the age of 12 and 19 years old who are mothers of at least one child. The measure is constructed from census data at the municipal level reported by Instituto Nacional de Estadística y Geografía (2011c). The

link between the erosion of the traditional family structure and organized criminal violence was also essential for Calderón's justification for the war on drugs as reflected in the National Security Strategy. One of the three core objectives of the strategy is "to rebuild the social fabric eroded by the lack of opportunities for young people and family, and social disintegration, as well as the loss of values." (Presidencia de la República, 2012).

The theoretical model discussed in Chapter 2 also indicates the relevance of the strategic value of certain territories as key structural determinants for understanding violence between criminal organizations. The central intuition of the contest success model of territorial competition is that DTOs will devote more resources to defending and capturing strategically valuable territories. Some areas are so valuable that criminals would be willing to kill and die to controlling them. Section 2.4 presented this hypothesis in the following terms:

(H_8) Higher territorial value is positively associated with higher levels of violent competition between criminal organizations.

The strategic importance of a territory is determined both by the objective characteristics of the territory and its subjective value as assigned by each DTO. This subjective appreciation might depend on the production function, organizational capability and area of specialization of each criminal group. Unfortunately, it is not possible to measure the subjective value assigned by organized criminals to each specific territory. For that reason, the operationalization of this hypothesis is limited to a number of objective characteristics that might influence the strategic value of a territory. These measures focus on the geographic characteristics of some areas that might be favorable for the production, reception and distribution of illicit drugs. Variable *drug production* measures the production of illegal marijuana and poppy crops on a four-level scale (none, low, medium and high) detected by the Mexican Army at the municipal level (Secretaría de la Defensa Nacional, 2011). Variables

Gulf and *Pacific* identify municipalities located along the Gulf of Mexico and the Pacific coasts. These areas are favorable for the reception of maritime and aerial drug shipments from Central and South America. Variable *Gulf* takes the value of 1 for the strip of three adjacent municipalities located along the Gulf of Mexico and 0 otherwise. Variable *Pacific* is also a dichotomous measure for municipalities located along the Pacific coastline. Variable *North* identifies territories favorable for international distribution of drugs. Municipalities located along the Northern border are key points of entry to the U.S. drug market. For this reason, these areas are highly valuable. This variable takes the value of 1 for the strip of three contiguous municipalities located along the Mexico–U.S. border. Figure 6.2 maps these territories favorable for the production, reception and distribution of illicit drugs.

Interviews conducted in the cities of Juarez, Chihuahua and Tijuana revealed the need to include one additional territorial variable to incorporate the impact of the 9/11 terrorist attacks on border security. After the 9/11 attacks, tightened border security measures implemented by the U.S. government made drug trafficking more difficult. Reducing the flow of drugs may have increased the price of the drugs successfully smuggled through the border, thus generating more incentives to fight for those sources of revenue. Another mechanism suggests that the September 11 terrorist attacks particularly increased the difficulty of smuggling drugs by air and sea, thus increasing the strategic importance of land transportation. This improved the relative leverage of Mexican DTOs vis-à-vis Colombian cartels, who were charged larger fees for smuggling through Mexican territory. As a consequence, the value of the entire Mexican territory increased because controlling the reception, transportation and distribution points became more profitable for Mexican DTOs. Another mechanism suggest that the slow-down in drug smuggling into the U.S. after the 9/11 attacks turned several northern municipalities into storage regions. The accumulation of drugs waiting to be smuggled increased the strategic importance of controlling these

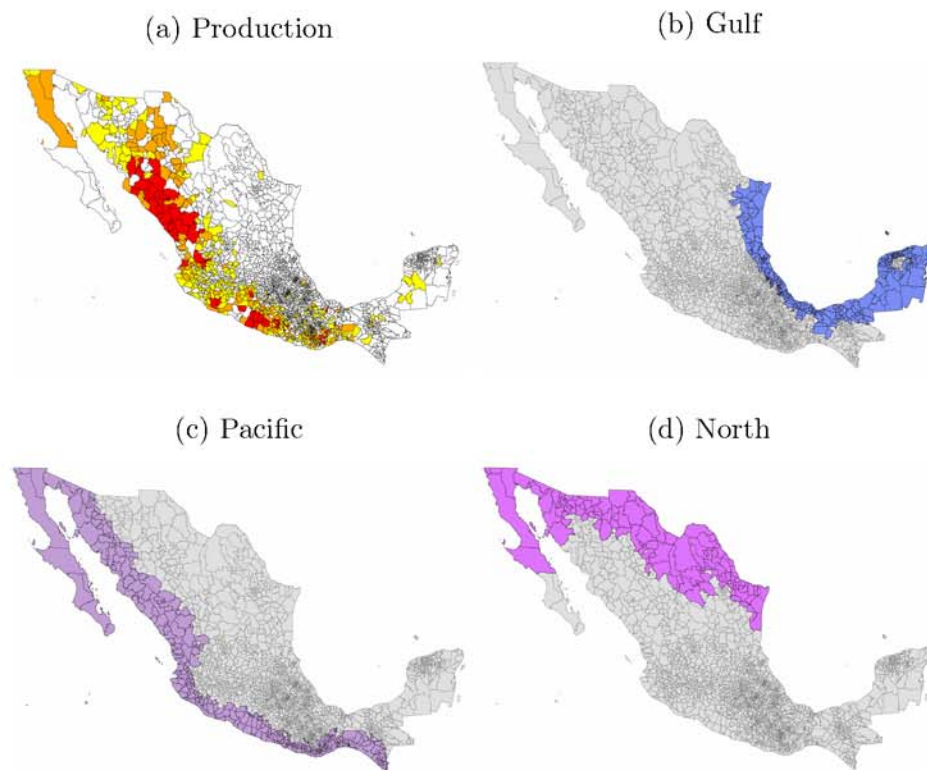


Figure 6.2. Drug valuable territories

territories, thus motivating the use of violence for capturing and defending them. Unfortunately, it is not possible to observe these mechanisms at work. However, if any or some of these mechanisms operated following the 9/11 attacks, we should be able to observe an increase of violence among criminal organizations. To evaluate this claim, variable *9/11* takes the value 1 after September 11, 2001 and 0 otherwise.

The theoretical model also addresses the relevance of criminals' ability to cause military damage and their ability to recover from an attack. According to the contest success model discussed in Chapter 2, criminals use their military strength and recovery capabilities to push and pull on the relative military balance that enables them to control or impedes them from controlling strategic territories. Section 2.4 presented this argument in terms of the following hypotheses:

(H_6) Greater ability to inflict damage is positively associated with higher levels of violent competition between criminal organizations.

(H_7) Greater capability of recovering from an attack is positively associated with higher levels of violent competition between criminal organizations.

Measuring the potential of criminal organizations to inflict military damage is difficult. This research relies on the variable *rifles* measuring the number of assault rifles produced in the U.S. Data for this variable comes from the Bureau of Alcohol, Tobacco and Explosives (2012) and it is measured in terms of million rifles annually produced. Although it is not the ideal measure, this variable serves as a proxy of the firepower of criminal organizations. The increasing availability of weapons with military characteristics such as automatic chargers, detachable magazines with multiple rounds, grenade launchers, and high-power rifles capable of piercing armored vehicles represent a substantial increase in the firepower of criminal groups. These types of weapons available to criminal organizations largely outstrip the weapons that municipal and state police forces are generally equipped with. In addition, the acquisition of this type of weaponry by one criminal group is likely to generate an arms race against their rivals. As indicated by Dube et al. (2013), the role of assault weapons in drug violence in Mexico became particularly important following the end of the Federal Assault Weapons Ban in 2004. The expiration of the ban increased the production of rifles and facilitated gun smuggling into Mexico, which substantially increased criminal firepower and led to higher murder rates after 2004. As Figure 6.3 shows, the production of assault weapons in the U.S. substantially increased after the expiration of the ban.

According to the theoretical model, criminal organizations can alter the relative military balance by causing damage to their rival's military capabilities or by effectively recovering from an attack. The empirical assessment in this research uses a measure of unemployment as a proxy for assessing criminals' recovery capabilities. The intuition is that high unemployment rates increase the human reserve available to

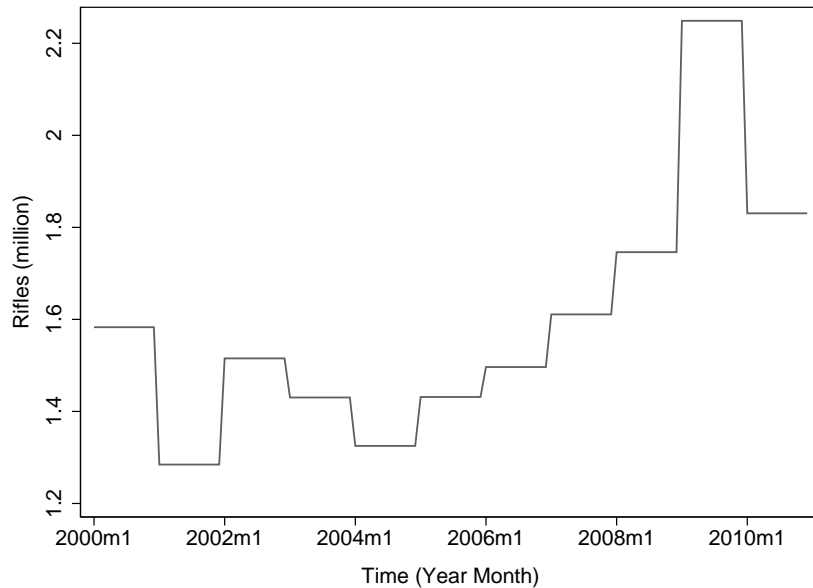


Figure 6.3. Annual production of assault weapons in the U.S.

criminal organizations, thus facilitating the replacement of casualties. This intuition is supported by research on criminal behavior and rebel recruitment indicating that higher levels of unemployment are associated with higher crime rates and participation in political violence (Fajnzylber, Lederman and Loayza, 2002*b*; Weinstein, 2007). The variable *unemployment* measures the percentage of unemployed population at state level on a quarterly basis with data from Instituto Nacional de Estadística y Geografía (2011*a*). As shown in Figure 6.4, Mexico experienced a substantial increase in unemployment in 2009 when the U.S. economic crisis affected the Mexican economy. In March of the same year, Mexico also suffered a severe economic shock caused by the outbreak of the AH1N1 Influenza crisis which exacerbated already high rates of unemployment. These high unemployment levels might be associated with the dramatic increase in levels of violence between criminal organizations in 2009 and 2010.

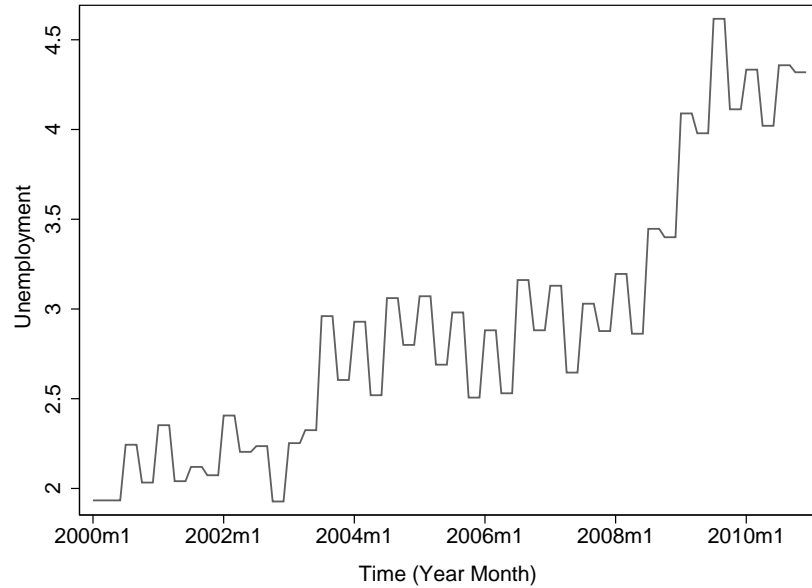


Figure 6.4. National average of unemployment rate on a quarterly basis

6.2.2 Model Specification

The statistical analysis evaluates the effect of these structural factors on violence between criminal organizations. The dependent variable used in the empirical assessment corresponds to the variable *competition* discussed in Chapter 4. This variable comprises the number of violent events between rival criminal organizations. The unit of analysis is at the municipality–day level and the model considers all municipalities of the country on a daily basis from January 1, 2000 to December 31, 2010. As shown in Figure 4.2, the dependent variable is distributed in a negative binomial function with hyper-dispersion. This indicates that in most municipality–days there are no events of violence between criminal organizations, but there is a handful of cases with high levels of violent competition. For that reason, the model consists of a negative binomial model for panel data with random effects and errors clustered by municipality. The decision to use random effects (RE) over fixed effects (FE) is informed by the theory, according to which violence is concentrated more

in strategic territories. Since the geographic location is temporally invariant, an FE model would exclude territorial variables from the estimation, thus eliminating the counterfactual and generating omitted variable bias. In contrast, an RE model incorporates territorial variation across units to estimate theoretically relevant variables. The following equation specifies the structural model of violent competition between criminal groups:

$$\mathbf{Y}_{it} = \alpha' + d_1\mathbf{p}_{it} + d_2\boldsymbol{\tau}_{it} + d_3\mathbf{r}_{it} + d_4\mathbf{u}_{it} + d_5\mathbf{c}_{it} + d_6\mathbf{d}_{it} + d_7\mathbf{s}_{it} + \mu'_{it}. \quad (6.1)$$

where \mathbf{Y}_{it} represents violent competition among DTOs in municipality i on day t ; \mathbf{p}_{it} is a vector of poverty variables including *poverty* and *State GDP*; $\boldsymbol{\tau}_{it}$ is a vector of territorial variables including *drug production*, *Gulf*, *Pacific*, *North* and *9/11*; \mathbf{r}_{it} is a measure of the production of *rifles*; \mathbf{u}_{it} is the measure of *unemployment*; \mathbf{c}_{it} is a measure levels of *corruption*; \mathbf{d}_{it} a vector that includes the price of *cocaine* and *drug markets* measured by hospital discharges; and \mathbf{s}_{it} measures social fabric by a vector including variables of *divorce* and *young mothers*. Scalars d_{1-7} are the coefficients associated with each covariate, and μ'_{it} contains the error terms.

For the sake of simplicity, let \mathbf{X}_{it} be a vector of all exogenous covariates and let δ' be a vector of scalars with their corresponding coefficients. In consequence, equation (6.1) can be expressed as:

$$\mathbf{Y}_{it} = \alpha' + \delta'\mathbf{X}_{it} + \mu'_{it}. \quad (6.2)$$

6.2.3 Statistical Results of the Structural Model

This section presents the results of the statistical model assessing the effect of structural factors on violent competition between criminal groups. Models 1–5 in Table 6.1 sequentially introduce the set of variables corresponding to each group of

covariates. For the sake of simplicity, the discussion of results is focused on Model 5 presenting the full model specification. It is important to note that the coefficients in the regression tables of this chapter are expressed in terms of the log of expected counts, while the interpretation of results and the graphs are expressed in terms of the number of expected events times the mean.⁷ Also, note that the sign and magnitude of coefficients are remarkably stable across models. Another characteristic of the results is the high statistical significance of the estimates. With “big data” (very large data sets), it is not unusual to have highly significant estimates. This is due to one of the most essential assumptions of statistical analysis: *the central limit theorem*. This theorem states that if we have a sufficiently large population sample from a true population with limited variance, the mean of all population samples will be approximately equal to the mean of the true population and, as the number of observations increase, the distribution of the sample means will approximate a normal distribution. One of the implications of the central limit theorem is that if the population sample is extracted from several other uncorrelated draws, all of them “contaminated” with random error, the error of the population sample tends to be normally distributed as the number of draws increase. This indicates that as the number of observations in the population sample increase, the mean of the population sample approaches the mean of the true population. In other words, there is less difference or “error” between the mean of the sample and the true population. Thus, having a large number of observations usually enables high levels of certainty about the results without inducing bias in the estimates.

⁷The description of the data presented in Chapter 4 shows that the events of violence are anomalous episodes. Since the database has 9.8 million observations and there are no events of violence for most municipality–days, the average or expected number of events of violence among DTOs is very low; 0.005 events per municipality–day. In order to provide a more intuitive interpretation of the results, the discussion of findings is expressed in terms of the number of expected events times the mean. For example, if the mean of Y is 0.005 and a given change in X generates a predicted increase of 0.015 in Y , this can be expressed as: the given change in X is associated with a threefold predicted increase in Y over the average number of events.

The findings resulting from Model 5 shown in Table 6.1 provide valuable insight that contradicts some of the key explanations of violence and help put in perspective other factors often associated with high levels of criminal behavior. The most striking finding of the structural model is that higher levels of economic development at the municipal and state levels are associated with more intense violence between DTOs. This finding contradicts dominant theories of large-scale political violence emphasizing the role of poverty to explain violent behavior, thus suggesting the need to further analyze the distinction between rebels and criminals suggested in Section 1.2. The statistical analysis also provides strong support for the relevance of territorial value suggested by the theoretical model. In general, violence between DTOs is more intense in areas favorable for the production, reception and distribution of drugs. The results also provide support for the relevance of military damage and recovery capability suggested by the theoretical explanation. Another surprising finding is that a reduction in drug prices is associated with higher levels of violence between DTOs. In addition, the model reveals that changes in the traditional family structure have a modest negative effect on violence. Finally, the results question the centrality of corruption and local drug markets as key explanatory factors for understanding the wave of criminal violence; these variables report the expected positive sign but the magnitude of their effect is small.

TABLE 6.1

STRUCTURAL DETERMINANTS OF VIOLENT COMPETITION

AMONG DTOs

	(1)	(2)	(3)	(4)	(5)
Poverty	-0.05*** (0.02)	-0.25*** (0.02)	-0.20*** (0.02)	-0.20*** (0.02)	-0.20*** (0.02)
State GDP log	1.96*** (0.02)	1.73*** (0.02)	1.01*** (0.02)	1.04*** (0.02)	1.05*** (0.02)
Drug production		0.09*** (0.01)	0.18*** (0.01)	0.19*** (0.01)	0.18*** (0.01)
Gulf		0.38*** (0.05)	0.48*** (0.04)	0.48*** (0.04)	0.47*** (0.05)
North		0.38*** (0.03)	0.54*** (0.03)	0.52*** (0.03)	0.60*** (0.03)
Pacific		1.00*** (0.04)	0.66*** (0.04)	0.67*** (0.04)	0.67*** (0.04)
9/11		1.23*** (0.04)	1.15*** (0.04)	1.07*** (0.05)	1.06*** (0.05)
Rifles (100 K)			0.13*** (0.00)	0.14*** (0.00)	0.13*** (0.00)
Unemployment			0.10*** (0.00)	0.09*** (0.01)	0.09*** (0.01)
Corruption				-0.01*** (0.00)	-0.01*** (0.00)
Cocaine price				-0.001*** (0.00)	-0.001*** (0.00)
Drug markets				0.001*** (0.00)	0.001*** (0.00)
Divorce					-0.00*** (0.00)
Young motherhood					-1.21*** (0.15)
Population log	0.15*** (0.01)	0.03*** (0.01)	0.05*** (0.01)	0.04*** (0.01)	0.06*** (0.01)
Constant	-42.43*** (0.41)	-38.97*** (0.41)	-27.71*** (0.38)	-27.89*** (0.40)	-27.76*** (0.40)
Observations	9,868,208	9,868,208	9,868,208	9,868,208	9,833,864
Coefficients are in log of expected counts. Standard errors in parentheses. The levels of significance are: * p< 0.1, ** p< 0.05, *** p< 0.01					

In contrast to the widely held belief that low economic development is associated with higher levels of criminal behavior and internal conflict, the statistical analysis indicates that violence between criminal organizations is more intense in wealthy areas. This relationship is reflected in the negative coefficient of poverty and the positive coefficient of State GDP. These estimates show that as poverty decreases at the municipal level, violence between DTOs increases. It also increases as state GDP increases. The magnitude of the effect of state GDP is remarkable. Moving from the poorest state with a GDP of 2.03 million dollars per year to the average state with a GDP of 15.2 million dollars increases events from 0.5 to 4.7 times the average number of confrontations between DTOs. Moving from the average state to the wealthiest state producing 165.6 million dollars per year is associated with 51.3 times more events of violence between DTOs. These results contradict the expectation of H_9 linking poverty with violence and are quite illustrative of the core differences between economically motivated violence perpetrated by organized criminals and politically motivated rebels discussed in Section 1.2.

There are several reasons why violence between criminal organizations might be more intense in wealthy areas. In contrast to poor and underdeveloped areas, wealthy areas tend to be more attractive to organized criminals because they offer much greater opportunity for money laundering in the formal economic sector. Urban areas also provide favorable conditions for discretely establishing safe houses and storage facilities. Wealthy areas offer the opportunity of developing economies of scale in which drug-trafficking organizations can conveniently expand their activities to other illicit sectors such as extortion and kidnapping. Areas with high levels of economic development also offer greater potential markets for local drug consumption. In addition, developed areas make it easier for high level drug-traffickers to conceal their wealth and operate with a low profile. All these factors make wealthier areas more attractive to criminal organizations. As explained in Section 2.4.1, a high

concentration of criminal groups in a given area can easily degenerate to a war of all against all.

The statistical analysis also provides support for H_8 , which states that valuable territories are likely to experience higher levels of violence among criminal organizations. Violence between DTOs is more intense in areas favorable for the production of drugs, reception of shipments and entry spots to the U.S. market. The results indicate that moving from a municipality that does not produce drugs to another one with high levels of production increases events of violence between criminal organizations from 6.6 to 12.4 times more. In addition, being located in reception municipalities on the Gulf or the Pacific Ocean coasts generates respectively 10.2 and 11.9 times more expected events of criminal competition. Northern municipalities contiguous to the U.S.–Mexico border are expected to have 11.8 times more episodes of criminal violence than non-border municipalities. The statistical analysis also indicates that there were 7.14 times as many events of violence between DTOs after 9/11 than before the terrorist attacks. The territorial centrality of drug violence supports the implications of the theoretical model and is consistent with other findings addressing the relevance of subnational geographic variation to understanding the dynamics of domestic conflict (Buhaug and Ketil Rod, 2006; Buhaug, Gates and Lujala, 2009).

The structural model also finds support for hypotheses H_6 and H_7 , indicating the relevance of military damage and recovery capabilities. The positive coefficient of rifles indicates that the increase in the number of assault weapons produced in 2004 before the expiry of the ban to the maximum production of 24.5 million rifles reached in 2009 is associated with an increase from 9.7 to 13.8 times as many events of violence between DTOs. The increased availability of assault weapons improves the ability of criminals to inflict military damage on their rivals, thus leading to higher levels of violence between DTOs. The results also indicate that unemployment contributes to the escalation of criminal violence. An increase from the average unemployment rate

of 2.9 percent to the highest level of unemployment of 9.2 percent is associated with an increase in episodes of violence between criminal organizations from 3.6 to 11.4 times. Based on the theoretical argument advanced in this research, higher rates of unemployment can be interpreted as a larger human reserve available for recruiting, which can increase the recovery capability of criminal organizations.

In contrast to the prominence of corruption in extant explanations of criminal behavior and drug violence, the statistical assessment reveals a limited explanatory leverage of corruption. As expected from hypothesis $H_{10.2}$, the results indicate that high levels of corruption are associated with lower levels of competition between DTOs. This provides some support for arguments emphasizing the role of peaceful configurations and state-sponsored protection rackets (Snyder and Duran-Martinez, 2009). However, the empirical leverage of corruption is so limited that it is hard to sustain its centrality for understanding the escalation of violence. According to the results, increasing the levels of police corruption from zero to 57 percent is associated with a slight reduction from 7.7 to 5.8 times fewer events of violence. In other words, there are only 1.9 times fewer confrontations between rival DTOs in states where no one is asked for a bribe than in states where one out of two citizens are victims of police corruption. Of course there are reservations about the quality of the corruption data reported by Transparency International, but it is still striking that such a large increase of corruption generates such a modest reduction of violence.

The structural model generates mixed support for hypothesis H_{11} associating drug markets with criminal violence. In contrast to the expectation that high drug prices are linked with intensified violence between criminal organizations, the results indicate that higher prices of cocaine in the U.S. market are related to lower levels of violence in Mexico, although the effect is modest. Increasing the price of a gram of pure cocaine by nearly \$100 from its minimum of \$128 to its maximum of \$222 is associated with a reduction of the expected levels of violence from 7.4 to 6.2

times more events of violence between DTOs. At first glance, this result might generate enthusiasm about the reduction of violence as drugs become more expensive. However, as illustrated by Figure 6.5, the price of a gram of pure cocaine has been declining steadily since the early 1980s. According to the Office of National Drug Control Policy (2004), the prices of all other drugs show a similar negative trend. Due to data limitations, this research only considers the study of drug violence in Mexico between 2000 and 2010; therefore it only includes part of the variation in cocaine prices where the slope is slightly negative and in excludes the sharp decline observed in the 1980s. If drug prices in the U.S. continue to fall, as is likely, it is plausible to expect an increase of violence between DTOs in Mexico.

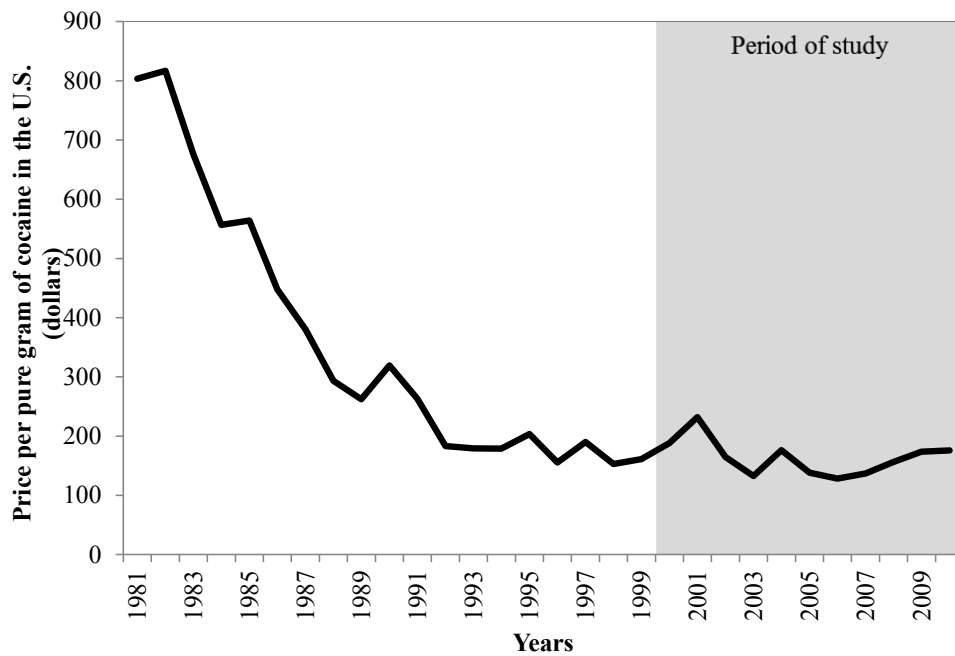


Figure 6.5. Price per pure gram of cocaine in the U.S.

Why would DTOs fight each other if drug prices are declining? The reduction in prices means that revenues are shrinking, which might increase the motivation for DTOs to fight their rivals in order to control their share of the market. As indicated by the Office of National Drug Control Policy (2004), the price of drugs has been declining in recent decades at the same time that the purity of almost all drugs has been increasing. This means that DTOs have to sell drugs of better quality at lower prices. This might indicate that the profitability of drug markets is shrinking, thus generating stress in criminal organizations. Profit shrinkage might motivate some DTOs to employ violence to eliminate their competitors in order to capture their share of the market and to increase their own revenues. Profit shrinkage in the drug market may also motivate the organisations to diversify their illegal activities. If drug trafficking is not as profitable as it used to be, criminal organizations might try complement their income with other violence-intensive activities such as racketeering and kidnapping, thus generating more violence.

The results also provide some support for hypothesis H_{11} in terms of the value of local drug consumption. As mentioned before, variable *drug markets* measures the number of hospital discharges diagnosed with intoxication from narcotics as a proxy for the levels of drug consumption at the municipal level. This measure assumes that a higher frequency of observed drug intoxication might reflect an equally distributed unobserved frequency of drug consumption. Results report a positive coefficient for the variable *drug markets*, yet the magnitude of the effect is modest. Moving from the mean of 1.2 hospital discharges to one standard deviation above the mean of 17.9 drug intoxication cases is associated with a slight increase of 0.46 times more expected events of violence among DTOs. An increase of ten standard deviations above the mean of drug intoxication would produce 4.3 times more events of violence and it would require an extraordinary increase of fifty standard deviations above the mean to produce 16.9 times more confrontations among DTOs. In this

sense, these results challenge a broadly held assumption that the wave of violence in Mexico is primarily caused by the fierce competition among drug cartels fighting to control emerging local consumption markets. It is true that there is more violence among criminals in municipalities with higher consumption of drugs, but the effect of increasing local consumption on violence is so small that it does not constitute a central explanation of violence in Mexico.

Finally, the results throw doubt on the relationship stated in hypothesis H_{12} arguing that the erosion of traditional social structures is associated with higher levels of violence between DTOs. Municipalities with a larger number of divorces and higher proportion of young mothers are associated with lower levels of violence between DTOs. Although the magnitude of the effect is very small, the relationship is negative. Increasing the number of divorces from the mean of 25 divorces by one standard deviation above the mean to 200 divorces has a negative, although modest effect, reducing the expected number of violent events among rival criminal groups from 6.98 to 6.97 times. A larger increase from the median number of divorces (3,525 cases) to the seventy-fifth percentile (5,288 cases) would reduce the expected number of confrontations between DTOs from 6.2 to 5.5 times. The effect of young mothers between the age of 12 and 19 show a similar modest effect on violence in the negative direction. Increasing the average proportion of young mothers from 14 percent by one standard deviation above the mean to 21 percent has a slight negative effect on the expected number of confrontations between DTOs, from 8.19 to 8.1 times.⁸ These results indicate that changes in the traditional family structure are not

⁸Part of the effect of these variables in the model could be caused by using contemporary measures of divorce and young motherhood instead of lagged variables that could assess the effect of these factors over time. For example, Donohue and Levitt (2001) use time series of abortion rates from the 1970s to assess their impact on criminal behavior in the 1990s. Data lagged by twenty years enables the effect of structural changes on the next generation to be assessed. However, data on divorce and young motherhood in Mexico is not available before 2000. Even if there were theoretical justifications for lagging those variables by at least five years, doing so would eliminate half of the database and generate problems of data truncation. In addition, this five-year lag would only leave

conducive to higher levels of violence between criminal organizations. The evidence thus contradicts the conservative discourse of government authorities indicating that family and social disintegration is a key factor for explaining the escalation of violence in Mexico (see Presidencia de la República, 2012).

6.2.4 Overall Model Fit

The structural model discussed in the previous section provides some valuable findings about the determinants of the wave of violence in Mexico. However, these structural factors simultaneously affect several areas and usually evolve slowly over time, thus providing limited explanatory power to account for the rapid variation in violence. As discussed in Chapter 4, levels of violence between criminal organizations vary substantially over time and across space, and the use of daily event data at the municipal level reveals the limited analytical leverage of structural explanations and aggregated data. However, the most important limitation of the structural approach is not empirical but theoretical. Structural explanations and statistical models overlook the highly interactive and dynamic characteristics of conflict, thus generating problems of omitted variable bias.

In order to assess the fit of the model, researchers often rely on the R^2 parameter as way to evaluate the amount of variation of the dependent variable explained by the regression analysis. Unfortunately, the R^2 corresponds to linear models estimated through ordinary least squares (OLS) and it is not applicable to non-linear models for categorical data using maximum likelihood estimation (MLE). Some MLE models allow goodness of fit to be estimated using McFadden's pseudo R^2 and its adjusted

data between 2005 and 2010 for conducting the analysis and that might bias the estimates upwards because this is the period showing the highest levels of violence.

version. However, these alternative estimates are not available for negative binomial models for panel data with random effects like the model used in this research.⁹

Since it is not possible to assess the goodness of fit of the model through standard post-estimation parameters, the alternative is to use visual methods. Figure 6.6 provides a visual representation of the fit between the observed values of the dependent variable and the predicted levels of violence between DTOs estimated by means of the structural model. A perfect fit would mean exact correspondence between the observed and the predicted outcome. Since the dependent variable has a negative binomial distribution, the visual representation of a perfect fit would be the data points being heavily clustered on zero and then perfectly aligned along a 45-degree diagonal for the non-zero observations. Of course it is not plausible to expect a statistical model to have perfect fit, but a good fit should display these characteristics. Unfortunately, Figure 6.6 reveals that even the fully-specified structural model does a poor job in predicting violence between criminal organizations. The number of predicted episodes of violence generated by the model do not go above 1.5 events per municipality–day. By neglecting the violent interaction between the state and DTOs, the structural model provides limited explanatory power for understanding the levels of violent competition between criminal organizations.

6.3 Interactive Model of Drug Violence

Given the limitations of the structural model to explain the substantial variation of violent competition among DTOs, this research relies on an interactive approach that includes the various actions and reactions between the state and criminal orga-

⁹The Stata command used for estimating the model with negative binomial models for panel data with random effects is `-xtnbreg, re-`. As indicated in the command syntax, the post-estimation options do not allow generation of a pseudo R^2 , Count R^2 or Adjusted Count R^2 ; see <http://www.stata.com/help.cgi?xtnbreg>.

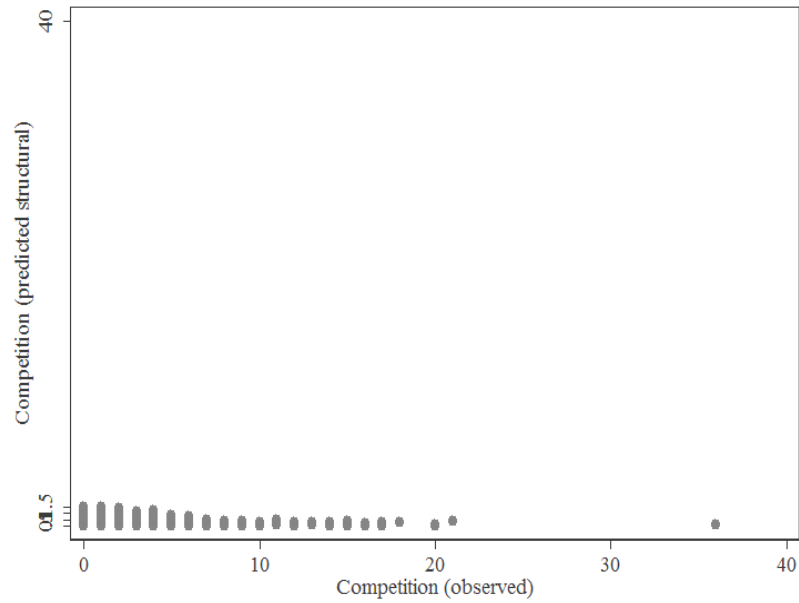


Figure 6.6. Goodness of fit of the structural model

nizations inherent to the war on drugs. This approach has the empirical advantage of incorporating fine-grained data to understand the micro-dynamics of conflict and, perhaps more importantly, it allows the ontology of violence portrayed in theoretical model to be aligned with the empirical strategy. As stated by Hall (2003, 387), in order to overcome the limitations of structuralist ontologies which assume that large structural variables have a strong, consistent, independent effect across space and time, it is necessary to incorporate alternative approaches that acknowledge more complex interactions and deal with endogenous processes.

By aligning the ontology of the theoretical model and the empirical strategy, this research contributes to a recent trend in political science known as the “Empirical Implications of Theoretical Models” approach (EITM). According to Aldrich, Alt and Lupia (2007), the EITM approach joins the analytical leverage of formal modeling and the methodological rigor of quantitative inference to improve the precision and credibility of research results. This research follows the EITM approach by deriving

empirical implications from the formal model and designing an empirical strategy that allows those hypotheses to be tested in the data.

6.3.1 Hypotheses to Evaluate

The formal model presented in Chapter 2 offers an integrative explanation for the onset, escalation and distribution of organized criminal violence. The theoretical model departs from a status quo in which corruption enables peaceful coexistence between government authorities and criminal organizations. The model argues that democratization then erodes these corrupt agreements by altering the system of political incentives and motivating authorities to enforce the law against criminals. The model additionally argues that in contexts of political strain when the legitimacy of the government is called into question, authorities reap political benefits by implementing harsh security policies that portray them as strong leaders and boost their approval levels. The following hypotheses already stated in Section 2.4 are derived from these arguments:

(H_1) Democratization is associated with higher levels of law enforcement.

(H_2) Increased political strain is associated with higher levels of law enforcement.

(H_3) High levels of corruption are associated with lower levels of law enforcement.

Hypothesis (H_2) is further refined to derive distinct hypotheses for different types of violent and non-violent law enforcement actions. The use of violent tactics is usually more costly for government authorities than non-violent tactics, therefore violent enforcement is used in exceptional circumstances. In contexts of political strain, the authorities reap higher political benefits from using violent enforcement tactics than from non-violent enforcement despite the higher cost of the former. This nuanced argument can be stated in the following terms:

($H_{2.1}$) Increased political strain is associated with higher levels of violent enforcement than non-violent enforcement tactics.

The theoretical explanation also uses a contest success model for territorial competition to explain the escalation of violence. According to the model, increasing law enforcement triggers an escalation of conflict between the state and criminal organizations and, most importantly, it unleashes a wave of violence between rival criminal groups. State action has a disruptive effect on the relative military balance of criminal organizations by weakening the ability of a DTO to protect its territory, thus motivating an invasion from a rival DTO. The model thus argues that law enforcement leads to violence between criminal organizations. As discussed in Section 2.4, this relationship can be stated as:

(H_5) Increasing law enforcement is associated with higher levels of violence among DTOs.

In order to explain the geographic distribution of violence, the model explicitly incorporates the importance of territorial value as a key determinant of conflict. According to the theoretical expectation, valuable territories tend to contain higher levels of violence among criminal organizations. This relationship was previously stated in hypotheses H_8 .

6.3.2 Data

Law enforcement is the outcome variable considered by hypotheses H_1 , H_2 , H_3 and $H_{2.1}$. Law enforcement is operationalized based on the set of violent and non-violent tactics used by the state to fight criminal organizations. As discussed in Chapter 4, these variables are identified by Eventus ID on a daily basis at the municipal level. *Violent enforcement* includes events in which state security forces attacked, wounded or killed suspected members of criminal organizations. Non-violent enforcement tac-

tics include events of *arrests*, seizure of criminal *assets*, *drug* interdiction, and seizures of *weapons*.

As mentioned by Coppedge (2012), democracy is one of the thickest concepts in political science, comprising several dimensions. We can mean many different things when we talk about “democracy.” Similarly, democratization can also be understood as a prolonged process of political change involving several dimensions. Instead of using a thick conceptualization of democratization that could lead to employing dozens of indicators, this research focuses on a thin perspective that employs two variables; the effective number of political parties, and divided government. These two measures are used to operationalize hypothesis H_1 .

The variable *effective number of parties* (ENP) measures the effective number of political parties competing in the presidential elections when Ernesto Zedillo, Vicente Fox and Felipe Calderón, respectively, were elected. The ENP index is calculated using the formula proposed by Laakso and Taagepera (1979) which takes into account the share of votes obtained by each party in the presidential election. An ENP value of 1 means that the party system is dominated by a single political actor. Larger values of the ENP index mean that there are more relevant political actors in the party system, which is often interpreted as a measure of competition. Using the ENP at the presidential level is a valid indicator of political competition in Mexico. As discussed in Chapter 5, for more than seventy years the Institutional Revolutionary Party dominated the political system in an autocratic fashion that permitted no genuine electoral competition (Greene, 2007; Magaloni, 2006). During this period, the PRI used a variety of tactics to manipulate election results in order to secure victory. The increase that occurred in the effective number of parties reflects substantial changes in the political scene. Analyzing the effect of increasing political competition at the executive level is also important to assess the impact of democratization on law enforcement against organized crime because the Mexican constitution also endows

the executive with the formal title of commander in chief of the armed forces. In consequence, the president has the prerogative of commanding the Army, the Navy and Federal Police in the fight against organized crime, a prerogative not extended to governors or majors.

Another important effect of democratization is the disruption of the hierarchical chain of command through the different levels of government that allowed implementation of corrupt agreements between political authorities and criminal organizations. During the period of one-party dominance, the PRI held the executive office continuously from 1929 to 2000, and the majority of Congress until 1997. At the sub-national level, the PRI controlled every state until 1992 when they lost the first governorship, and held most municipalities of the country until the 1980s. This long period of cohesive party dominance at all levels of government enabled the construction of a straightforward chain of command that facilitated political operations, including non-aggression equilibrium with criminal organizations. With the advent of democratization, starting at the sub-national level, the Mexican political scene began to change, and the chain of command was gradually eroded. To reflect the decentralization of political power, variable *divided government* measures the degree of partisan division in the executive office across the three different levels of government (federal, state and municipal). This variable takes the value 0 if the three levels of government belong to the same party, 1 if either the governor or the mayor belong to the same party as the president, and 2 if neither the governor nor the mayor belong to the same party as the president. Divided government thus serves as a proxy for the eroding effect of democratization on the chain of command and the increased difficulty of establishing or maintaining peaceful configurations between criminals and politicians.

In order to measure the concept of political strain, this research uses the *margin of victory*, the difference in vote share between the winner and the runner-up in presidential elections. This variable serves as a proxy for political strain, as it reflects the

political difficulties of the 2006 election when the PAN candidate, Felipe Calderón, won the election by a margin of less than 1 percent of the votes. This election represented the most profound political crisis in the short democratic history of Mexico. Due to the narrow margin of victory, the opposition candidate from the left-wing Party of the Democratic Revolution (PRD), Andrés Manuel López Obrador, loudly raised allegations of election fraud. López Obrador called for a recount of all the ballots under the slogan “*voto por voto, casilla por casilla*” (vote by vote; booth by booth) to clear away any doubts over the election result. In a country with such a long history of electoral fraud, vote buying, voter coercion, control of election officials, political clientelism and result rigging, these allegations of fraud resonated with broad sectors of the population. After the election, thousands of protesters took the streets in different parts of the country. Remarkably, over a million and a half people attended a rally in downtown Mexico City in the largest post-election protest. Elite and mass polarization swelled during a period several months. The crisis reached its peak when the members of the opposition PRD took over Congress to prevent president-elect Calderón from making his pledge to the Constitution and formally taking office. Members of the Mexican secret service had to push through the crowded tribune to make space to allow Calderón to formally take office. After the episode, López Obrador kept referring to Calderón as “The Illegitimate President.” This period of political crisis has been widely characterised by political analysts, public opinion leaders, scholars and journalists as severely damaging the legitimacy of President Calderón from the the beginning of his administration (e.g. Álvarez Béjar, 2007; Castañeda, 2012; Castañeda and Aguilar, 2010; Pacheco, 2006).

The remaining variables are the same as the variables specified in the structural model.

6.3.3 Model Specification

The concept of political violence conflates highly dynamic and endogenous processes of conflict. As stated by Kalyvas, Shapiro and Masoud (2008), violence is used by those challenging the existing order and by those fighting to preserve it. One of the central challenges of analyzing the micro-dynamics of violence, therefore, is the high degree of endogeneity and reciprocal causation of overlapping but distinct processes of violence. In this particular research, the risk of endogeneity rests primarily in hypothesis H_3 , which states that law enforcement generates violence between criminal organizations. However, the relationship can also operate in the opposite direction, as the legitimate use of force against potential or actual threats is inherent to the process of state formation (Hobbes, 1651; Scott, 2009; Tilly, 1985, 1992; Weber, 1978).

This endogenous relationship complicates the design of a proper identification strategy capable of disentangling the reciprocal causation between enforcement and violence between criminals. Taking the naive approach of simply regressing the levels of violence between DTOs on the different types of law enforcement would certainly identify a strong positive relationship. However, the estimates would be highly biased because they would be incorporating the feedback effects caused by this endogenous relationship, thus generating misleading conclusions. Instead of using a naive approach, the identification strategy used in this study follows research by Acemoglu, Johnson and Robinson (2001); Angrist and Pischke (2009); Miguel, Satyanath and Sergenti (2004) and Levitt (1997), who employ an instrumental variables approach to overcome problems of endogeneity.

Instrumental variables methods are quasi-experimental methods used to estimate the impact of a treatment variable when an experimental design is not feasible. Instrumental variables are used as an exogenous source of variation that enables part of the effect of a variable on the outcome to be isolated regardless of the endoge-

nous relationship among them. The identification strategy of this research uses a two-stage instrumental variable approach. The first stage assesses the effect of democratization and political strain on levels of law enforcement. The second stage then evaluates the impact of predicted levels of enforcement caused by the exogenous variation of democratization and political strain on the levels of violence between criminal organizations.

As mentioned earlier, the variables of interest (enforcement and violent competition) are distributed according to Poisson functions with hyperdispersion; therefore the statistical analysis uses a negative binomial model for panel data. The unit of analysis is the municipality–day for all municipalities of the country on a daily basis between January 1, 2000 and December 31, 2010, producing a total of 9.8 million observations. The time series cross-sectional data structure enables the fine-grained variation of violence to be analyzed across time and space. The model includes a random effects specification with errors clustered by municipality. The random effects justification is the same as that for the structural model, as discussed above.

Unfortunately, there are no standardized commands in Stata or R for computing an instrumental variable regression with a negative binomial distribution for panel data. I therefore computed the instrumental variable assessment as a two-stage negative binomial regression analysis. As discussed in detail by Angrist and Pischke (2009), computing the two stages in separate regressions does not induce bias in the estimates of the second stage. However, the variance–covariance matrix produces misleading residuals. For this reason, errors for the second stage were calculated by bootstrapping. This is a method for assessing the accuracy of the estimates based on taking several random samples from the observed distribution. Instead of implementing the bootstrapping iterations from the full sample of 9.8 million data points, the bootstrapping procedure used a more stringent test based on smaller samples of 300,000 observations. In addition, instead of running hundreds of iterations to assess

the accuracy of the estimates, the bootstrapping procedure implemented in this research considered a conservative approach of only fifty iterations. This bootstrapping strategy conducting only a few iterations based on relatively small random samples of the data constitutes a highly astringent test for the precision of the confidence intervals estimated in the second stage.

The two-stage analysis uses violent competition among DTOs and law enforcement as the endogenous variables. The instrumental variables are the effective number of parties, the degree of divided government, and the margin of victory. The other variables are considered to be exogenous covariates. The first stage model is expressed in terms of the following equation:

$$\mathbf{E}_{it} = \alpha + \theta_1 \mathbf{P}_{it} + \theta_2 \mathbf{D}_{it} + \theta_3 \mathbf{M}_{it} + \delta'_i \mathbf{X}'_{it} + \mu_{it}, \quad (6.3)$$

where \mathbf{E}_{it} represents the levels of law enforcement in municipality i on day t , vector \mathbf{P}_{it} contains information on the effective number of parties, \mathbf{D}_{it} is the degree of divided government and \mathbf{M}_{it} represents the margin of victory. As stated in equation (6.2) for the structural model, \mathbf{X}'_{it} a vector containing some control variables. Scalars θ_i and δ'_i represent the coefficients for the corresponding variables and μ_{it} contains the error terms. Equation (6.3) is the mathematical expression of the first stage, comprising hypotheses H_1 and H_2 .

The reduced form of the instrumental variable model is the mathematical expression of the relationship stated in hypothesis H_3 , in which predicted levels of law enforcement caused by democratization and political strain have an impact on violence between DTOs. The second stage is formulated mathematically as:

$$\mathbf{Y}_{it} = \alpha' + \beta_1 \mathbf{E}'_{it} + \delta' \mathbf{X}_{it} + \mu'_{it}. \quad (6.4)$$

where \mathbf{Y}_{it} represents violence between DTOs in municipality i on day t and \mathbf{E}'_{it} represents the predicted level of law enforcement from the first stage caused by democratization and political strain. The vector of controls \mathbf{X}_{it} contains the control variables already discussed in Equation (6.2) of the structural model. Consider that that $\mathbf{X}_{it} = \mathbf{X}'_{it} + \mathbf{X}''_{it}$, where \mathbf{X}'_{it} is the set of controls of the first stage and \mathbf{X}''_{it} are all other exogenous covariates.

Following Angrist and Pischke (2009), we can think of instrumental variables as initiating a causal chain where the instruments \mathbf{P}_{it} , \mathbf{D}_{it} , and \mathbf{M}_{it} affect the variable of interest \mathbf{E}_{it} , which in turn affects the outcome \mathbf{Y}_{it} . In this way, the model isolates part of the effect of law enforcement on violent competition among criminals caused by the exogenous variation of democratization and political strain. This identification strategy addresses the problem of endogeneity while being consistent with the data generation process expected from the theory, thus allowing consistency between the ontology of the theoretical construct and the methodology used for evaluating it.

The instrumental variable approach helps remove the endogenous relationship between the various processes of violence and enables the effect of law enforcement on violence between DTOs to be identified. Variation in the number of political parties, the degree of government division, and the margin of victory are plausibly exogenous to levels of violence between criminal groups. In consequence, the change in incentives caused by the process of democratization and political strain is conceivably independent from the wave of drug-related violence. The employment of this type of political variables as exogenous instruments is congruent with other political variables such as local elections and close municipal victories used by other authors (Dell, 2011; Levitt, 1997) to assess the quasi-experimental effect of law enforcement on criminal violence.

One of the requirements of instrumental variables is the *exclusion restriction*, which requires the instrument to be assigned ‘as if’ random (Angrist and Pischke,

2009; Dunning, 2012). This can be accomplished when the instrumental variable (Z_i) is correlated with the instrumented variable (S_i) of interest but uncorrelated with other determinants of the outcome variable (Y_i). For example, researchers employing instrumental variables have used truly random or as-if random factors such as colonial settler mortality rates to study contemporary economic growth (Acemoglu, Johnson and Robinson, 2001), rainfall to study land invasion (Hidalgo et al., 2010) and twin births to study the economic consequences of unwanted motherhood (Bronars and Grogger, 1994). In these examples, there is a strong presumption of compliance with exclusion restriction. However, in non-experimental research, it is hard to find adequate instruments that comply perfectly with the exclusion restriction. For the specific case of this research, an ideal instrument would have to be correlated with law enforcement but uncorrelated with any other determinant of violence between drug trafficking organizations.

A critical assessment of using democratization and political strain as instrumental variables allows the possibility of some correlation of these factors with economic development and corruption, which are already identified as determinants of criminal violence in the structural model. For instances, the relationship between high levels of economic development and democracy is well known in the literature (Przeworski et al., 2000). In the case of Mexico, Magaloni (2006) argues that economic conditions are related to increasing levels of political competition that could be reflected in the number of political parties and divided government. In addition, the literature on accountability has identified a relationship between high levels of democracy and low levels of corruption (Schedler, Diamond and Plattner, 1999). In order to minimize bias in the generation of first stage estimates due to potential violation of the exclusion restriction, the model specification includes some control variables in \mathbf{X}'_{it} in Equation (6.3). This vector of covariates is composed of measures of poverty at the municipal

level, state GDP, population, and corruption. The inclusion of these variables helps to control part of the variation caused by possible violations of the exclusion restriction.

An purist approach to the use of instrumental variables as a quasi-experimental strategy would emphasize strict observance of the exclusion restriction. However, perfect quasi-experimental instruments are hard to find, and researchers often use control variables in the first stage to address concerns about the violation of some assumptions. In this way, the inclusion of controls in the first stage is consistent with the central objective of the instrumental variable approach of addressing problems of endogeneity by trying to isolate the effect of the instrumented variable on the observed outcome.

6.3.4 Effect of Violent Enforcement on Violence Among DTOs

First stage of violent law enforcement

This part of the discussion of the results will focus on analyzing the relationship between violent law enforcement and violence between DTOs. The second part will compare the effect of different law enforcement tactics, both violent and non-violent, on criminal competition.

Tables 6.2 and 6.3 present the results of the first and second stage respectively for the relationship between violent law enforcement and violent competition between DTOs. Models 1–3 in Table 6.2 sequentially assess the effect of the effective number of parties, margin of victory and divided government on violent law enforcement without controls. Model 4 shows the full model specification of political variables including controls. In general, the first stage provides strong support for hypotheses H_1 and H_2 , which propose that democratization and political strain motivate politicians to use force to fight crime. The magnitude of coefficients of the political variables across all models in Table 6.2 are stable, as are their high levels of statistical significance. In addition, it is important to notice that the instruments are remarkably strong even

after inclusion of the control variables. According to Angrist and Pischke (2009) and Stock, Wright and Yogo (2002), the standard criteria to evaluate the strength of instruments is when the F-statistic is above 10 at acceptable levels of significance. As reported in Table 6.2, the F-statistics of Models 1–4 are several times larger than the baseline threshold, indicating the presence of strong instruments.

TABLE 6.2

FIRST STAGE: BASE-LINE AND FULL MODEL OF VIOLENT
ENFORCEMENT

	(1)	(2)	(3)	(4)
ENP	5.699*** (0.107)	4.552*** (0.210)	4.565*** (0.210)	4.304*** (0.214)
Margin of victory		-6.682*** (1.134)	-6.490*** (1.135)	-4.583*** (1.144)
Divided government			0.095*** (0.031)	0.121*** (0.032)
Poverty				-0.408*** (0.038)
State GDP (log)				0.589*** (0.049)
Population (log)				0.191*** (0.018)
Corruption				-0.032*** (0.002)
Constant	-22.213*** (0.351)	-18.339*** (0.706)	-18.518*** (0.708)	-31.224*** (1.103)
Observations	9,868,208	9,868,208	9,868,208	9,868,208
F - statistic	2,842***	1,426***	953***	539***
Coefficients are in log of expected counts. Standard errors in parentheses. The levels of significance are: * p< 0.1, ** p< 0.05, *** p< 0.01				

The discussion of the results shown in Table 6.2 will be focused on the full specification of the first stage reported in Model 4. As expected from the theory, the statistical analysis indicates that democratization and political strain increase political incentives to enforce the law, thus providing strong support for hypotheses H_1 and H_2 . The results show that increasing political competition measured by the effective number of parties is associated with the intensification of violent law enforcement against criminals. Figure 6.7 presents the marginal effect of increasing the effective number of political parties on the use of violent enforcement. According to the figure, the increase in competition from 2.9 effective parties in the Zedillo administration to 3.3 effective parties when Calderón became president increased violent enforcement events from 3.8 to 21.8 times more expected events of state violence. This result indicates how sensitive the use of violent enforcement is to slight changes in the political scene: increased levels of political competition have a profound effect on the system of incentives that motivate politicians to use force against criminals.

The results also indicate that the degree of divided government has a significant effect on enforcement. Figure 6.8 shows that changing from a unitary government to a divided government in which the governor or mayor are not from the president's party increases the expected number of events of violent law enforcement against crime from 9.8 to 14.9 times. In addition, comparing the levels of law enforcement in unified government to a context where neither the governor nor the mayor belong to the same party as the president increases episodes of violent enforcement from 9.8 to 15.2 times more. This result indicates that democratization has a considerable disruptive effect on the uni-partisan chain of command that could facilitate the establishment and feasibility of state-sponsored protection rackets for criminal organizations.

These results help to elucidate the political conditions that facilitated a peaceful equilibrium between the state and DTOs during the period of political hegemony dominated by the PRI. The hierarchical chain of command characteristic of the

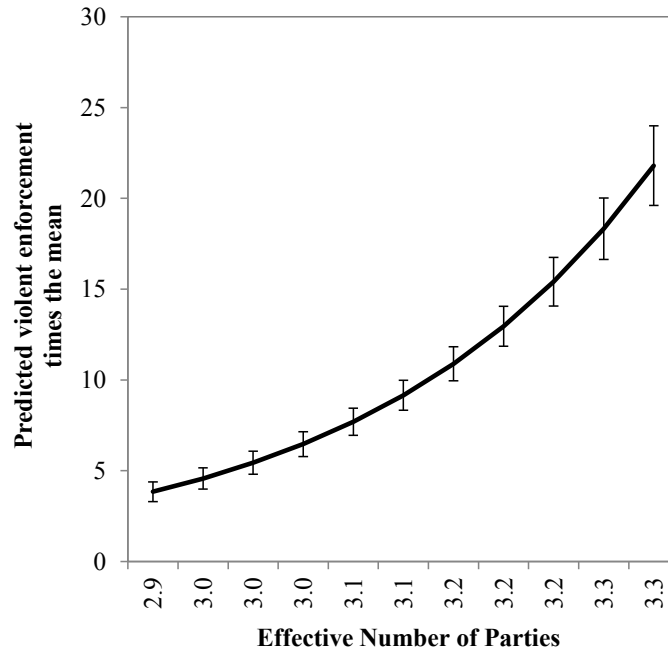


Figure 6.7. Effect of political competition on violent enforcement

hegemonic party system enabled non-aggressive coexistence between the state and criminal groups. In addition, the lack of effective elite circulation through electoral means lent these agreements stability and assurance. The gradual process of democratization deeply affected the Mexican political arena and disrupted these peaceful configurations. As opposition parties entered the political scene, implicit agreements between corrupt officials and DTOs became more difficult to achieve or to sustain. Political competition also created incentives for government authorities to provide public goods such as public security.

Improving democratic conditions is necessary yet not sufficient for launching a crusade against organized crime. Such bellicose behavior requires a trigger. Model 4 also shows that winning the presidency by a narrow margin of votes motivates politicians to use the state's coercive apparatus to fight crime. This result provides support for hypothesis H_2 which states that periods of political strain are associated with intensi-

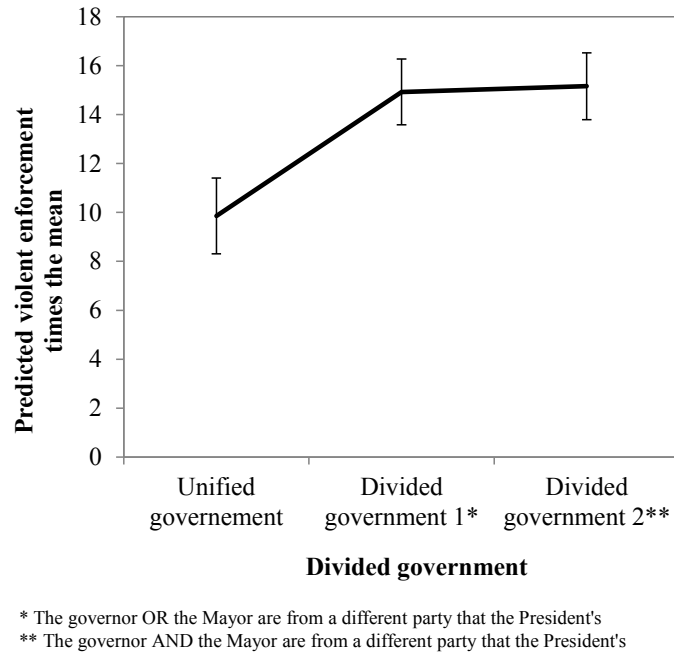


Figure 6.8. Effect of divided government on violent enforcement

fication of enforcement. Figure 6.9 shows that changing from the comfortable margin of victory of 22.8 percent when Zedillo was elected to the narrow margin of victory of less than 1 percent of the votes when Calderón was elected is associated with a change from 5.7 to 14.9 times more expected events of violent enforcement. This finding is consistent with argument that President Calderón launched a full-fledged campaign against crime as a way to increase his popularity after winning the 2006 election by a very narrow margin in the midst of accusations of fraud (Castañeda, 2012).

Second stage of violent law enforcement

In general, results of the first stage indicate that democratization and periods of political strain are associated with higher levels of violent law enforcement. The

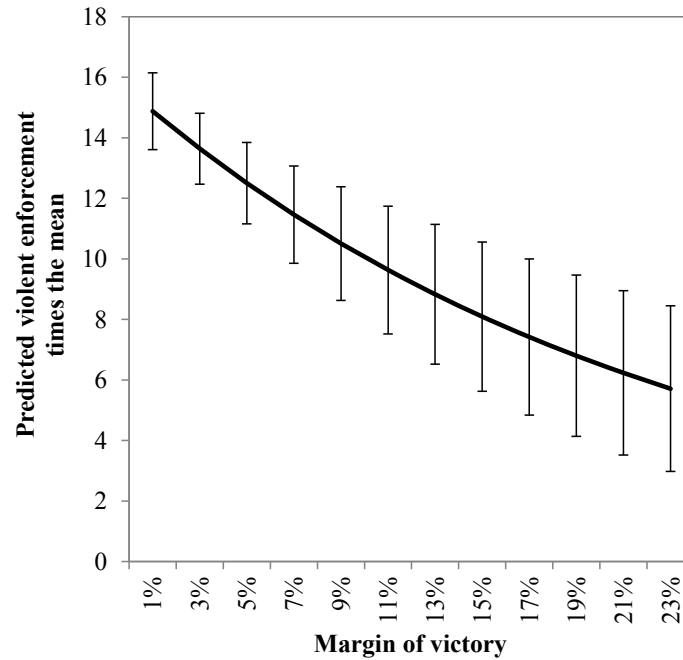


Figure 6.9. Effect of political strain on violent enforcement

next step is assessing the effect of violent crackdowns generated by the exogenous variation of political variables on the levels of conflict between criminal organizations. The answer is presented in Table 6.3 which shows the estimates for the second stage. The results provide strong support for hypothesis H_5 which claims that government efforts to fight crime trigger waves of violence between rival DTOs. This relationship might be related to the theoretical expectation about the disruptive effect of law enforcement on the relative military balance among DTOs that unleashes turf wars among rival criminal groups.

TABLE 6.3

SECOND STAGE: BASE-LINE AND FULL MODEL OF VIOLENT
COMPETITION AMONG DOTs

	(1)	(2)	(3)	(4)
Violent enforcement	49.860*** (2.826)	49.777*** (2.112)	48.873*** (2.609)	11.501*** (1.814)
Retaliation	0.593*** (0.183)	0.594*** (0.133)	0.590*** (0.147)	0.594*** (0.174)
Drug production	0.197*** (0.059)	0.197*** (0.041)	0.195*** (0.063)	0.167*** (0.057)
Gulf	0.509*** (0.163)	0.509*** (0.189)	0.481*** (0.172)	0.582*** (0.166)
North	0.464** (0.226)	0.465** (0.232)	0.456** (0.233)	0.469*** (0.167)
Pacific	0.378*** (0.098)	0.379*** (0.098)	0.425*** (0.094)	0.761*** (0.133)
9/11	0.896*** (0.242)	0.831*** (0.261)	0.839*** (0.249)	1.085*** (0.178)
Poverty	-0.245*** (0.094)	-0.245** (0.095)	-0.256** (0.101)	-0.197** (0.083)
State GDP (log)	0.407*** (0.034)	0.409*** (0.036)	0.435*** (0.034)	0.704*** (0.116)
Population (log)	0.041 (0.036)	0.041 (0.042)	0.042 (0.039)	-0.098* (0.052)
Rifles (100 K)	0.008 (0.033)	0.009 (0.017)	0.011 (0.034)	0.111*** (0.024)
Unemployment	0.081*** (0.024)	0.081*** (0.014)	0.081*** (0.024)	0.061** (0.024)
Corruption	-0.008*** (0.003)	-0.008*** (0.003)	-0.008*** (0.003)	0.008*** (0.003)
Cocaine prince	0.005** (0.002)	0.005** (0.002)	0.005** (0.002)	-0.001 (0.002)
Drug markets	0.001 (0.001)	0.001 (0.002)	0.001 (0.001)	0.002 (0.002)
Divorce	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Young motherhood	1.153 (0.922)	1.132* (0.606)	1.011 (0.992)	-0.174 (0.940)
Constant	-15.608*** (0.977)	-15.584*** (0.917)	-16.065*** (1.042)	-19.830*** (1.754)
Observations	9,868,208	9,868,208	9,868,208	9,868,208
Coefficients are in log of expected counts. Bootstrapped standard errors in parentheses. The levels of significance are: * p< 0.1, ** p< 0.05, *** p< 0.01				

Models 1–4 in Table 6.3 report the effect of violent enforcement and other covariates on violent competition among DTOs. The predicted levels of enforcement are generated from the first stage, in which the first three models include no controls and the fourth one has the full specification. As Table 6.3 shows, the size of the coefficients of violent enforcement in Models 1–3 is substantially larger than in Model 4. This suggests that not including controls in the first stage might overestimate the predicted levels of law enforcement due to possible violations of the exclusion restriction, which is then corrected by including control variables. In consequence, the enforcement coefficient in Model 4 represents a more plausible estimate of the isolated variation of violent law enforcement generated in the fully specified model in the first stage. The discussion of results of the second stage is focused on Model 4.

According to Model 4 in Table 6.3, the use of state violence to fight crime has a strong increasing effect on the levels of violence between criminal organizations. Figure 6.10 illustrates the relationship between the predicted degree of violent enforcement caused by democratization and political strain on violence between DTOs. The graph shows that intensifying the predicted levels of violent enforcement from minimum to maximum generates an increase from 5 to 62.7 times more expected events of violence among DTOs. The results indicate that after controlling for endogeneity, violence among criminal organizations surges upward as the Mexican government intensifies its efforts to fight crime. This provides empirical support for the theoretical argument about the disturbing effect of state intervention. According to the formal model, government enforcement against a criminal organization weakens that criminal group and is likely to motivate invasion by a rival criminal group into the territory of the weakened cartel. If the government launches a generalized and sustained campaign against all criminal organizations operating within its territory, state action is likely to have a profound disturbing effect on the criminal groups and the balance between them, and unleash a massive wave of violence of all against all.

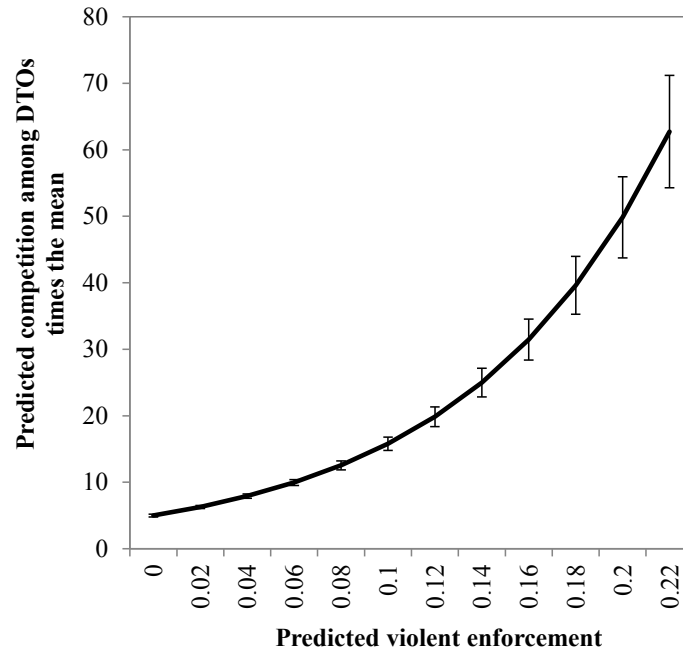


Figure 6.10. Effect of violent enforcement on violent competition among DTOs

The coefficients of all other covariates in Model 4 show very similar results to those reported in the structural model. This indicates that even after modelling an interactive approach to conflict caused by the disruptive effect of law enforcement on violence among criminals, the effects of structural factors are remarkably robust. In general, the interactive model indicates that higher levels of economic development are associated with more intense violence between DTOs. However, it is important to notice that the coefficient of state GDP in Model 4 in Table 6.3 is significantly smaller than the coefficient estimated using the structural model. Drug strategic territories are also relevant for understanding criminal competition. The availability of rifles and the vast human reserve caused by unemployment also indicate that violence is explained by criminals' potential for inflicting military damage and their capability

of recovering from it. To avoid redundancy, this section does not discuss the effects of the structural factors in the interactive model in detail, and the reader is referred to Section 6.2.3 where these factors are discussed in the context of the structural model.

Instead, the remainder of this section provides a more analytical discussion about the effects of increasing law enforcement in valuable territories on the dynamics of violent competition between DTOs. The equilibrium conditions of the theoretical model indicate that law enforcement provides incentives for criminals to use violence if the territory is valuable enough that the fight is worthwhile (see Section 2.3.5). In consequence, it is plausible to expect that law enforcement will have a more disturbing effect in valuable territories and generate more violence between criminal organizations in areas where DTOs have vested interests. The statistical analysis provides overall support for this claim. The results of Model 4 indicate that violence between DTOs tends to concentrate around drug-producing areas, in territories favorable for the reception of drugs along the Gulf of Mexico and the Pacific coasts, and in municipalities located along the U.S.–Mexico border (and hence favourable for staging shipments to the U.S.) In addition, the panels in Figure 6.11 show that the deployment of state violence in drug-valuable territories generates higher levels of violent competition between DTOs than in non-strategic areas. This indicates that the interaction between structural factors and dynamic mechanisms of violence provide valuable insights for understanding the escalation of violence and its geographical concentration in particular areas.

Panel (a) in Figure 6.11 shows that violent law enforcement generates more violence between DTOs in municipalities with high levels of drug production than in areas where marijuana and poppy crops are detected less frequently. The higher levels of predicted law enforcement in non-drug-producing areas generates 58.4 times more expected events of violence between DTOs, and deploying the same levels of enforcement in municipalities with high production of illicit crops generates 105 times more

expected episodes of violence between criminals. For easier visualization, the graph in Panel (a) does not include the margins of error, but the predicted marginal effects are statistically significant at each level of drug production.

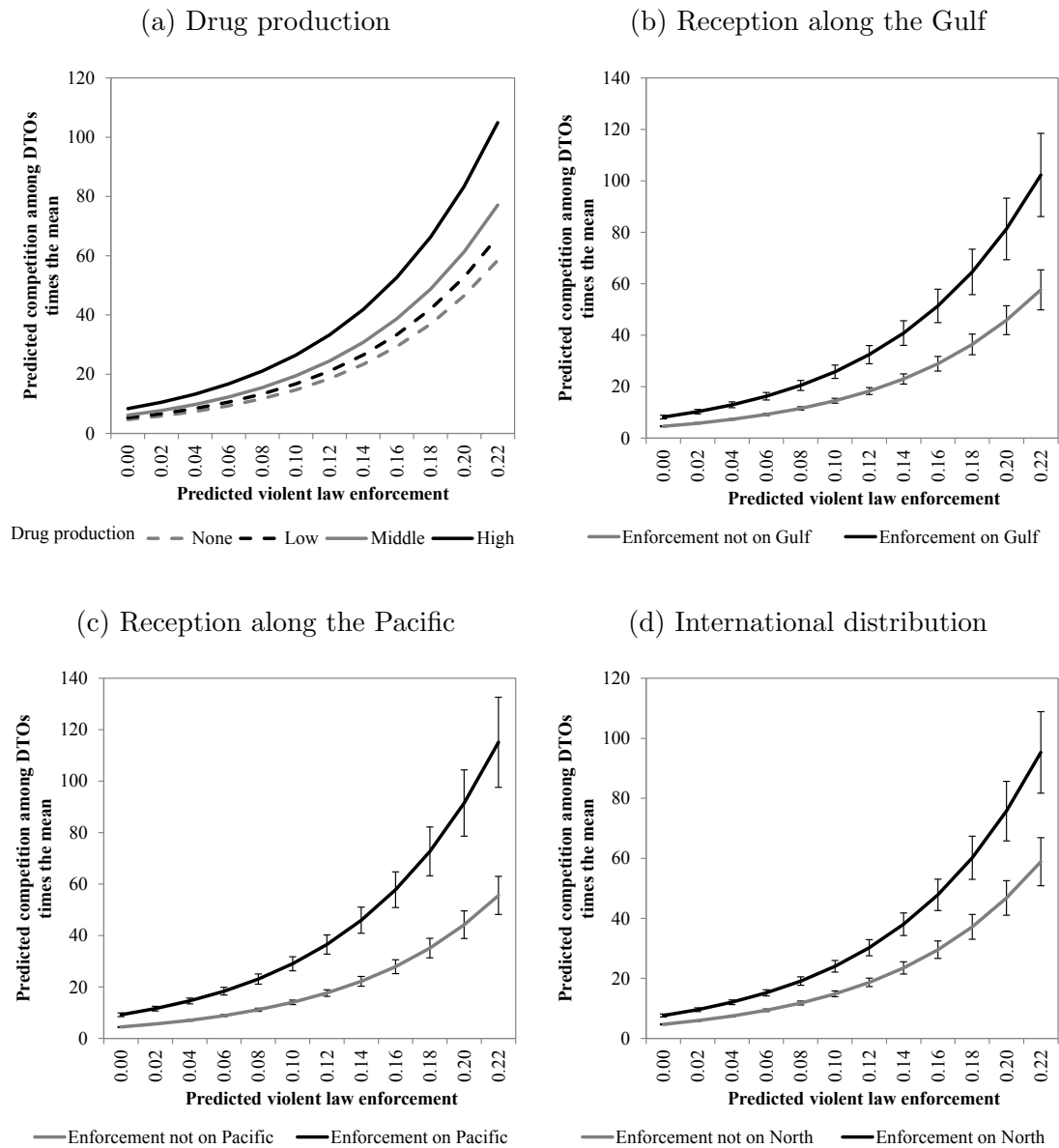


Figure 6.11. Effect of violent law enforcement on different territories

Panels (b) and (c) confirm that increasing the levels of law enforcement on territories favorable for the reception of drug shipments along the Gulf or Pacific coastlines generate more conflict between criminals than enforcement in areas away from the coasts. High levels of law enforcement in municipalities not located along the Gulf experience 57.6 times more expected events of criminal violence while the same levels of enforcement in Gulf coast municipalities generate 102.3 times more expected events of violence between DTOs. Similarly, intense law enforcement in non-Pacific areas generates 55.6 times more criminal competition; application of the same intensity of violent law enforcement in municipalities located along the Pacific coast generates 115.1 times more expected events of violence between rival DTOs.

Panel (d) also provides evidence for the disruptive effect of increased state action in municipalities favorable for the international distribution of illicit drugs across the Mexico–U.S. border. Deploying the highest levels of state violence in municipalities not located along the northern border generates 58.9 times more events of criminal competition; employing the same high levels of law enforcement in the strip of municipalities bordering the U.S. generates 95.3 times more violence between competing criminal organizations.

In general, the empirical assessment using the interactive model provides strong support for hypotheses H_1 , H_2 , H_5 and H_8 derived from the theoretical model. Democratization and political strain are plausible sources of exogenous variation in levels of violent and non-violent enforcement. The instrumental variable approach shows that the efforts of Mexican authorities to fight crime triggered an unprecedented wave of territorial violence among rival criminal groups. Criminal violence is particularly intense in municipalities favorable for the production of illegal drugs, entry points suitable for the reception of shipments along the Pacific and the Gulf of Mexico coasts, and territories along the Mexico–U.S. border.

6.3.5 Effect of Violent and Non-Violent Enforcement on Violence Among DTOs

As discussed in section 2.4, the theoretical model provides a set of empirical implications to be tested in the statistical analysis. In general, these hypotheses argue that democratization is associated with higher levels of law enforcement (H_1) and periods of political strain motivate authorities to enforce the law against criminal organizations (H_2). According to the model, increased law enforcement is expected to increase violence among rival criminal groups (H_5). If the theoretical model is right, we should see these these relationships operating with regularity across different types of violent and non-violent enforcement tactics used by the state to fight criminal organizations. The theoretical model also provides a more nuanced expectation about the effects of political strain on violent and non-violent enforcement due to the different costs and benefits associated with different tactics. According to hypothesis $H_{2.1}$, increased political strain is associated with higher levels of violent enforcement than non-violent enforcement tactics. Tables 6.4 and 6.5 present the first and second stage results for the effects of violent and non-violent law enforcement on the intensity of violent competition among criminal organizations.

First stage of violent and non-violent law enforcement

For comparative purposes, Model 1 in Table 6.4 reports the same results as Model 4 in the first stage of the interactive model (see Table 6.2). Models 2–5 in Table 6.4 report the effects of political variables on the employment of non-violent enforcement tactics such as arrests of suspected members of criminal organizations, seizure of criminal assets, interdiction of drugs, and weapons seizures.

TABLE 6.4

FIRST STAGE: POLITICAL DETERMINANTS OF VIOLENT AND
NON-VIOLENT ENFORCEMENT

	(1)	(2)	(3)	(4)	(5)
	Enforcement	Arrests	Assets	Drugs	Guns
ENP	4.304*** (0.214)	2.401*** (0.036)	2.720*** (0.062)	1.775*** (0.033)	3.521*** (0.084)
Divided government	0.121*** (0.032)	0.077*** (0.009)	0.068*** (0.016)	0.109*** (0.009)	0.111*** (0.019)
Margin of victory	-4.583*** (1.144)	2.845*** (0.136)	2.309*** (0.235)	1.804*** (0.131)	1.561*** (0.343)
Corruption	-0.032*** (0.002)	-0.009*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)
Poverty	-0.408*** (0.038)	-0.326*** (0.018)	-0.303*** (0.027)	-0.328*** (0.014)	-0.519*** (0.029)
State GDP (log)	0.589*** (0.049)	0.299*** (0.016)	0.149*** (0.029)	0.200*** (0.012)	0.503*** (0.032)
Population (log)	0.191*** (0.018)	-0.034*** (0.007)	0.154*** (0.012)	0.097*** (0.006)	0.093*** (0.011)
Constant	-31.224*** (1.103)	-15.416*** (0.288)	-16.234*** (0.538)	-13.762*** (0.233)	-26.095*** (0.619)
Observations	9,868,208	9,868,208	9,868,208	9,868,208	9,868,208
F-statistic	539***	1,383***	628***	1,149***	884***
Coefficients are in log of expected counts. Standard errors in parentheses.					
The levels of significance are: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$					

Results from the first stage provide strong support for hypothesis H_1 which states that democratization is associated with higher levels of law enforcement. Increasing the effective number of political parties generates a consistent increase in the various types of violent and non-violent law enforcement efforts used for fighting crime. Figure 6.12 compares the predicted effect of increasing the number of effective parties on the levels of violent law enforcement, arrests, seizure of assets, drugs and

guns. For easier visualization, standard errors are omitted from the graph, but the Table 6.4 shows that all these coefficients are highly statistically significant. The figure shows that increasing political competition has the largest effect on seizures of criminal assets and arrests of suspected members of criminal organizations. Violent law enforcement is the tactic third-most increased by the effective number of parties. When compared to the other trends, the graph shows that state use of violence is highly sensitive to increasing political competition; this trend grows faster than the other types of non-violent tactics. Increasing the number of parties also increases weapons seizures and interdiction of illicit substances. Figure 6.12 provides strong and consistent evidence that increasing the conditions of political competition motivates government authorities to fight crime with a broad menu of violent and non-violent enforcement tactics.

The first stage also shows that having a divided government has a consistent effect of increasing law enforcement efforts across different types of tactics. Figure 6.13 shows that changing from a unified government to a divided government where either the governor or mayor belong to a different party than the president's is associated with higher levels of law enforcement using all violent and non-violent tactics. As before, the graph omits the standard errors to facilitate the visualization of trends. It should be noted that violent law enforcement shows the largest increase when the government shifts from a united to a divided configuration. This effect is less sharp on non-violent tactics. In general, these results indicate that the entrance of new political actors at different levels of government broke the unified chain of command that facilitated the creation and maintenance of non-aggression agreements between politicians and criminals.

The results of the first stage reveal a fascinating finding about the differential effect of political strain on violent and non-violent law enforcement tactics. The statistical analysis indicates that violent law enforcement is used in extraordinary circumstances

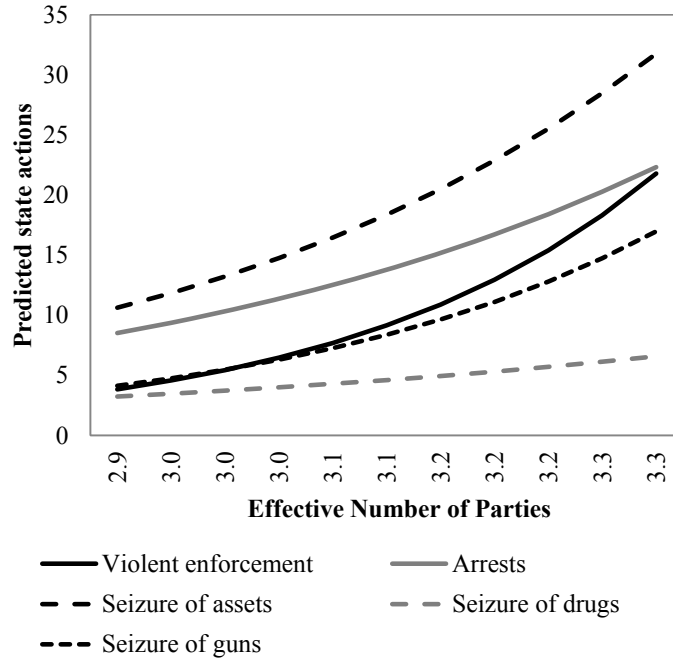


Figure 6.12. Effect of political competition on violent and non-violent enforcement

associated with periods of political crisis, whereas non-violent tactics do not follow this pattern. Figure 6.14 shows the differing effect of the margin of victory in the presidential election on law enforcement tactics. The figure shows that the narrower the margin of electoral victory, the more incentives politicians have to employ violent tactics to fight crime. In contrast, as the margin of victory increases, government authorities rely more on non-violent tactics. This result provides empirical support for hypothesis $H_{2,1}$ and suggests that violent law enforcement is used as a last resort to boost presidential approval rankings in periods of political strain. The distinct effect of political strain on the decision to rely on lethal force to fight crime provides support for the expectations suggested by Goldstein (1978) and Muller (1970) that displaying aggressive policies generates political benefits for government authorities as they signal strong leadership and resolve.

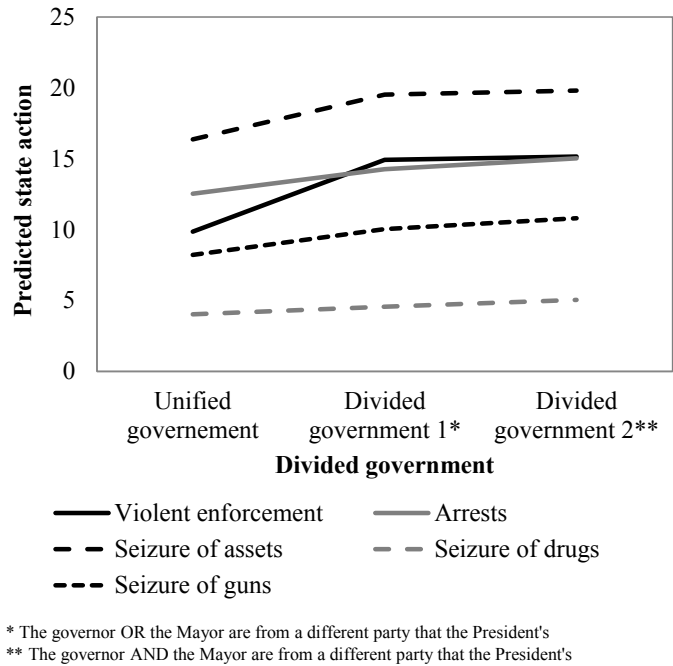


Figure 6.13. Effect of divided government on violent and non-violent enforcement

Second stage of violent and non-violent law enforcement

Table 6.5 reports the estimates for the second stage, evaluating the effect of the different law enforcement tactics on violent competition between DTOs. The results provide strong support overall for hypothesis H_5 , which claims that fighting crime has a disruptive effect on criminals and triggers waves of violence among DTOs. Models 1–5 in Table 6.5 show that after controlling for the endogeneity of overlapping processes of violence, this positive effect on competition between criminal groups holds consistently across violent and non-violent enforcement including arrests of suspected criminals and seizures of assets, drugs and weapons.

Figure 6.15 presents the effects of violent and non-violent enforcement on violence between DTOs. Since each enforcement tactic has its own range of predicted intensity, the horizontal axis presents them in a standardized manner as percentiles. Results

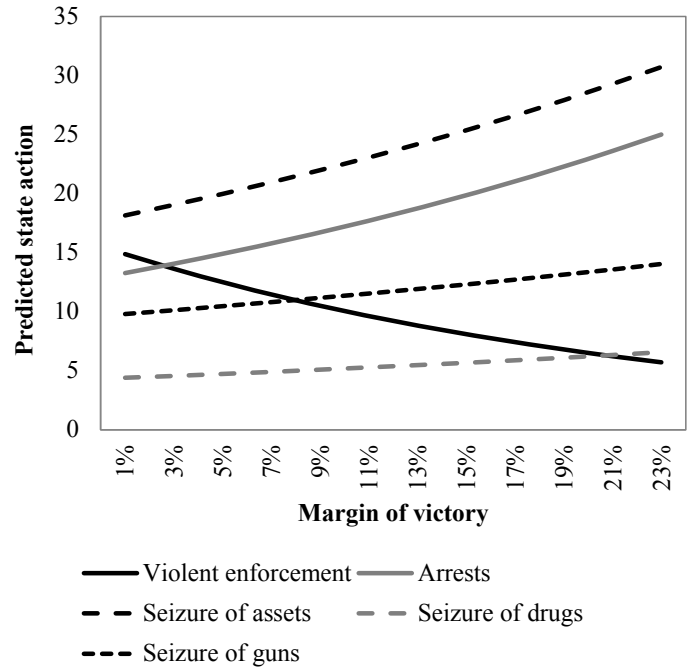


Figure 6.14. Effect of political strain on violent and non-violent enforcement

show that all enforcement tactics exacerbate the levels of criminal competition, yet there is a wide variation in the magnitude of their effects. Drug seizures have the most disruptive effect on criminal violence. Rising drug interdiction to its maximum level generates 210.9 times more expected episodes of conflict between DTOs. Weapons seizures have the second most disruptive effect on criminal competition and generate 131.2 times more events of violence when deployed at maximum intensity. The seizure of assets also instigates conflict between DTOs and triggers 101.4 times more events of violence among DTOs. The graph shows that arresting criminals also ignites conflict and generates 96.8 times more violent events between DTOs when applied at its highest level. Finally, violent enforcement also has disrupting effects on criminal competition but, when analyzed in comparative perspective, the magnitude of its effect is the lowest, as it generates 62.7 events of violence among DTOs.

TABLE 6.5

SECOND STAGE: VIOLENT COMPETITION AMONG DTOs

	(1)	(2)	(3)	(4)	(5)
Violent enforcement	11.501*** (1.814)				
Arrests		11.757*** (0.681)			
Seizure of assets			15.524*** (0.833)		
Seizure of drugs				24.080*** (1.112)	
Seizure of guns					13.021*** (1.367)
Retaliation	0.594*** (0.174)	0.594*** (0.150)	0.581*** (0.152)	0.585*** (0.144)	0.600*** (0.157)
Drug production	0.167*** (0.057)	0.185*** (0.058)	0.177*** (0.034)	0.177*** (0.036)	0.176*** (0.056)
Gulf	0.582*** (0.166)	0.584*** (0.193)	0.566*** (0.220)	0.571** (0.226)	0.571*** (0.199)
North	0.469*** (0.167)	0.497*** (0.173)	0.354** (0.154)	0.391*** (0.141)	0.504** (0.203)
Pacific	0.761*** (0.133)	0.574*** (0.103)	0.688*** (0.120)	0.737*** (0.116)	0.726*** (0.108)
9/11	1.085*** (0.178)	1.327*** (0.151)	1.168*** (0.124)	1.223*** (0.123)	1.088*** (0.141)
Poverty	-0.197** (0.083)	0.199* (0.111)	-0.031 (0.099)	0.100 (0.093)	-0.100 (0.108)
State GDP (log)	0.704*** (0.116)	0.089** (0.041)	0.467*** (0.024)	0.357*** (0.030)	0.588*** (0.021)
Population (log)	-0.098* (0.052)	0.068 (0.047)	-0.245*** (0.051)	-0.207*** (0.054)	-0.069 (0.050)
Rifles (100 K)	0.111*** (0.024)	0.052 (0.035)	0.062*** (0.011)	0.067*** (0.011)	0.097*** (0.034)
Unemployment	0.061** (0.024)	0.059** (0.025)	0.065*** (0.018)	0.064*** (0.018)	0.064*** (0.026)
Corruption	0.008*** (0.003)	0.011*** (0.004)	0.001 (0.003)	0.001 (0.003)	-0.003 (0.004)
Cocaine price	-0.001 (0.002)	0.002 (0.002)	0.002 (0.002)	0.001 (0.002)	-0.001 (0.002)
Drug markets	0.002 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)
Divorce	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Teenage mothers	-0.174 (0.940)	0.493 (1.202)	0.715 (0.620)	0.450 (0.586)	-0.259 (1.201)
Constant	-19.830*** (1.754)	-10.618*** (1.067)	-14.197*** (0.432)	-12.800*** (0.385)	-17.654*** (0.959)
Observations	9,868,208	9,868,208	9,868,208	9,868,208	9,868,208
Coefficients are in log of expected counts. Bootstrapped standard errors in parentheses. The levels of significance are: * p< 0.1, ** p< 0.05, *** p< 0.01					

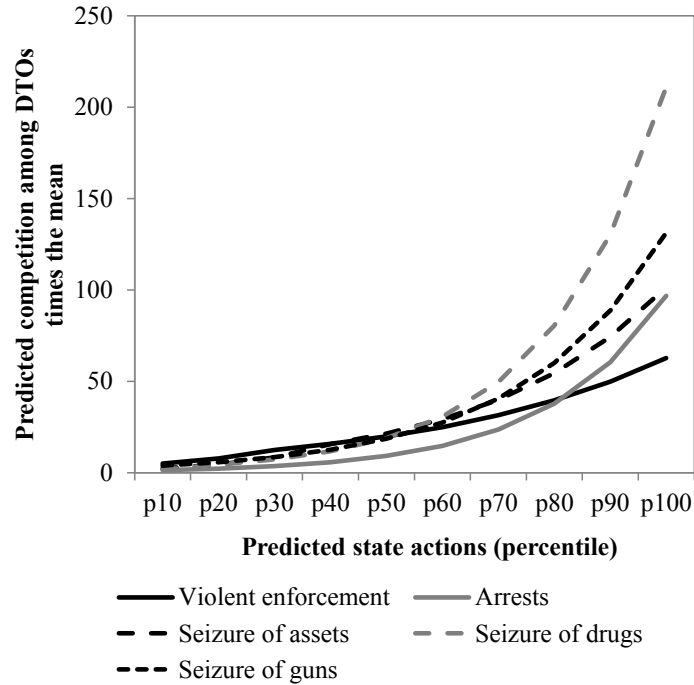


Figure 6.15. Effect of violent and non-violent enforcement on violent competition among DTOs

Since drug seizures have the strongest impact in generating violence between criminal organizations, the discussion of mechanisms will focus on analyzing this type of enforcement tactic. According to the theoretical model, *territorial competition* is the main mechanism driving the escalation of violence. In addition, interviews conducted during fieldwork suggest a variety of other mechanisms that could aid in understanding the effect of drug interdiction on violence between DTOs. These mechanisms are *compensation*, *reprisal*, *spill-over*, *substitution* and *discipline*. Some of these mechanisms have already been discussed by Osorio (2012). Although these specific mechanisms might operate in slightly different ways, the underlying common factor

in their operation is consistent with the general mechanism of territorial competition discussed in the theoretical model.

Territorial competition. The main causal mechanism suggested by the theoretical model is that law enforcement may trigger an invasion from a challenger DTO into the territory of the target criminal group affected by law enforcement. Drug seizures could generate at least three different signs of the target DTOs diminished capability to defend its territory. First, a series of government crackdowns signals that the target DTO is no longer protected under corrupt agreements with government authorities, thus increasing its vulnerability to raids from rival cartels. Second, the fact that the target DTO has experienced a crackdown by the state and lost some of its goods indicates that the criminal group was not able to protect its assets. This can signal weakness or incompetence on the part of the internal branch in charge of providing security to the organization, which can motivate their rivals to launch an invasion. Third, if the target DTO suffered a large drug seizure or a significant number of smaller seizures, the loss of merchandise could decrease the income of the criminal organization. The loss of income might undermine the capability of the target DTO to adequately carry out its activities, including provision of its own security.

Compensation. Since drugs provide the most important source of income for DTOs, drug seizures might motivate the targeted DTO to launch an offensive against its rivals in order to seize their drugs. The objective is to compensate for their loss by raiding their competitors. DTOs make considerable investments of money and reputation with international partners in producing and destination countries, which might try to compensate for the loss of the seized cargo by capturing their rival's drugs so they can fulfill their part of the deal. A lost cargo might not only imply losing the income expected from the seized drugs, but can also affect other business that the target DTO has with its partners or even generate violent reactions from

disappointed associates. In addition, raiding their competitors might generate violent retaliation as rivals try to protect their cargo and storage facilities.

Reprisal. Drug interdiction enacted on a target DTO might be caused by a rival informing authorities about the opportunity of seizing drugs. This mechanism can be a type of selective law enforcement in which a criminal group might cooperate with government authorities to inform them about the operations of rivals criminal organizations. Cooperation of this type might be based on corrupt agreements but also extracted from interrogations of arrested criminals trying to reduce their time in prison. In cases where information provided by a rival DTO caused a drug cargo to be interdicted, the targeted DTO might launch an offensive against the rival group who turned them in.

Spill-over. Dell (2011) argues that enforcement generates a spill-over effect of violence. Increased law enforcement in some areas motivates DTOs to use different drug-trafficking routes to avoid these operations. Changing routes generates a diffusion of violence among criminal groups to areas not previously affected by violence.

Substitution. Another mechanism potentially employed by DTOs is instead of expanding their territorial area of operations, reacting to drug seizures by expanding their activities to other types of illicit markets. Some DTOs might use their comparative advantage as specialists in violence to engage in predatory activities such as racketeering and kidnapping. Revenues from extortion and ransom might thus help compensate for the loss of income incurred by the seizure of cargo. In addition, engaging in violence-intensive activities such as racketeering and kidnapping sends a clear signal about the aggressiveness of the criminal group that might help to keep their rivals at bay.

Discipline. Drug interdiction can also generate violence within a targeted criminal organization. In some cases, leaders of criminal organizations might use violence to sanction their lower ranks as punishment for losing a valuable cargo. This disciplinary

mechanism also serves the purpose of reducing principal-agent problems when leaders declare that they will not tolerate “errors” from their lower ranks. Ensuring discipline is crucial for leaders because lower ranks can easily claim that drugs were seized, when they actually were not, and attempt to sell the cargo independently for their private gain. By using disciplinary violence, the leader sends a signal to the organization itself as well as to other groups about his ability and willingness to use violence.

6.3.6 Overall Model Fit

As discussed in Section 6.2.4, the structural model has limited explanatory power to account for the substantial variation in violence between DTOs. The goodness of fit assessment showed that structural variables often used for explaining criminal behavior and violence are so large and slow-moving that they cannot account for the rapid variation in criminal violence across time and space. In fact, Figure 6.6 showed that the structural model does a poor job in predicting violence between DTOs. In contrast, the interactive model of large-scale organized criminal violence presented in this research has stronger explanatory power than the structural model.

Figure 6.16 presents the scatter plot between the number of observed and predicted events of violent competition between DTOs as estimated by the second stage of the interactive model. This figure shows that the interactive model is better at explaining the variation in violent competition between criminal organizations.

Since the full database contains more than 9.8 million observations, the scatter plots of the observed and predicted events of violent competition generated by the structural model (Figure 6.6) and the interactive model (Figure 6.16) are somewhat limited for visualization purposes. The limitation of the scatter plots is due to the difficulty of depicting the concentration of a large number of observations around particular values. This is especially relevant for this research because the dependent variable is distributed as a negative binomial with a high concentration of data points

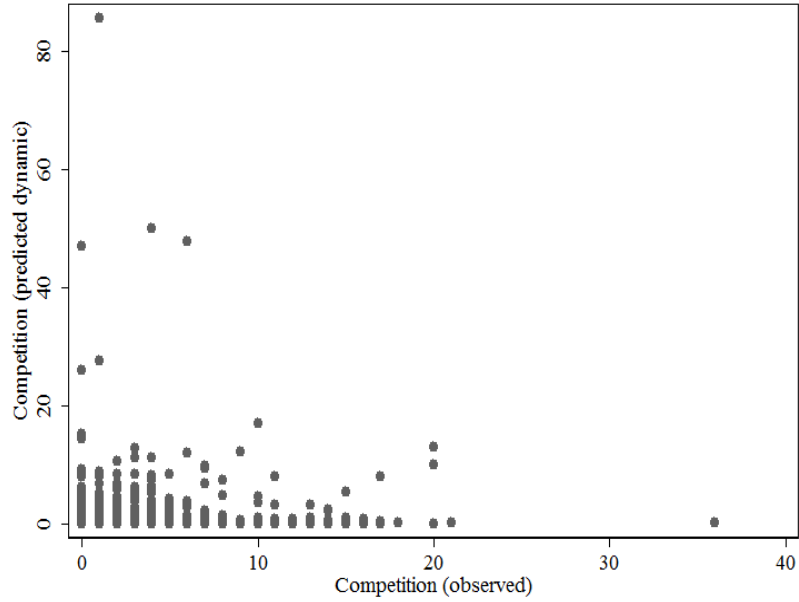


Figure 6.16. Goodness of fit of the interactive model

around zero (see Section 4.3.1). Figure 6.17 overcomes the limitations of the scatter plots by presenting heat-maps for the concentration of observed and predicted outcomes of the structural and interactive models. Darker areas in the panels indicate a higher concentration of observations around those values. As presented in the left panel of the figure, the structural model does a poor job of explaining the variation in violent competition between criminals. The predicted values generated by this model are heavily concentrated at the lower-left edge of the graph. In contrast, the right panel shows that the interactive model is substantially better at explaining the variation of violence between criminal groups. As expected, most of the predicted and observed events tend to cluster around zero. In addition, the gray areas of diminishing intensity indicate a broader variation between the predicted and observed levels of violent competition among criminal groups. In consequence, the empirical assessment indicates that the interactive explanation of violent competition between

criminal organizations is more useful than an explanation based exclusively on structural factors.

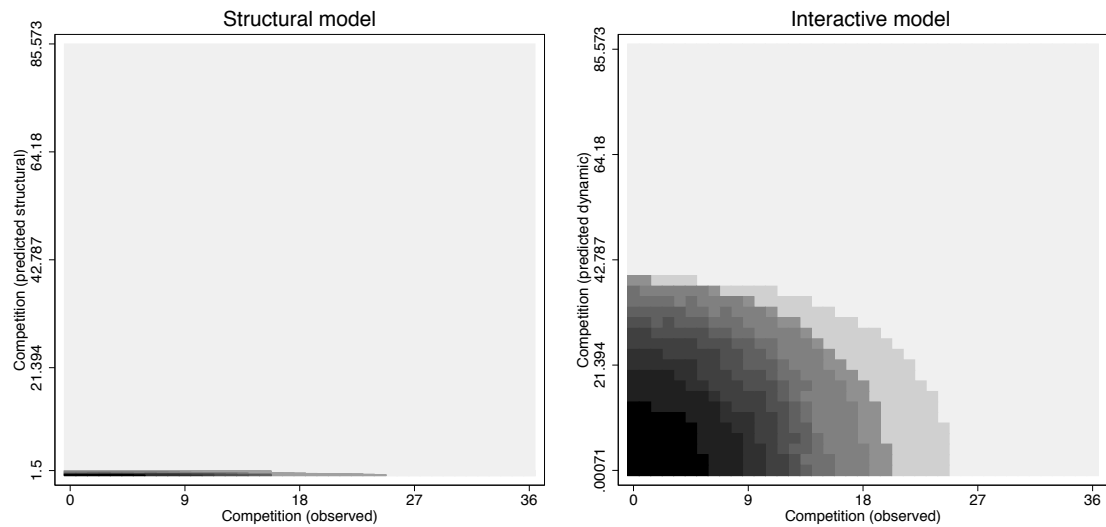


Figure 6.17. Comparative model fit between structural and dynamic models

6.4 Conclusions

This chapter provides the main empirical support for the predictions derived from the theoretical model. In a context where government authorities coexist with powerful criminal organizations, democratization erodes preexisting agreements between politicians and criminals, and periods of political strain can further motivate authorities to fight organized crime in an effort to gain citizen support. These increased efforts to enforce the law have a strong disruptive effect on the relative balance among

criminal organizations and trigger waves of violent competition among rival criminal groups fighting to control strategic territories.

The research design advances an interactive model of violent competition that overcomes the limitations of structural explanations of violence. However, the use of an interactive model of conflict carries the risk of finding spurious correlations due to the interaction between law enforcement and criminal violence, potentially generating reciprocal causation. The identification strategy used in this research relies on the use of instrumental variables, a quasi-experimental methodological strategy capable of overcoming the endogenous relationship among overlapping processes of conflict.

The empirical analysis reveals that the entrance of new parties to the political scene is associated with increased levels of enforcement across a broad menu of violent and non-violent law enforcement tactics. This may be indicative of how political competition motivates government authorities to provide public goods, including public security. The results also indicate that divided governments are associated with increased efforts to fight crime. This finding suggests that the entrance of new political actors across different levels of government disrupted the long-standing chain of command that enabled a peaceful, stable coexistence between the state and criminal organizations. In addition, the results indicate that narrow margins of election victory are related to the intensification of violent, but not of non-violent enforcement. This finding is consistent with the notion that political strain may motivate politicians to implement aggressive security policies under exceptional circumstances.

The results show that the effect of increased law enforcement caused by the exogenous variation of democratization and political strain is to increase levels of violence between criminal groups. This effect holds for both violent enforcement and non-violent tactics such as arrests and seizures of assets, drugs and weapons. The comparative analysis of the effect of different tactics reveals that drug interdiction has the most disrupting effect on violent competition between DTOs. Witness accounts

collected from interviews conducted during fieldwork suggest a variety of mechanisms involved in the relationship between drug seizures and criminal violence. These mechanisms are consistent with the main theoretical expectation of territorial competition among criminal organizations.

The statistical analysis supports the argument about the centrality of territorial values to explain violence between criminal groups. The results indicate that criminal violence tends to concentrate in territories favorable for the production of illegal drug crops, entry points along the Gulf and Pacific coasts, and international distribution spots on the U.S.–Mexico border. The analysis also shows that the deployment of law enforcement in these strategic areas dramatically exacerbates levels of violent competition between criminal organizations.

The research design of the interactive model using instrumental variables is not only able to overcome the problems of endogeneity between enforcement and criminal violence, but is also consistent with the data generation process described in the theoretical explanation, thus providing an application of the EITM approach capable of aligning the ontology of the formal model with the methodology used for testing its empirical implications.

The interactive approach of the empirical strategy helps provide a better understanding of the substantial variation in the micro-dynamics of violence in a way that structural explanations are not capable of doing. Despite of its limited analytical leverage, the structural model furnishes some findings that challenge the dominant theories of violence. One of the most striking findings related to structural factors is that violence between organized criminal groupss is strongly associated with higher levels of economic development. This finding is consistent across a variety of model specifications of the structural and the interactive models, and contradicts a widely held expectation among conflict scholars and criminologists that poverty is one of the most important determinants of political violence and criminal behavior. This

finding, in contrast, is consistent with the theory advanced in this research about the importance of valuable territories for understanding violent competition among DTOs. In any case, the positive relationship between economic development and violence suggests the need to further analyze the conceptual distinction between rebels and organized criminals.

CHAPTER 7

DYNAMICS OF VIOLENCE

IN THE MEXICAN WAR ON DRUGS

7.1 Introduction

The most vigorous debate in the Mexican war on drugs revolves around the efficacy of the punitive strategy implemented by government authorities to fight criminal organizations. On one side of the debate, Poiré and Martínez (2011) support the official discourse, arguing that law enforcement does not increase the levels of drug-related violence. To support their claim, these authors provide evidence of a single case in which the Mexican Army killed Ignacio “Nacho” Coronel Villarreal, a prominent leader of the Sinaloa Cartel, in 2010. According to their account, the general trend of drug-related homicides did not increase after the Army shot Coronel. On the same side of the debate, Villalobos (2010, 2012) offered an eloquent defense of the government strategy but with no systematic evidence to support his claim. On the other side of the debate, Guerrero (2011*b*) questioned the methodological approach used by Poiré and Martínez to conclude, based on a single data point, that the government strategy did not increase violence. Instead, Guerrero relies on 28 cases

in which government authorities captured or killed prominent drug lords to argue that the punitive strategy of the government triggers spirals of increasing violence between criminal groups. Other analysts have added their voices to the criticism of the full-fledged military campaign launched by President Calderón against criminal organizations, citing its deleterious consequences (Castañeda and Aguilar, 2010; Domínguez Ruvalcaba, 2010; Escalante Gonzalbo, 2009, 2011; Escalante Gonzalbo et al., 2011; Guerrero, 2009*a*, 2010*a,b*, 2011*a*; Merino, 2011).

Despite these keen insights, the empirical support for either side of the debate is problematic. The arguments focus primarily on the actions of the state towards criminal organizations but fail to consider the reactions of DTOs against the state and the actions rival criminal groups undertake towards each other. This unilateral approach largely ignores the dynamic and interactive characteristics of conflict. As indicated in Section 4.2 of Chapter 4, this unilateral approach is caused in part by the use of aggregated data focused exclusively on homicides, and provides no information about other interactions between the perpetrators and victims of violence. Another empirical problem of this debate is the narrow focus on analyzing a single law enforcement tactic (usually the targeting of drug leaders) without considering the broader menu of actions implemented by the state to fight crime. Not considering the full set of law enforcement efforts incurs a problem of omitted variable bias that is likely to generate misleading results.

However, the limitations of this debate are not only empirical and methodological. The tendency to study violence by paying narrow attention to a single actor and focusing on a reduced menu of actions reflects a pervasive theoretical limitation characteristic of research on conflict. Although the ontology of conflict is often depicted as the opposing actions or interests of two or more antagonistic actors, most theoretical developments and empirical assessments in conflict research tend to focus on only one actor without considering their opponents. In addition, most research

on conflict is focused on a narrow repertoire of contentious or repressive tactics, but fails to consider broader tactical alternatives. For example, those studying social movements, terrorism, or insurgencies tend to focus exclusively on protestors, terrorists or rebels, respectively, without taking into account the interactions between their subjects of study and the state. Similarly, those studying state repression and counter-insurgency tend to focus on the actions of government authorities without considering the interplay of their dynamic interaction with protesters or insurgents. Due to the theoretical complexities and the methodological sophistication required to study conflict from a dynamic, interactive perspective, there are few theoretical and empirical efforts that adopt this interactive approach. Perhaps the area of research that has advanced the farthest in analyzing the dynamic and interactive characteristics of conflict is the literature on the repression–dissent nexus (see McAdam, Tarrow and Tilly, 2001). In this emerging area of research, Davenport, Johnston and Mueller (2005) proposed the “Maryland model” of coercion and mobilization, arguing that the study of conflict requires taking into account the interactions between the state and challengers as they evolve over time and employ a diverse variety of tactics.

This chapter adopts the main insights of the “Maryland model” to assess the empirical implications derived from the theoretical model presented in Chapter 2, enabling the empirical analysis described in this section to provide an *interactive, dynamic, multimodal* explanation of violence in the Mexican war on drugs. The interactive nature of the method consists in analyzing the actions and reactions between the state and criminal organizations and between rival criminal groups. The dynamic character consists in explicitly incorporating the temporal evolution of individual and joint processes of violence into the empirical assessment. The multimodal character is based on simultaneous analysis of a variety of violent and non-violent tactics used by the state to fight criminal organizations.

Consistent with the theoretical expectations, the results show that a sustained campaign of violent law enforcement generates a substantial escalation of conflict between rival criminal organizations. In addition, the use of force to fight crime triggers a wave of retaliatory attacks perpetrated by criminal organizations against government authorities. The dynamic analysis also shows that sustained campaigns of violence between DTOs generate a violent response from government authorities, but this effect is moderate. The results provide, rather, the surprising finding that direct criminal attacks against the state do not seem to generate a coercive response from government authorities to counter or neutralize criminal hostilities.

The material presented in this chapter to support these claims is divided into four sections. The first part presents the main hypotheses to be tested and briefly discusses the research design based on methodologies of time series analysis. The second section identifies the specific characteristics of each time series of violence. The third segment presents the results of the dynamic and interactive analysis of the different processes of violence inherent to the Mexican war on drugs. Finally, the fourth section summarizes the findings and discusses the results.

7.2 Hypotheses and Research Design

The literature review in the theoretical chapter discussed one of the most robust findings in the research on political repression, known as the “law of coercive responsiveness” (Davenport, 2007). It is broadly recognized in this body of literature that government authorities generally respond with the use of repressive behavior to counter or neutralize dissenters attempting to subvert the political or economic status quo. In other words, the state regularly employs force to protect itself. In addition, theories on state formation largely agree that the state holds the legitimate right to use violence to suppress any kind of behavior that could threaten the life and

property of the population living in its territory (Hobbes, 1651; Olson, 2000; Tilly, 1985; Weber, 1978). According to this perspective, the state uses force to protect its citizens. These relationships can be expressed in terms of the following hypotheses, which are useful for analyzing the behavior of government authorities in the context of the Mexican war on drugs:

($H_{12.1}$) Criminal retaliation against government authorities is associated with higher levels of law enforcement.

($H_{12.2}$) Violent competition between rival criminal organizations is associated with higher levels of law enforcement.

In addition, Section 2.4 discussed the direct empirical implications derived from the formal model of drug violence. According to the theoretical explanation, law enforcement is expected to generate violent reactions from criminal groups against the state as well as violence between rival criminal organizations. These arguments are stated in the following hypotheses:

(H_4) Increased law enforcement is positively associated with higher levels of criminal retaliation against the state.

(H_5) Increased law enforcement is positively associated with higher levels of violent competition among criminal organizations.

To test these hypotheses, the empirical strategy relies on time series analysis of daily data aggregated at the national level. The processes analyzed in this chapter include *violent enforcement* used by the state to fight DTOs, *competition* among rival criminal organizations, *retaliation* attacks perpetrated by criminals against government authorities, as well as non-violent law enforcement tactics such as *arrests* of suspected members of criminal organizations, *seizures of assets*, *seizures of drugs* and *seizures of guns*. The characteristics of these variables are discussed in Chapter 4 and their descriptive statistics aggregated at the national level on a daily basis can be found in Appendix A.7.

The empirical analysis consists of three sections. The first relies on autoregressive integrated moving average (ARIMA) models to identify and estimate the appropriate autocorrelation process generating the outcome in each individual time series. These ARIMA models serve to generate reliable predictions about the dynamics of each time series. The second and third sections use vector autoregressive (VAR) models for analyzing the dynamic and reciprocal interactions among the different time series. In particular, the second section applies a baseline VAR model to the interactions between violent enforcement, competition between rival DTOs and criminal retaliation against the state. The third section analyzes a fully specified VAR model that includes the interactions between the violent and non-violent law enforcement tactics used by the state to fight crime, as well as the reaction by criminal groups against the state and the dynamics of competition between rival criminal organizations.

7.3 Time Series of Organized Criminal Violence

The model identification of each time series process is based on the procedure proposed by Box and Jenkins (1976), consisting of three stages: (i) identification, (ii) estimation and (iii) diagnosis. For brevity, this section mainly discusses the three stages for the time series of violent competition between criminal organizations. However, each subsection presents the general results for all the other time series of criminal retaliation, and violent and non-violent law enforcement.

7.3.1 Time Series Identification

There are three components of any time series process: trend, cyclical characteristics and random variation. The first two are deterministic and can be removed or filtered in order to reach *stationarity*, a crucial concept in time series analysis. According to Enders (2009), a time series is stationary if its mean, variance and

autocorrelations are time invariant. Even if we do not know the data generation process that produced the outcome, a stationary time series allows the use of information from previous events – such as the mean, variance and stochastic error – to predict the outcome in the future or changes in the outcome that would be caused by external shocks. This is possible because the mean, variance and autocorrelation of a stationary time series are stable over time. What happened in the past can be thus informative of what will happen in the future in stationary series. A time series is said to have *unit root* if it has the characteristics of a non-stationary process.

The first step in determining whether a time series is stationary is to make a basic visual assessment. Figure 7.1 presents the time series of daily data of violent competition between DTOs aggregated at the national level. A first examination of the graph suggests that the series might be non-stationary because of the positive trend and increasing variance towards the end of the series. However, the compression of eleven years of daily data into a single graph makes it hard to assess the stationarity of the series visually.

A more rigorous strategy for identifying the stationarity of the time series is to conduct an Augmented Dickey-Fuller (ADF) test. The null hypothesis of the ADF test is that the series is non-stationary. In consequence, if the statistic produced by the test is large (in absolute terms) and statistically significant, we can reject the null hypothesis and say that the series is stationary. The result of the augmented Dickey-Fuller test indicates that the time series of violent competition between criminal organizations follows a stationary process, but is influenced by a positive trend. The main estimate of the ADF reports a $Z(t)$ statistic of -46.909 with a MacKinnon p-value of 0.0000, thus rejecting the null hypothesis of a unit root. In addition, the $Z(t)$ statistic is well below the critical value of -3.960. The lag coefficient of the ADF is -0.71 and statistically significant. In addition, the trend component is positive and significant, thus indicating the presence of a deterministic trend in the process.

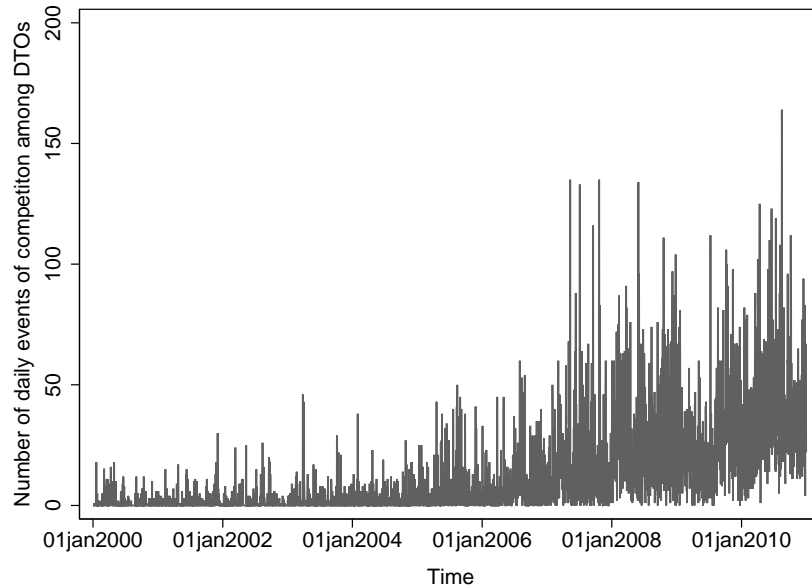


Figure 7.1. Daily time series of violent competition among DTOs at the national level

The augmented Dickey-Fuller test indicates that the time series of violence between DTOs is already stationary. Therefore it is not necessary to apply the difference transformation to the time series to make the process mean stationary nor to apply a logarithm transformation to generate variance stationarity. Differencing and log-transforming the data are the usual strategies for filtering deterministic components in non-stationary data. However, it is not necessary to apply such procedures to this time series since it has no unit root. Attempting to difference or log-transform the data would generate a largely negative lag coefficient of -1.42 , thus indicating problems of over-differencing in the time series.

Further diagnostics indicate that the time series of violence between DTOs is highly correlated over time. The Autocorrelation Function (AC) in panel (a) of Figure 7.2 shows that the AC decays slowly, thus suggesting an auto-regressive (AR) process of temporal autocorrelation. In addition, the slow decay of the spikes in the AC reveal a longterm autocorrelation process This long temporal influence is likely to

be caused by the use of daily data. In addition, the Partial Autocorrelation Function (PAC) in panel (b) of Figure 7.2 confirms the AR process. The large number of spikes above the 95 percent confidence intervals in the PAC function indicates that the autocorrelation in the time series goes back up to a month. In more intuitive terms, these diagnostics show that the events of violence between criminal organizations that occurred in the previous day strongly influence the number of events occurring in the current day and this temporal influence persists for approximately a month.

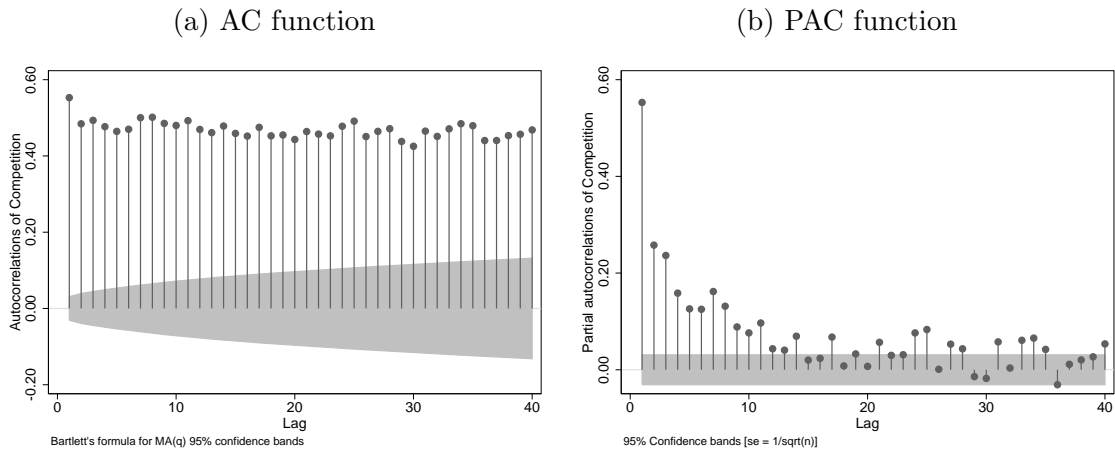


Figure 7.2. Autocorrelation (AC) and Partial Autocorrelation (PAC) of violent competition among DTOs

Table 7.1 presents the results of the augmented Dickey-Fuller tests for all the processes of conflict inherent to the Mexican war on drugs, including violent competition between DTOs, violent enforcement, criminal retaliation, arrests of organized criminals, seizures of assets, events of drug interdiction, and seizures of weapons. The analysis of the ADF tests indicate that all the time series are stationary processes

with a high degree of autocorrelation affected by positive trends. The AC and PAC graphs of all the different time series are not reported here, but they present similar characteristics of slow decay and longterm autocorrelation effects to those shown in Figure 7.2, thus suggesting the presence of auto-regressive processes.

TABLE 7.1
AUGMENTED DICKEY-FULLER TEST FOR DIFFERENT
PROCESSES OF VIOLENCE

Time series	Z(t) statistic	MacKinnon p-value	Critical value	Lag coefficient	Trend coefficient
Competition	-46.909	0.0000	-3.96	-0.71***	0.007***
Violent enforcement	-48.777	0.0000	-3.96	-0.74***	0.001***
Retaliation	-50.724	0.0000	-3.96	-0.78***	0.002***
Arrests	-48.134	0.0000	-3.96	-0.73***	0.004***
Assets	-52.452	0.0000	-3.96	-0.81***	0.002***
Drugs	-44.895	0.0000	-3.96	-0.67***	0.004***
Guns	-50.823	0.0000	-3.96	-0.78***	0.002***

7.3.2 Time Series Estimation and Diagnosis

After the identification of the time series as a stationary process, the second stage consists of estimating the structure of the autocorrelation using Autoregressive Integrated Moving Average (ARIMA) models. These models are useful for predicting future values of a time series by a linear combination of its past values and a series of error terms. In order to generate accurate predictions it is necessary to identify the order of temporal autocorrelations in the data realization process. The order

indicates the number of lags to be included in the estimation of the time series. After assessing different model specifications, it was found that the time series of violence between DTOs is best described by an autoregressive (AR) model of the 37st order, represented by the acronym AR(37). This means that events of violence that took place 37 days in the past still have an effect on the current levels of conflict between DTOs. The assessment of different model specifications indicate that there is no need to include moving-average processes or seasonal components.

The key diagnostic of an ARIMA model an analysis of the residuals generated by the time series process, which in this case is an AR(37) model. If the specification of the model is correct, the model should generate no autocorrelation in the residuals, a characteristic known as white noise. If autocorrelation is absent from the error terms, the residuals should be randomly distributed around zero. This indicates that the disturbances are stochastic and this white noise does not affect the prediction of future values. In contrast, if the model does not include the correct specification of autoregressive or moving average terms with their respective order of lags, the model will not show white noise, and will not be able to forecast accurately based on the observed data. One strategy for detecting white noise is to visually inspect the correlograms of the residuals. Panels (a) and (b) in Figure 7.3 present the AC and PAC functions of the residuals generated after estimating the ARIMA AR(37) model. Both panels show that the model generates white noise in the residuals. With the exception of lag 40, there are no spikes outside the confidence intervals of either the AC or PAC correlograms. Even the spike at day 40 is so small and so far back in time that it is not likely to affect the model.

An alternative way to assess the level of autocorrelation in the residuals is to consider a Portmanteau test for white noise. The null hypothesis of this test is that there is no serial correlation. If the test produces a large statistic with high levels of statistical significance, the null hypothesis is rejected, and autocorrelation

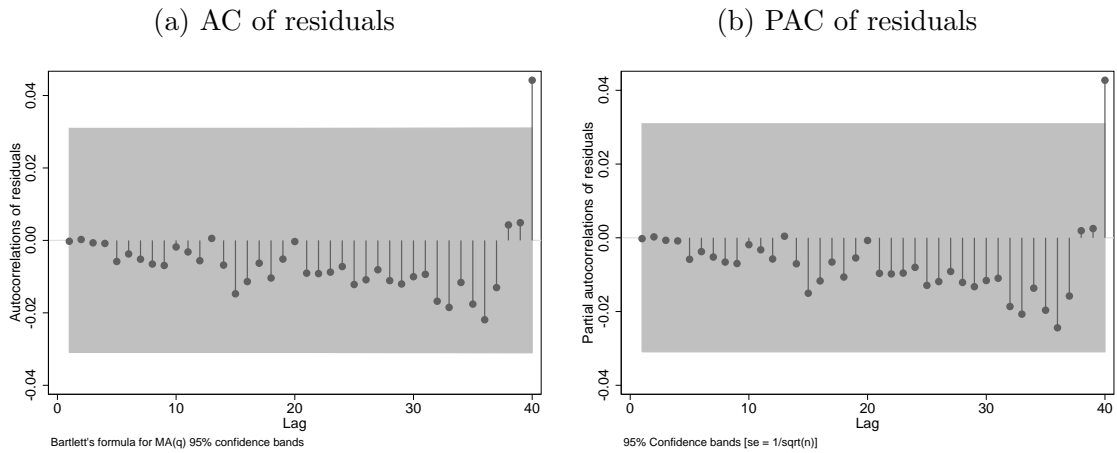


Figure 7.3. Autocorrelation (AC) and Partial Autocorrelation (PAC) functions of residuals from the ARIMA AR(37) model

is suspected. In the case of an AR(37) model for the time series of violence between DTOs, the Portmanteau test yields a Q statistic of 22.6 with a p-value of 0.9879, thus failing to reject the null hypothesis. In consequence, it can be concluded that there is white noise in the residuals and that this model specification is reliable for generating accurate predictions about violence between rival criminal groups.

Instead of presenting the AC and PAC graphs of residuals for all the other time series, Table 7.2 reports the Q statistics and their corresponding p-values of the portmanteau test for white noise for all the other processes of violence. Based on the proposed model specifications, the test fails to reject the null hypothesis, thus suggesting that there is no serial correlation in the error terms. In consequence, these ARIMA models can be used for accurate forecasting for each process of violence inherent to the Mexican war on drugs.

TABLE 7.2

PORTMANTEAU TEST FOR WHITE NOISE IN DIFFERENT
PROCESSES OF VIOLENCE

Time series	ARIMA model	Order	(Q) statistic	p-value
Competition	AR	37	22.6	0.988
Violent enforcement	AR	31	33.92	0.74
Retaliation	AR	28	49.9	0.135
Arrests	AR	21	50.25	0.129
Assets	AR	22	31.09	0.84
Drugs	AR	28	32.14	0.999
Guns	AR	28	24.37	0.81

7.3.3 Model Specification of Time Series Processes

Based on the time series identification procedure proposed by Box and Jenkins (1976), the following set of equations describes the time series processes for violence between criminal groups, violent law enforcement, criminal retaliation and non-violent enforcement tactics such as arrests, seizure of assets, drug interdiction and seizures of weapons. Notice that these equations are presented in terms of autoregressive (AR) processes represented by including a series of lags of the outcome variable. The identification and estimation strategy discussed above does not suggest the need to include moving average (MA) processes in the residuals nor seasonal components. These ARIMA models will be used in the next section to analyze the conflict interactions between the state and criminal organizations and violence between rival criminal organizations.

Equation 7.1 represents the time series of violent competition among DTOs:

$$C_t = \alpha_1 + \beta_1 C_{t-1} + \beta_2 C_{t-2} + \cdots + \beta_k C_{t-k} + u_{1t} \quad (7.1)$$

where C_t represents the number of events of violent competition between criminal groups at time t , scalar α_1 is the intercept, C_{t-i} represents the lags of violence between DTOs for each day $i \in [1 - k]$, parameter β_i represents the autoregressive effect of each lag in time $t - i$ and u_{1t} represents the current error terms. The ARIMA model of violent competition between criminal groups uses $k=37$, thus including an autoregressive process of lags for 37 days.

Equation 7.2 represents the time series of violent enforcement from the state against DTOs:

$$E_t = \alpha_2 + \theta_1 E_{t-1} + \theta_2 E_{t-2} + \dots + \theta_k E_{t-k} + u_{2t} \quad (7.2)$$

where E_t represents the daily number of events of violent law enforcement, scalar α_2 is the intercept of this time series, E_{t-i} represents the lags of violent enforcement back to k days, coefficient θ_i accounts for the lagged effect of the data in time $t - i$ and u_{2t} captures the error terms. The ARIMA model of violent enforcement conducted by the state against criminal organizations uses an autoregressive process of 31 lags.

Equation 7.3 represents the time series of criminal retaliation against the state:

$$R_t = \alpha_3 + \Omega_1 R_{t-1} + \Omega_2 R_{t-2} + \dots + \Omega_k R_{t-k} + u_{3t} \quad (7.3)$$

where R_t represents the number of events of violence against the state perpetrated by criminal organizations, α_3 is the intercept, R_{t-i} represents the events of retaliation in previous days, parameter Ω_i is the coefficient of lagged observations in time $t - i$ and u_{3t} represents the error terms. The ARIMA model of criminal retaliation against the state uses an autoregressive order of 28 days.

Equation 7.4 represents the time series of arrests:

$$A_t = \alpha_4 + \delta_1 A_{t-1} + \delta_2 A_{t-2} + \dots + \delta_k A_{t-k} + u_{4t} \quad (7.4)$$

where A_t represents the number of daily arrests, α_4 is the intercept, A_{t-i} represents the number of arrests in the past, parameter δ_i represents the autoregressive effect of lags in $t - i$ and u_{4t} corresponds to the error terms. The ARIMA model of the time series of arrests of suspected members of criminal organizations uses an autoregressive process of the 21st order.

Equation 7.5 represents the time series of seizures of criminal assets:

$$S_t = \alpha_5 + \sigma_1 S_{t-1} + \sigma_2 S_{t-2} + \cdots + \sigma_k S_{t-k} + u_{5t} \quad (7.5)$$

where S_t represents the number of seizures of criminal assets, α_5 corresponds to the intercept, S_{t-i} are the number of seizures conducted in previous days, coefficient σ_i is the coefficient of the lag at time $t - i$ and u_{5t} represents the error. The ARIMA model of the number of events where authorities confiscate criminal assets uses an order of 22 lags in the autoregressive process.

Equation 7.6 represents the time series of seizures of criminal assets:

$$D_t = \alpha_6 + \mu_1 D_{t-1} + \mu_2 D_{t-2} + \cdots + \mu_k D_{t-k} + u_{6t} \quad (7.6)$$

where D_t corresponds to the daily number of drug seizures, scalar α_6 represents the intercept, D_{t-i} indicates the previous events of drug seizures back to k days, μ_i represents the effect of lags in $t - i$ and u_{6t} is the error term of drug interdiction. The ARIMA model of the time series of drug interdiction considers autoregressive order of 28 days.

Lastly, equation 7.7 represents the time series of the number of daily gun seizures:

$$G_t = \alpha_7 + \rho_1 G_{t-1} + \rho_2 G_{t-2} + \cdots + \rho_k G_{t-k} + u_{7t} \quad (7.7)$$

where G_t is the number of events in which the state confiscates weapons to criminal organizations, α_7 is the intercept, R_{t-i} represents the number of seizures of guns that took place in the k previous days, coefficients ρ_i account for the the autoregressive effect of lagged observations in time $t - i$ and u_{7t} corresponds to the error terms. The ARIMA model of gun seizures considers an autoregressive process of 28 lags.

7.4 Dynamic Analysis of Drug-Related Violence

7.4.1 Base-Line Vector Autoregressive Model for the Dynamics of Drug Violence

The ARIMA models identified in the previous section are useful for generating accurate forecasts for each individual time series. In addition, these models can also be used as building blocks for assessing the simultaneous and dynamic interactions among the different processes of conflict as they evolve over time. These types of dynamic, endogenous relationships can be analyzed with vector autoregressive (VAR) models. In their seminal work, Freeman, Williams and Lin (1989) introduced the use of VAR models in political science as a way of developing an empirical strategy that could better approximate the complexity and endogeneity of theoretical explanations. VAR models are particularly useful for testing hypotheses in dynamic analysis because they require fewer theoretical assumptions and empirical restrictions than traditional structural equation models (SEM). Due to their flexibility and analytical leverage, VAR models have been used to analyze the dynamic interactions in conflict processes including anti-terrorist strategies (Enders and Sandler, 1993), strategic behavior at the intersection of domestic and international conflicts (Moore, 1995), and interactions between the state and dissidents in a variety of domestic conflicts (Shellman, Hatfield and Mills, 2010; Shellman, 2004).

Instead of predicting the outcome of a time series from the effect of *exogenous* variables, VAR analysis treats the interactions between time series as *endogenous*. Following Freeman, Williams and Lin (1989, 845), VAR models regress each of the variables in their system on the past lags of those variables and on the past lags of all the remaining variables.

The basic intuition behind VAR models is illustrated in Figure 7.4 depicting the temporal evolution and reciprocal interactions among the time series of violent competition between DTOs, violent enforcement from the state, and criminal retaliation against government authorities. The first set of components in the figure refer to the time series of competition between criminal groups, the second set to the time series of violent enforcement and the third set to criminal retaliation against the state. Solid arrows depict the effect of previous events of each series on its own outcomes, and dashed arrows show the reciprocal interactions between different time series. Solid arrows thus actually represent a combined effect of both the occurrence of previous events and variation caused by the interaction with other time series in the past. The example in this figure includes only two lags. As the diagram implies, the use of VAR analysis enables prediction of the outcome of violent competition between DTOs at time t caused by previous events of violence between criminal groups at times $t - 1$ and $t - 2$, while also incorporating the simultaneous effect on competition caused by current and previous shocks of law enforcement and events of criminal retaliation. The other time series are simultaneously estimated based on their own temporal inertia and the effects of other processes of violence affecting them.

The vector autoregressive model shown in Figure 7.4 can be useful for testing the central hypothesis related to the dynamic interaction between the state and criminal organizations and between rival criminal groups. According to the law of coercive responsiveness, the state is likely to engage in repressive behavior if directly challenged by criminal organizations ($H_{12,1}$). In addition, the state is likely to use

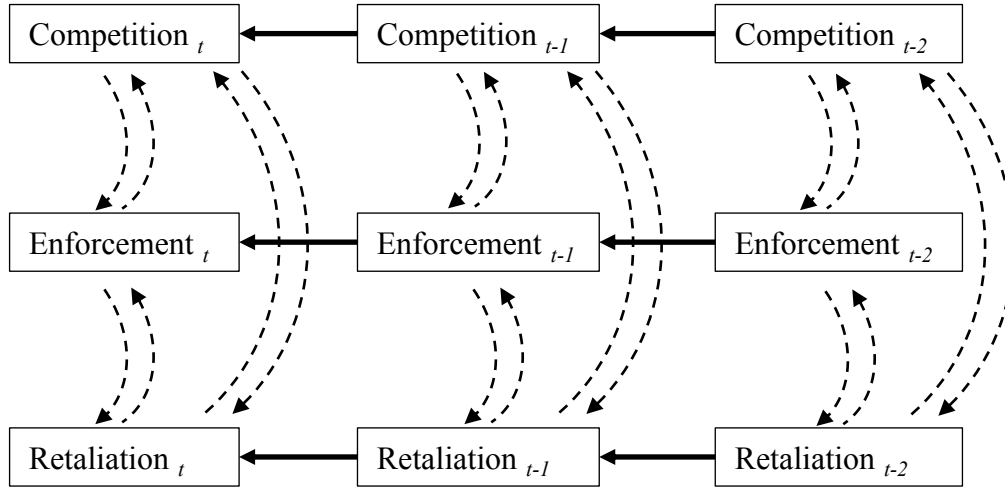


Figure 7.4. General intuition of Vector Autoregressive (VAR) models

force to impose order if rival criminal groups are fighting each other ($H_{12.2}$). Based on the expectations of the theoretical model, state violence is also likely to trigger violent reactions from criminal organizations against government authorities (H_4) and between rival criminal groups (H_5). These dynamic and interactive relationships can be simultaneously tested in VAR model 1 comprising the following system of equations:

$$\begin{aligned}
 \mathbf{C}'_t &= \alpha_1 + \beta_{11}C_{t-1} + \beta_{12}C_{t-2} + \cdots + \beta_{1k}C_{t-k} \\
 &\quad + \theta_{10}E_t + \theta_{11}E_{t-1} + \theta_{12}E_{t-2} + \cdots + \theta_{1k}E_{t-k} \\
 &\quad + \Omega_{10}R_t + \Omega_{11}R_{t-1} + \Omega_{12}R_{t-2} + \cdots + \Omega_{1k}R_{t-k} + u_{1t}
 \end{aligned} \tag{7.8}$$

$$\begin{aligned}
 \mathbf{E}'_t &= \alpha_2 + \theta_{21}E_{t-1} + \theta_{22}E_{t-2} + \cdots + \theta_{2k}E_{t-k} \\
 &\quad + \beta_{20}C_t + \beta_{21}C_{t-1} + \beta_{22}C_{t-2} + \cdots + \beta_{2k}C_{t-k} \\
 &\quad + \Omega_{20}R_t + \Omega_{21}R_{t-1} + \Omega_{22}R_{t-2} + \cdots + \Omega_{2k}R_{t-k} + u_{2t}
 \end{aligned} \tag{7.9}$$

$$\begin{aligned}
 \mathbf{R}'_t &= \alpha_3 + \Omega_{31}R_{t-1} + \Omega_{32}R_{t-2} + \cdots + \Omega_{3k}R_{t-k} \\
 &\quad + \theta_{30}E_t + \theta_{31}E_{t-1} + \theta_{32}E_{t-2} + \cdots + \theta_{3k}E_{t-k} \\
 &\quad + \beta_{30}C_t + \beta_{31}C_{t-1} + \beta_{32}C_{t-2} + \cdots + \beta_{3k}C_{t-k} + u_{3t}
 \end{aligned} \tag{7.10}$$

Equation (7.8) in VAR model 1 models the process of violent competition between rival criminal groups, denoted by \mathbf{C}'_t , which is generated by previous events of violence between DTOs (represented by the parameters in the first row, the current and past levels of violent law enforcement (represented by the second row) and the current and previous levels of criminal retaliation (represented in the third row of the equation). The outcomes from the time series of violent competition between DTOs thus incorporates both internal dynamics of violence between criminal groups over time and the interactive effect of state violence against criminals and violent retaliation from criminal groups against government authorities.

Equation (7.9) models the time series of violent law enforcement, \mathbf{E}'_t , which is affected by past events of state violence (parameters in the first row), current and past events of violence between criminal organizations (second row of the equation) and criminal attacks against the state (third row).

Equation (7.10) models the time series process of criminal retaliation, \mathbf{R}'_t , which is influenced by previous criminal attacks against government authorities (in the first row of the equation), current and past levels of violent law enforcement (second row) and current and past events of violent competition among criminal organizations (represented by the third row of the equation).

This vector autoregressive model for the dynamic interaction between the state and DTOs and between rival criminal groups employs an autoregressive process of 37 lags. The order of serial correlation is based on both the estimation of the ARIMA model in equation (7.1) capable of generating white noise and the analysis of the lag-order selection statistic computed in Stata by command `varsoc`. In consequence, equations (7.8), (7.9) and (7.10), making up the system of equations in VAR model 1, are estimated with lags of 37 days. Finally, this base-line model specification includes no exogenous variables.

The particular regression results of each of the 118 parameters in VAR model 1 are not of specific interest of this research. For this reason the table of results is not reported. Table 7.3 shows that the model provides a good fit for the data, with R^2 ranging from 32.3 percent to 50.1 percent. However, it is important to note that VAR analysis usually yields high R^2 values due to the high degree of autocorrelation between the lagged terms.

TABLE 7.3

EXPLANATORY POWER OF VAR MODEL 1

Equation	Parameters	RMSE	R^2	χ^2	p-value
Competition	112	13.2516	0.5089	4125.827	0.0000
Violent enforcement	112	3.08389	0.3201	1873.904	0.0000
Retaliation	112	5.27884	0.3929	2576.207	0.0000

Rather than specific parameter estimates, the discussion of the regression results is focused on analyzing the causal relationships relating to the dynamic interaction among actors as stated in Hypotheses $H_{12.1}$, $H_{12.2}$, H_4 and H_5 . The dynamic and reciprocal interactions inherent to a VAR analysis require a Granger causality test to be performed to assess the effect of one variable (or sets of variables) on another and vice versa. The Granger test of causality indicates whether the lags of one variable affect the outcome of another variable.¹ This test is implemented by performing a

¹Following Enders (2009, 318), the Granger causality test analyzes the temporal effects of previous values of a variable $x(t)$ on the outcome of another variable, $y(t)$, such that $x(t) \rightarrow y(t)$. In this sense, the term *causality* is restricted to the temporal relationship between the two variables, which is referred as *Granger causality*. Therefore, the Granger causality test should not be directly interpreted as a test of causal inference as understood in the experimental literature (Dunning, 2012).

χ^2 test for the joint hypothesis that a potential causal variable does not cause the other variable. Performing a Granger causality test requires first estimating the full model to calculate the likelihood of this specification and then excluding the time series of another variable to calculate the likelihood of this restricted model. The null hypothesis of the Granger causality test is that the excluded time series *has no effect* on the outcome of interest. If the likelihood of the restricted and full models are the same, the test fails to reject the null hypothesis. This means that extracting the removed time series has no effect in the full model and the excluded variable does not contribute to the explanation of the outcome of interest. In contrast, if the test reports a large coefficient with high statistical significance, then we can reject the null hypothesis and state that the excluded time series *Granger-causes* the outcome.

Table 7.4 presents the result of the Granger causality test for VAR model 1. The χ^2 statistics of all tests are large at high levels of statistical significance, thus providing evidence for the endogeneity inherent to the dynamics of violence in the Mexican war on drugs. In particular, the Granger causality test indicates that previous efforts by government authorities to enforce the law Granger-cause violent competition among criminals. In addition, events of criminal retaliation against government authorities Granger cause violence among DTOs. The third row in Table 7.4 indicates that a restricted model excluding time series of both violent enforcement and criminal retaliation generates a different likelihood than the full model, thus suggesting that the levels of violent law enforcement and criminal retaliation jointly cause competition among rival drug cartels. The remaining results in the Granger test of causality confirm that these relationships are reciprocal. The statistics indicate that competition among DTOs and criminal attacks against government authorities independently and jointly Granger-cause violent law enforcement by the state. In addition, the results indicate that violent confrontations between rival criminal organizations and govern-

ment efforts to enforce the law by violent means Granger-cause criminal retaliation against government authorities.

TABLE 7.4

GRANGER CAUSALITY TEST FOR VAR MODEL 1

Equation	Excluded	χ^2 test	d.f.	p-value
Competition	Violent enforcement	84.31	37	0.000
	Criminal retaliation	84.77	37	0.000
	All	195.52	74	0.000
Violent enforcement	Competition	118.8	37	0.000
	Criminal retaliation	59.85	37	0.010
	All	185.06	74	0.000
Criminal retaliation	Competition	122.91	37	0.000
	Violent enforcement	116.99	37	0.000
	All	246.54	74	0.000

Although the Granger causality test provides valuable information about the reciprocal relationships among the different time series, the test only indicates whether the temporal variation of one time series has an effect on the outcome of another series. It does not specify the direction or the magnitude of this feedback relationship. Fortunately, the analytical leverage of VAR models helps provide an understanding of the dynamic characteristics and interactive behavior of the series estimated in the system. The empirical strategy for identifying the direction and magnitude of the reciprocal effect of the variables relies on the use of impulse response functions (IRFs). These enable the effect of an external shock on the behavior of another variable to be analyzed. The external shock is thus modeled as an impulse and the IRF function

describes the reaction of the time series of interest. The dynamic decomposition of the effect provides information about the direction of the effect, its magnitude, and its duration over time.

A simple IRF gives the effect over time caused by a one-time unit shock on the response function, holding all else constant. For example, suppose that we want to assess the effect of an external shock of law enforcement on violence among criminals. In principle, the IRF could give us information about the behavior of violence between DTOs as a response to a one-time impulse of violent enforcement. However, as indicated by parameters $\theta_{10}E_t$ in equation (7.8), the shock of law enforcement is contemporaneously correlated with the outcome of violent competition between criminals and it cannot be held constant; therefore a simple IRF cannot have a causal interpretation for the kind of specification used in VAR model 1. To solve this problem, Orthogonal Impulse Response Functions (OIRFs) implement a Cholesky decomposition to treat the impulse as an exogenous shock and enable a causal interpretation (Hill, 2006; Sims, 1980; Sims and Zha, 1999).

Figure 7.5 shows the orthogonal impulse response functions (OIRFs) of the various processes of violence inherent to the war on drugs. The solid line represents the effect of the shock, the gray area around the impulse depicts the 95 percent confidence intervals,² steps in the horizontal axis indicate the number of days after day 0, when the external shock is applied. The analysis of response functions in this figure extends up to 40 days following the initial shock.

The panel in the upper left of Figure 7.5 shows the OIRF effect of a one-unit increase of violent law enforcement at time 0 on the behavior of violent competition

²It is important to note that the impulse response functions presented in this research have very narrow margins of confidence. This is unusual in VAR analysis, as most IRF display very wide margins of error, thus reducing the levels of certainty about the results. Wide margins of confidence are usually caused by the use of aggregated data in large temporal units (e.g. years). The use of fine-grained daily data contained in OCVED produces narrow margins of error, thus increasing confidence about the results.

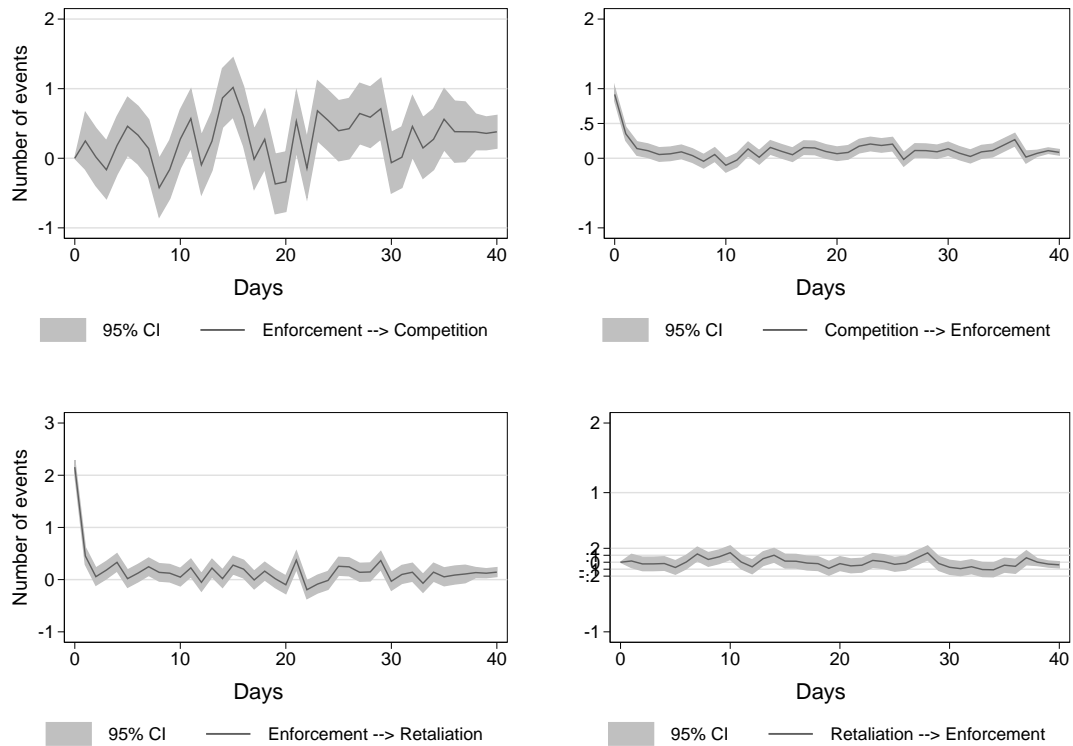


Figure 7.5. Orthogonal Impulse Response Functions (OIRF) of violence in the Mexican war on drugs

between criminals. The OIRF shows that a single shock of violent enforcement has a large disturbing effect on violence between DTOs that endures over time. This effect is highly irregular, consisting of a series of spikes of violence between rival criminal organizations at days 5, 11, 14, 15, 21, 23–28, 33 and 35. In the last ten days of the analysis, the response function shows a sustained positive trend. This OIRF panel reveals that the use of force by government authorities to fight crime has a lasting effect on criminal competition that causes several confrontations between rival criminal groups. Moreover, even after 40 days from the initial crackdown from the state, violence between DTOs does not fade. This impulse response function thus provides support for hypothesis H_5 which claims that violent enforcement generates

violence between criminal organizations. As expected from the theoretical model, law enforcement actions from the state disrupt the balance among criminal organizations and are likely to trigger a series of violent actions and reactions among DTOs as they push the relative military balance back and forth between them.

The second panel at the upper right of Figure 7.5 shows the effect of violent competition between criminal groups on the levels of violent enforcement employed by the state. The figure shows that a one-time event of violence between DTOs generates an immediate repressive reaction from government authorities but has no lasting consequences on the behavior of the state. The OIRF indicates that the reaction from government authorities is proportional to the violence between criminals, to the extent that one event of criminal competition generates approximately one violent reaction by the state on day 0. Analyzing the behavior of the state over a 40-day period shows that the event of violence between criminals does not have a long term impact on law enforcement beyond the immediate reaction by government authorities. This evidence provides support for Hypothesis $H_{12.2}$ which claims violence between DTOs causes the state to employ coercive force to impose order. However, it is surprising that violence between DTOs generates such a modest reaction from government authorities.

The third panel at the lower left of Figure 7.5 presents the OIRF function for the effect of a one-time event of violent law enforcement on criminal retaliation. The figure shows that criminal groups react immediately to violent law enforcement by perpetrating approximately two attacks against government authorities in response to a single event of violent enforcement. However, after a few days there are no more attacks against government authorities. This result provides support for the theoretical expectation expressed in Hypothesis H_4 , which claims that law enforcement generates violent contestation from criminal organizations against the state. One of the most remarkable findings of this panel is the scale of the response by organized

criminals to attacks from government forces; that is, retaliating twice for each single action committed by the state.

Finally, the lower right panel in Figure 7.5 reports the behavior of the state in response to a one-time attack from organized criminals. The panel shows the surprising finding that attacks perpetrated by criminal organizations against the state do not seem to generate a violent reaction from government authorities. In contrast to the robust expectation of the “law of coercive responsiveness” that the state will invariably deploy a repressive response when threatened by a hostile actor, the results show that the Mexican government has not reacted with the use of force when attacked by criminal organizations. The evidence provided in this panel does not support hypothesis $H_{12.1}$.

OIRFs provide valuable insights into the dynamic interactions of drug-related violence. However, these functions only provide information about the behavior of a time series in reaction to a single shock in one point in time. Unfortunately, this single-shot approach does not reflect the sustained events of violence characteristic of the Mexican war on drugs. To overcome this limitation, the empirical strategy relies on Cumulative Orthogonal Impulse Response Functions (COIRF) to assess the aggregated response of a variable of interest in reaction to a sequence of shocks. Instead of focusing on the effect of a single and isolated event, COIRFs enable the cumulative effect of sustained campaigns of violence to be modeled. COIRFs describe the response over time of an outcome variable in reaction to the application of a sequence of one-unit shocks applied over a period of time. For example, in an observation period of 40 days, the COIRF incorporates the cumulative effect of a single shock occurring repeatedly every day over the 40-day period. The analytical leverage of this tool is thus helpful for understanding the reciprocal and dynamic interactions characteristic of sustained campaigns of violence.

Figure 7.6 presents the cumulative orthogonal impulse response functions of the Mexican war on drugs. The upper left panel shows the aggregated effect on violence between DTOs caused by the government continuously using violent enforcement over a period of 40 days. The panel shows a sustained positive effect, indicating that the sustained use of force against criminal groups generates a massive escalation of violence between criminal organizations. According to the results, by the fortieth day in the campaign of violent law enforcement, a single additional government crackdown triggers some 12 events of violence between criminal organizations the same day. Even when considering the wide span of the 95 percent confidence intervals caused by the irregular variation in each individual crackdown discussed above, the fortieth consecutive event of law enforcement generates between 6 and 19 events of violent criminal confrontations. Consistent with theoretical expectations, this result indicates that launching a full-fledged campaign against criminal organizations is likely to have a large disturbing effect on the relative military balance among criminal groups, thus unleashing a massive and lasting wave of violence among rival criminal groups. The COIRF function in this panel thus provides strong support for hypothesis H_5 .

The upper right panel in Figure 7.6 presents the COIRF for the effect of violent competition between DTOs on the levels of violent law enforcement deployed by the state. The results indicate that sustained confrontations among rival criminal groups increase the number of violent crackdowns conducted by government authorities. After a sustained sequence of 40 days of confrontations between DTOs the state employs violent tactics to fight crime an average of five times a day. These results provide support for hypothesis $H_{12.2}$ which claims that the state uses force to impose order. However, it is surprising that after 40 days of violent confrontations between criminal groups the state displays such moderate behavior.

The panel in the lower left corner of Figure 7.6 shows the effect of violent law enforcement on criminal retaliation against the authorities. The results show that

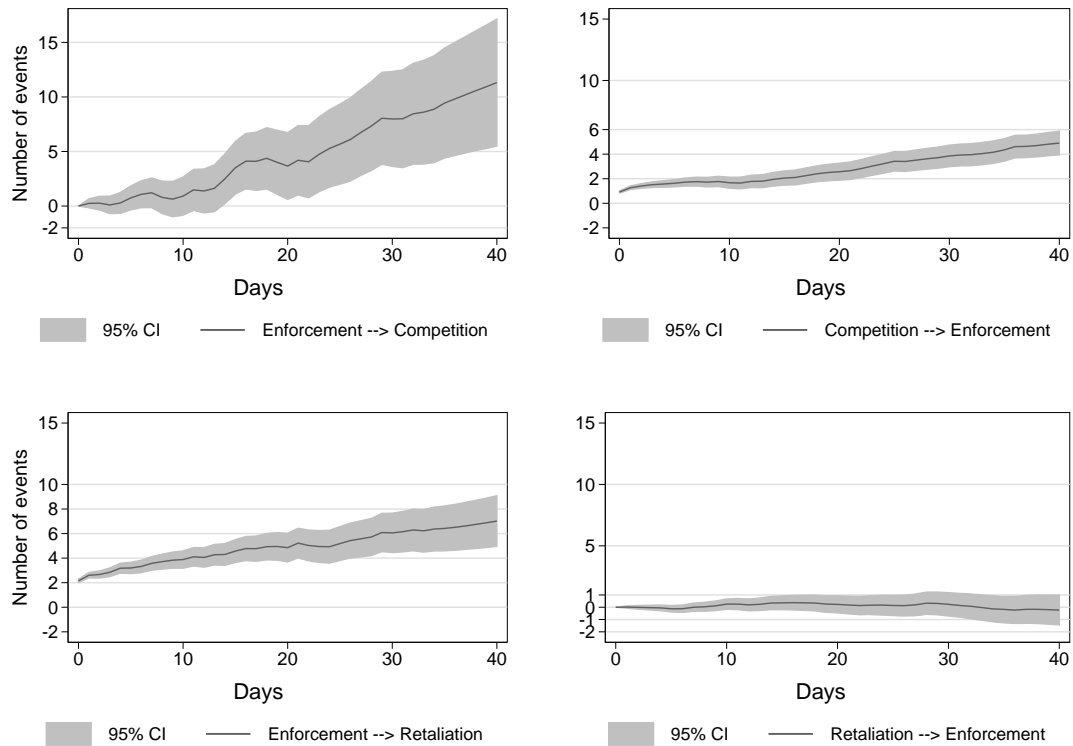


Figure 7.6. Cumulative Orthogonal Impulse Response Functions (COIRF) of violence in the Mexican war on drugs

government efforts to fight crime generate an aggressive response against the state from organized criminals. According to the OCIRF, the first crackdown from the state generates two attacks against government authorities perpetrated by criminal organizations. The intensity of contestation keeps increasing as the government continues to carry out a punitive strategy over the subsequent days and weeks. After the fortieth day of consecutive state violence, criminal organizations retaliate with an average of seven attacks against government authorities per event of violent enforcement carried out by the state. This indicates that instead of deterring violent challenges against the state, the punitive strategy to fight crime exacerbates the hos-

tilities against government authorities. The escalating effect of law enforcement on criminal retaliation provides empirical support for hypothesis H_4 .

Finally, the lower right panel in Figure 7.6 shows the COIRF for the effect of criminal retaliation on levels of violent law enforcement. The COIRF reveals that even after a series of 40 days of continuous attacks from criminal organizations, there is no evidence of the state engaging in violent behavior to counter or neutralize criminal attacks. This languid response from the state contradicts the theoretical expectation from the “law of coercive responsiveness,” thus failing to provide support for hypothesis $H_{12.1}$.

7.4.2 Full Specification of the Vector Autoregressive Model for the Dynamic Analysis of Drug Violence

The previous section analyzed the micro-mechanisms of drug violence using VAR model 1. Although this analysis provides valuable understanding of the dynamics of conflict in the Mexican war on drugs, it only considers the interactions between criminal competition, violent enforcement, and criminal retaliation but ignores other non-violent enforcement tactics also used by the state against criminal organizations. This section presents the analysis of VAR model 2 incorporating the complete menu of violent and non-violent anti-criminal tactics such as arrests; seizure of assets, drugs, and weapons; and it includes the time series of violent competition between DTOs, and criminal retaliation against government authorities. This model also includes a vector of structural factors as control variables.

Equations (7.11)–(7.17) constitute the system of equations estimated in the fully specified vector autoregressive model, referred here as VAR model 2, which contains the following parameters:

- \mathbf{C}_t'' represents the outcome of the time series of violent competition between criminal organizations and all the other series contained in equation (7.11).

- \mathbf{E}_t'' represents the outcome of the time series of violent law enforcement and all the other series contained in equation (7.12).
- \mathbf{R}_t'' represents the outcome of the time series of retaliation against the state and all the other series contained in equation (7.13).
- \mathbf{A}_t'' represents the outcome of the time series of arrests and all the other series contained in equation (7.14).
- \mathbf{S}_t'' represents the outcome of the time series of seizures of criminal assets and all the other series contained in equation (7.15).
- \mathbf{D}_t'' represents the outcome of the time series of drug interdiction and all the other series contained in equation (7.16).
- \mathbf{G}_t'' represents the outcome of the time series of seizures of guns and all the other series contained in equation (7.17).
- C_{t-i} contains a vector of violent competition between criminal organizations at time $t - i$, and β_{ei} is a vector of its corresponding coefficients in the system of equations of the fully specified VAR model 2.
- E_{t-i} contains a vector of violent law enforcement and θ_{ei} is a vector of its corresponding coefficients.
- R_{t-i} contains a vector of criminal retaliation against the state and Ω_{ei} is a vector of its corresponding coefficients.
- A_{t-i} contains a vector of arrests and δ_{ei} is a vector of its corresponding coefficients.
- S_{t-i} contains a vector of seizure of criminal assets and σ_{ei} is a vector of its corresponding coefficients.
- D_{t-i} contains a vector of drug interdiction and μ_{ei} is a vector of its corresponding coefficients.
- G_{t-i} contains a vector of seizure of guns and ρ_{ei} is a vector of its corresponding coefficients.
- X_t contains a vector of control variables and Π_e is a vector of its corresponding coefficients. The control variables included in this vector are poverty, state GDP, drug production, 9/11, rifles and unemployment. The descriptive statistics of the controls can be found Appendix A.7.
- α_e give the intercepts in each equation.
- u_{et} are the error terms for each equation.

The full specification of VAR model 2 consists of the following system of equations:

$$\begin{aligned}
\mathbf{C}_t'' &= \alpha_1 + \beta_{11}C_{t-1} + \beta_{12}C_{t-2} + \cdots + \beta_{1k}C_{t-k} \\
&\quad + \theta_{10}E_t + \theta_{11}E_{t-1} + \theta_{12}E_{t-2} + \cdots + \theta_{1k}E_{t-k} \\
&\quad + \Omega_{10}R_t + \Omega_{11}R_{t-1} + \Omega_{12}R_{t-2} + \cdots + \Omega_{1k}R_{t-k} \\
&\quad + \delta_{10}A_t + \delta_{11}A_{t-1} + \delta_{12}A_{t-2} + \cdots + \delta_{1k}A_{t-k} \\
&\quad + \sigma_{10}S_t + \sigma_{11}S_{t-1} + \sigma_{12}S_{t-2} + \cdots + \sigma_{1k}S_{t-k} \\
&\quad + \mu_{10}D_t + \mu_{11}D_{t-1} + \mu_{12}D_{t-2} + \cdots + \mu_{1k}D_{t-k} \\
&\quad + \rho_{10}G_t + \rho_{11}G_{t-1} + \rho_{12}G_{t-2} + \cdots + \rho_{1k}G_{t-k} \\
&\quad + \Pi_1X_t + u_{1t}
\end{aligned} \tag{7.11}$$

$$\begin{aligned}
\mathbf{E}_t'' &= \alpha_2 + \theta_{21}E_{t-1} + \theta_{22}E_{t-2} + \cdots + \theta_{2k}E_{t-k} \\
&\quad + \beta_{20}C_t + \beta_{21}C_{t-1} + \beta_{22}C_{t-2} + \cdots + \beta_{2k}C_{t-k} \\
&\quad + \Omega_{20}R_t + \Omega_{21}R_{t-1} + \Omega_{22}R_{t-2} + \cdots + \Omega_{2k}R_{t-k} \\
&\quad + \delta_{20}A_t + \delta_{21}A_{t-1} + \delta_{22}A_{t-2} + \cdots + \delta_{2k}A_{t-k} \\
&\quad + \sigma_{20}S_t + \sigma_{21}S_{t-1} + \sigma_{22}S_{t-2} + \cdots + \sigma_{2k}S_{t-k} \\
&\quad + \mu_{20}D_t + \mu_{21}D_{t-1} + \mu_{22}D_{t-2} + \cdots + \mu_{2k}D_{t-k} \\
&\quad + \rho_{20}G_t + \rho_{21}G_{t-1} + \rho_{22}G_{t-2} + \cdots + \rho_{2k}G_{t-k} \\
&\quad + \Pi_2X_t + u_{2t}
\end{aligned} \tag{7.12}$$

$$\begin{aligned}
\mathbf{R}_t'' &= \alpha_3 + \Omega_{31}R_{t-1} + \Omega_{32}R_{t-2} + \cdots + \Omega_{3k}R_{t-k} \\
&\quad + \beta_{30}C_t + \beta_{31}C_{t-1} + \beta_{32}C_{t-2} + \cdots + \beta_{3k}C_{t-k} \\
&\quad + \theta_{30}E_t + \theta_{31}E_{t-1} + \theta_{32}E_{t-2} + \cdots + \theta_{3k}E_{t-k} \\
&\quad + \delta_{30}A_t + \delta_{31}A_{t-1} + \delta_{32}A_{t-2} + \cdots + \delta_{3k}A_{t-k} \\
&\quad + \sigma_{30}S_t + \sigma_{31}S_{t-1} + \sigma_{32}S_{t-2} + \cdots + \sigma_{3k}S_{t-k} \\
&\quad + \mu_{30}D_t + \mu_{31}D_{t-1} + \mu_{32}D_{t-2} + \cdots + \mu_{3k}D_{t-k} \\
&\quad + \rho_{30}G_t + \rho_{31}G_{t-1} + \rho_{32}G_{t-2} + \cdots + \rho_{3k}G_{t-k} \\
&\quad + \Pi_3X_t + u_{3t}
\end{aligned} \tag{7.13}$$

$$\begin{aligned}
\mathbf{A}_t'' &= \alpha_4 + \delta_{41}A_{t-1} + \delta_{42}A_{t-2} + \cdots + \delta_{4k}A_{t-k} \\
&\quad + \beta_{40}C_t + \beta_{41}C_{t-1} + \beta_{42}C_{t-2} + \cdots + \beta_{4k}C_{t-k} \\
&\quad + \theta_{40}E_t + \theta_{41}E_{t-1} + \theta_{42}E_{t-2} + \cdots + \theta_{4k}E_{t-k} \\
&\quad + \Omega_{40}R_t + \Omega_{41}R_{t-1} + \Omega_{42}R_{t-2} + \cdots + \Omega_{4k}R_{t-k} \\
&\quad + \sigma_{40}S_t + \sigma_{41}S_{t-1} + \sigma_{42}S_{t-2} + \cdots + \sigma_{4k}S_{t-k} \\
&\quad + \mu_{40}D_t + \mu_{41}D_{t-1} + \mu_{42}D_{t-2} + \cdots + \mu_{4k}D_{t-k} \\
&\quad + \rho_{40}G_t + \rho_{41}G_{t-1} + \rho_{42}G_{t-2} + \cdots + \rho_{4k}G_{t-k} \\
&\quad + \Pi_4X_t + u_{4t}
\end{aligned} \tag{7.14}$$

$$\begin{aligned}
\mathbf{S}_t'' = & \alpha_5 + \sigma_{51}S_{t-1} + \sigma_{52}S_{t-2} + \cdots + \sigma_{5k}S_{t-k} \\
& + \beta_{50}C_t + \beta_{51}C_{t-1} + \beta_{52}C_{t-2} + \cdots + \beta_{5k}C_{t-k} \\
& + \theta_{50}E_t + \theta_{51}E_{t-1} + \theta_{52}E_{t-2} + \cdots + \theta_{5k}E_{t-k} \\
& + \Omega_{50}R_t + \Omega_{51}R_{t-1} + \Omega_{52}R_{t-2} + \cdots + \Omega_{5k}R_{t-k} \\
& + \delta_{50}A_t + \delta_{51}A_{t-1} + \delta_{52}A_{t-2} + \cdots + \delta_{5k}A_{t-k} \\
& + \mu_{50}D_t + \mu_{51}D_{t-1} + \mu_{52}D_{t-2} + \cdots + \mu_{5k}D_{t-k} \\
& + \rho_{50}G_t + \rho_{51}G_{t-1} + \rho_{52}G_{t-2} + \cdots + \rho_{5k}G_{t-k} \\
& + \Pi_5X_t + u_{5t}
\end{aligned} \tag{7.15}$$

$$\begin{aligned}
\mathbf{D}_t'' = & \alpha_6 + \mu_{61}D_{t-1} + \mu_{62}D_{t-2} + \cdots + \mu_{6k}D_{t-k} \\
& + \beta_{60}C_t + \beta_{61}C_{t-1} + \beta_{62}C_{t-2} + \cdots + \beta_{6k}C_{t-k} \\
& + \theta_{60}E_t + \theta_{61}E_{t-1} + \theta_{62}E_{t-2} + \cdots + \theta_{6k}E_{t-k} \\
& + \Omega_{60}R_t + \Omega_{61}R_{t-1} + \Omega_{62}R_{t-2} + \cdots + \Omega_{6k}R_{t-k} \\
& + \delta_{60}A_t + \delta_{61}A_{t-1} + \delta_{62}A_{t-2} + \cdots + \delta_{6k}A_{t-k} \\
& + \sigma_{60}S_t + \sigma_{61}S_{t-1} + \sigma_{62}S_{t-2} + \cdots + \sigma_{6k}S_{t-k} \\
& + \rho_{60}G_t + \rho_{61}G_{t-1} + \rho_{62}G_{t-2} + \cdots + \rho_{6k}G_{t-k} \\
& + \Pi_6X_t + u_{6t}
\end{aligned} \tag{7.16}$$

$$\begin{aligned}
\mathbf{G}_t'' = & \alpha_7 + \rho_{71}G_{t-1} + \rho_{72}G_{t-2} + \cdots + \rho_{7k}G_{t-k} \\
& + \beta_{70}C_t + \beta_{71}C_{t-1} + \beta_{72}C_{t-2} + \cdots + \beta_{7k}C_{t-k} \\
& + \theta_{70}E_t + \theta_{71}E_{t-1} + \theta_{72}E_{t-2} + \cdots + \theta_{7k}E_{t-k} \\
& + \Omega_{70}R_t + \Omega_{71}R_{t-1} + \Omega_{72}R_{t-2} + \cdots + \Omega_{7k}R_{t-k} \\
& + \delta_{70}A_t + \delta_{71}A_{t-1} + \delta_{72}A_{t-2} + \cdots + \delta_{7k}A_{t-k} \\
& + \sigma_{70}S_t + \sigma_{71}S_{t-1} + \sigma_{72}S_{t-2} + \cdots + \sigma_{7k}S_{t-k} \\
& + \mu_{70}D_t + \mu_{71}D_{t-1} + \mu_{72}D_{t-2} + \cdots + \mu_{7k}D_{t-k} \\
& + \Pi_{70}X_t + u_{7t}
\end{aligned} \tag{7.17}$$

VAR model 2 comprises a complex system of reciprocal and dynamic interactions among the processes of violent competition between DTOs, violent law enforcement, criminal retaliation, and non-violent law enforcement tactics also used by the state to fight criminals; arrests, seizures of assets, drug interdiction and seizures of weapons. The analysis accounts for the temporal inertia of each of these series as it is affected by past and contemporary events of other time series. In contrast to the model specification of VAR model 1, which incorporates an AR process of 37 lags, the

analysis of the autoregressive order processes in VAR model 2 indicates that the most appropriate specification is an AR model with only 15 lags.

The particular values of the coefficients of each of the 112 parameters in VAR model 2 are not of specific interest of this research. For this reason the table of regression results is not reported. Table 7.5 reports the fit of the model with R^2 estimates ranging between 29.8 percent to 54.3 percent. However, as mentioned earlier, it is not surprising to find high R^2 in vector autoregressive analysis due to the high degree of serial correlation in this type of model.

TABLE 7.5

EXPLANATORY POWER FOR VAR MODEL 2

Equation	Parameters	RMSE	R^2	χ^2	p-value
Competition	112	13.3493	0.4998	3999.927	0.0000
Violent enforcement	112	3.07918	0.3189	1874.552	0.0000
Criminal retaliation	112	5.25578	0.3957	2620.75	0.0000
Arrests	112	12.1608	0.3680	2330.546	0.0000
Seizure of assets	112	5.68984	0.2549	1369.44	0.0000
Seizure of drugs	112	16.3792	0.3228	1908.427	0.0000
Seizure of guns	112	5.51704	0.3387	2050.348	0.0000

Table 7.6 presents the Granger causality test for the full model. Large χ^2 statistics at high levels of significance provide evidence of reciprocal interactions and feedback effects between the different time series. Events of competition between criminal organizations are individually and jointly Granger-caused by violent enforcement, criminal retaliation, arrests, seizures of assets, drug interdiction, and gun seizures. Observations in the time series of violent enforcement are individually and jointly

Granger-caused by violence between DTOs, criminal retaliation against the state, and non-violent tactics such as arrests, seizures of assets and drugs; however, gun seizures do not seem to affect violent enforcement. The time series of attacks perpetrated by DTOs against the state is individually and jointly Granger-caused by competition between rival criminal groups, violent enforcement, and all non-violent state actions. The Granger test indicates that arrests are caused by violence between DTOs, violent law enforcement, criminal retaliation, drug interdiction, and gun seizures, but not by seizures of criminal assets. Events involving seizures of criminal assets are Granger-caused by competition between criminal organizations, violent enforcement, criminal retaliation, and arrests of suspected members of criminal organizations; however, drug interdiction and gun seizures do not seem to affect the confiscation of criminal assets. The time series of drug interdiction is individually and jointly Granger-caused by violence between DTOs, violent law enforcement, criminal retaliation, and gun seizures. Finally, the causality test indicates that gun seizures are caused by conflict between rival criminal groups, violent enforcement, criminal retaliation, arrests, and seizures of assets and of drugs.

The analysis of the impulse response functions of the processes of violence inherent to the Mexican war on drugs is divided into two parts. The first part analyzes the dynamics of conflict between DTOs and criminal reactions against the state caused by government efforts to fight crime. The second part analyzes how the state implements its various violent and non-violent security actions in reaction to increasing levels of conflict between DTOs or as a response to direct attacks perpetrated by criminals.

Figure 7.7 reports the cumulative orthogonal impulse response functions (COIRF) for the effect of the full menu of violent and non-violent tactics on the dynamics of violent competition between criminal organizations. To facilitate the visualization of the results, the figure does not present the confidence intervals. However, as mentioned

TABLE 7.6

GRANGER CAUSALITY TEST FOR VAR MODEL 2

Equation	Excluded							
	Compe- tition	Enfor- cement	Retali- ation	Arrests	Assets	Drugs	Guns	All
Competition		84***	86***	49*	83***	54**	89***	471***
Enforcement	114***		61***	80***	73***	74***	60	439***
Retaliation	91***	101***		99***	69***	85***	56**	527***
Arrests	76***	92***	53**		31	68***	66***	395***
Assets	66***	94***	62***	57***		45	46	389***
Drugs	80***	50**	64***	40	45		63***	343***
Guns	62***	104***	75***	61***	61***	68***		452***

Numbers represent the χ^2 statistic for the Granger causality test.
The levels of significance are: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

above, the use of daily data yields narrow margins of error. The response function indicates that sustained campaigns of violent enforcement and seizures of criminal assets have the most disrupting effect on criminals and cause the highest levels of violent confrontations between them. The results of Figure 7.7 provide strong support for the theoretical expectation that state efforts to fight crime disrupt the relative military balance among criminals and trigger waves of violence between rival criminal groups. According to the figure, the final event of enforcement after a campaign of 40 days of violent law enforcement generates 7.1 confrontations between criminals on that day. By the end of the campaign, 40 consecutive events of violent law enforcement have generated a cumulative count of 153 events of criminal competition. The results also show that the last seizure of assets over a 40-day period triggers 7.8 events of violence between rival DTOs. By the end of this period, 40 seizures of assets have generatee a cumulative total of 184 events of violence between criminal groups. The COIRF function indicates that this positive effect is also present in the time series of arrests, although the effect is less marked. The fortieth arrest in a sustained series of

detentions generates about 2.3 events of violence between criminal organizations. At the end of a sequence of 40 arrests, this campaign generates about 38 events of violence between criminal groups. These results provide strong support for hypothesis H_5 , which claims that law enforcement triggers waves of violent competition between DTOs.

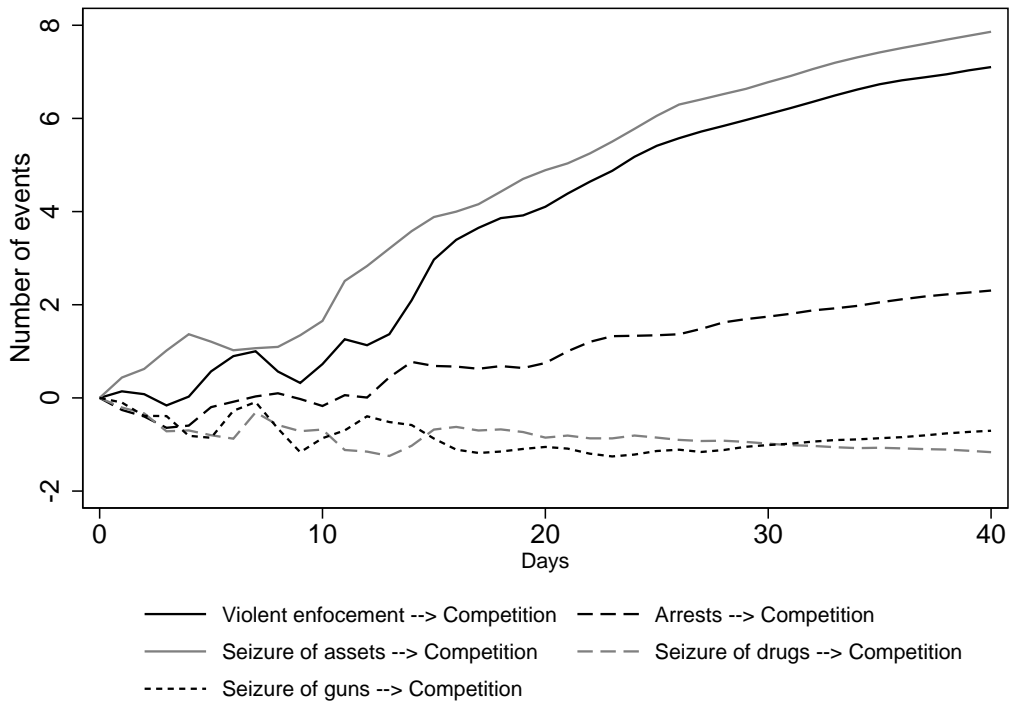


Figure 7.7. Cumulative Orthogonal Impulse Response Functions (COIRF) for the effect of violent and non-violent enforcement on competition among DTOs

In contrast to the theoretical expectations, the time series of drug interdiction and gun seizures shown in Figure 7.7 seem to have a slight deterrent effect on criminal

competition. The fortieth seizure of drugs reduces events of violence between criminal organizations by a count of about 1.2. By the end of a sustained campaign of 40 days of drug interdiction there would be 34.4 fewer events of criminal competition. The fortieth confiscation of weapons barely reduces conflict among criminals by generating 0.7 fewer events of violence. By the end of a sustained campaign of gun seizures there would be 34 fewer events of criminal confrontation. It is important to note that the margins of error of the time series of drug and gun seizures (not reported in the figure) make this effect indistinguishable from zero. In any case, the COIRF functions modeling drug interdiction and seizures of guns do not support H_5 .

Figure 7.8 presents the COIRF function for the dynamic effect of violent and non-violent enforcement on criminal retaliation against government authorities. The results provide strong support for the empirical implication derived from the formal model that law enforcement is likely to trigger counterattacks from criminal groups against the state. The impulse response function of violent enforcement indicates that the fortieth consecutive crackdown on criminals generates about 5.2 violent reactions perpetrated by DTOs against government authorities. By the end of a campaign of 40 days of consecutive events of violent law enforcement, the punitive strategy will generate 172.2 attacks from criminal organizations against the state. The figure also reports a positive relation between seizures of assets and criminal retaliation. The last confiscation of assets in a 40-day campaign of seizures generates about 2.2 counterattacks from DTOs against the state. By the end of the sequence of seizures of criminal assets, the cumulative count of acts of retaliatory aggression from DTOs will be 55.1. These results provide strong support for the theoretical expectation stated in hypothesis H_5 , which claims that DTOs are likely to retaliate against law enforcement.

The results also indicate that arrests generate violent reactions from criminal organizations against government authorities, although the effect is less acute than the

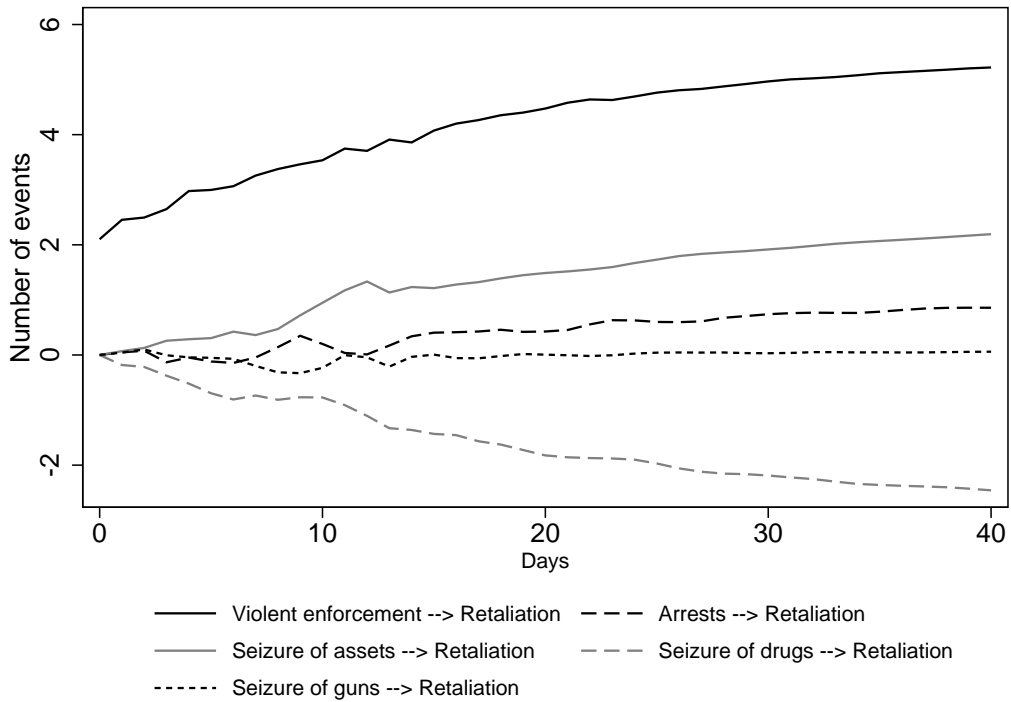


Figure 7.8. Cumulative Orthogonal Impulse Response Functions (COIRF) for the effect of violent and non-violent enforcement on criminal retaliation

effect of state violence or asset confiscation. According to the figure, the fortieth arrest generates about 0.9 events of violence against the state, and by the end of a campaign of 40 consecutive arrests there will be an aggregated number of 17.7 criminal attacks against government authorities. The results depicted in Figure 7.8 show that the effect of gun seizures is not distinguishable from zero. By the end of a campaign of 40 days of gun confiscations there will be a 0.8 reduction in the accumulated count of retaliation events. The results from arrest and gun seizure models indicate that by reducing the human reserve and firepower of criminal organizations, government authorities are capable of neutralizing attacks from DTOs. In contrast to the expectation derived from hypothesis H_5 , the COIRF function of drug seizures indicates that a sustained campaign of drug interdiction is capable of inhibiting hos-

tilities against government authorities. The fortieth confiscation of drugs can reduce the number of daily counterattacks by 2.5 events and by the end of a sequence of 40 drug seizures the cumulative number of retaliation attacks will be reduced by 63.9.

Figure 7.9 presents the reactions implemented by government authorities as a response to increasing levels of violence among criminal organizations. The COIRF functions provide strong support for hypothesis $H_{12.2}$, which claims that the state employs the use of force to impose order within its territory. In general terms, the impulse response analysis in Figure 7.9 shows that the Mexican government relies mostly on non-violent responses to increasing competition between DTOs. In this sense, the use of lethal force is employed as a last resort. All the security tactics available to the state are increasing as a reaction to violence among DTOs, but the impulse response function of violent enforcement is less acute than that of non-violent strategies. After a period of 40 days of consecutive events of violence between criminal organizations, the state reacts with three violent crackdowns per day. At the end of the wave of criminal violence, the state would have implemented 92.7 violent crackdowns. In contrast, the COIRF of arrests indicates that the fortieth event of violence between DTOs generates 9.9 daily arrests, and at the end of the period of criminal confrontations the state would have arrested 277.8 suspected members of criminal organizations. The models also estimate that government authorities will implement 5.2 daily seizures of assets as a response to the fortieth event of violence between criminals, and that the cumulative count of asset confiscation events will be 143.2. Finally, the results indicate a similar trend for seizures of guns. The last event of criminal competition in a consecutive series of 40 days will correspond to 4.7 weapons seizures carried out by the state. By the end of this period, government authorities would have seized weapons 122.4 times.

Finally, Figure 7.10 presents the results for the COIRF functions analyzing the reaction of the state against acts of aggression perpetrated by criminal organizations.

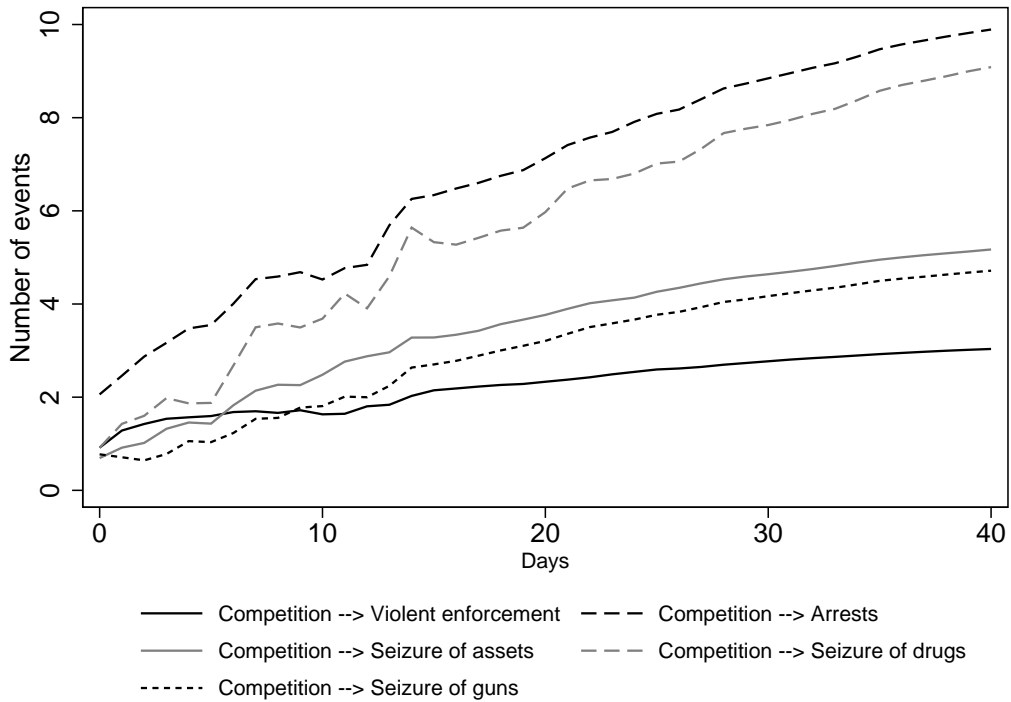


Figure 7.9. Cumulative Orthogonal Impulse Response Functions (COIRF) for the effect of competition among DTOs on violent and non-violent enforcement

In general, the results do not provide support for hypothesis $H_{12,2}$, which formulates the “law of coercive responsiveness” for this context. The response from the Mexican government in terms of the number of arrests, events of violent enforcement, seizures of criminal assets, and confiscation of weapons are barely distinguishable from zero even at the end of a 40-day period of consecutive attacks from criminal groups. Moreover, the impulse response function of drug seizures shows a negative trend. This suggests that a sustained campaign of criminal hostilities is capable of inhibiting government efforts to seize illicit drugs from criminal groups. After the fortieth attack from organized criminals, the number of daily drug seizures decreases by 2.7 events and by the end of a sustained campaign of aggression against the state the estimated number of drug interdiction events is 60.2 lower. In any case, the lack of

responsiveness from the Mexican state in the face of criminal hostilities is a robust and surprising finding.

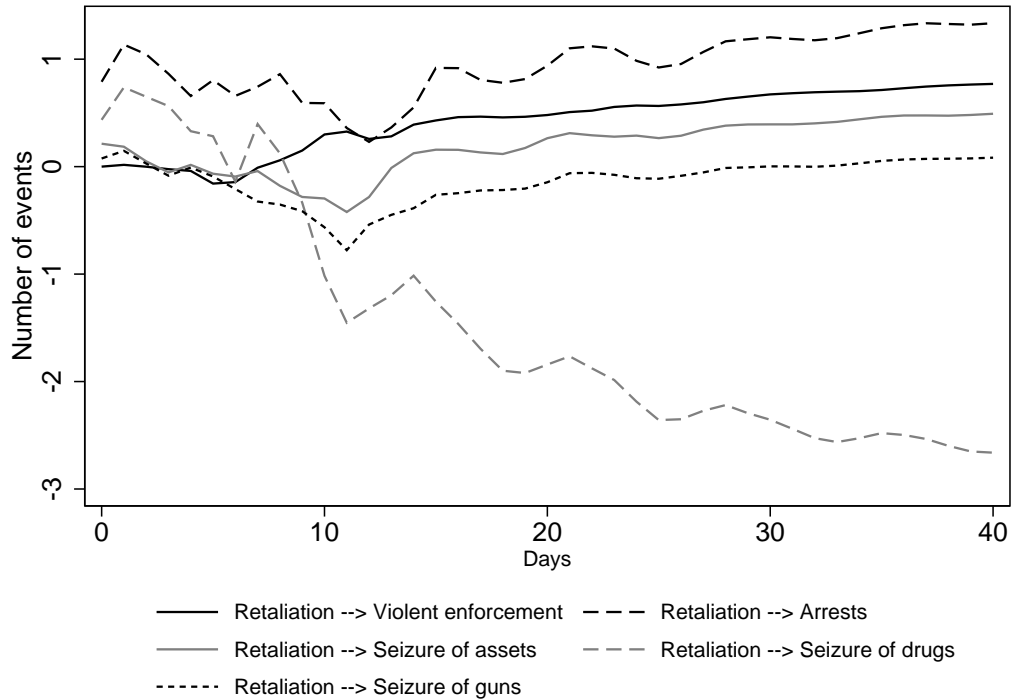


Figure 7.10. Cumulative Orthogonal Impulse Response Functions (COIRF) for the effect of criminal retaliation on violent and non-violent enforcement

As indicated by Olson, Shirk and Selee (2010), Mexican government officials have repeatedly stated that the increase of violence between DTOs lends credence to the claim that the strategy against criminal organizations is working. According to this argument, violence between criminals might increase in the short term but will decrease in the long run. In order to explore the possibility of an inverse (U-shaped) relationship, in which violence initially increases but eventually goes down over time,

Figure 7.11 explores the predictions of the impulse response functions extended to a period of six months. This figure is based on the estimates of VAR model 2 but only reports the dynamic interactions between violent law enforcement, competition between DTOs and criminal retaliation, omitting the effect of non-violent enforcement. The COIRF impulse response functions of sustained campaigns of violence among the various actors over six months did not show any of the processes of violence declining over time. Instead, violent competition among rival DTOs generated by the use of force by government authorities stabilizes at a higher level of violence.

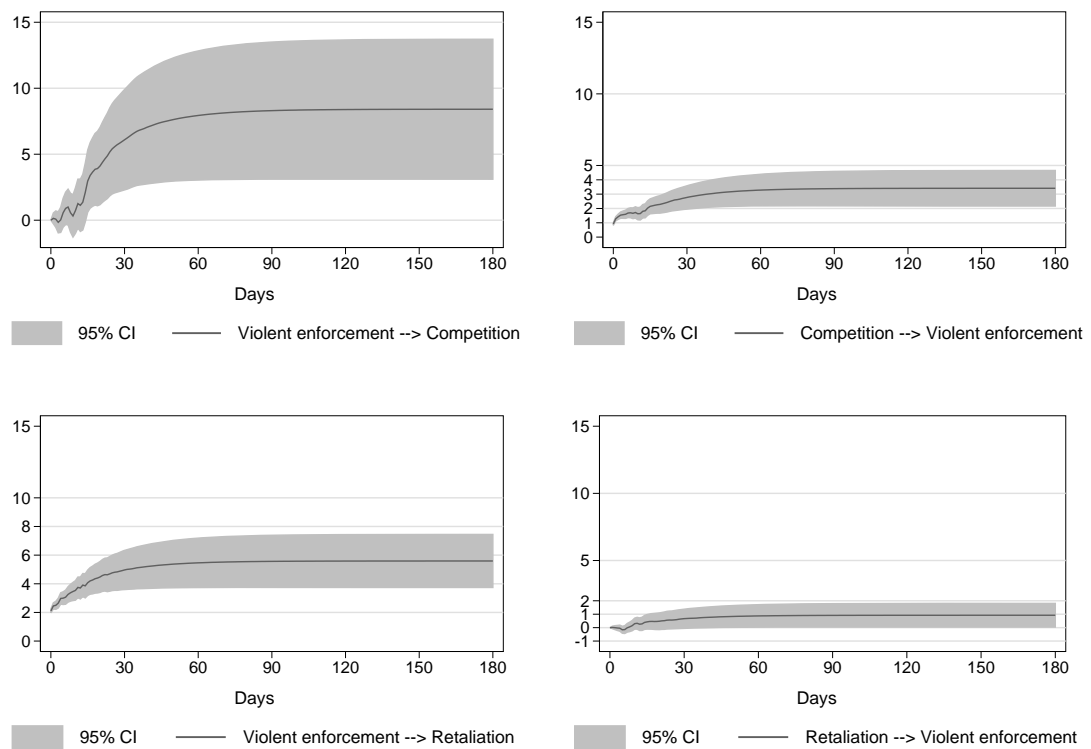


Figure 7.11. Cumulative Orthogonal Impulse Response Functions (COIRF) of sustained campaigns of violence during six months

The upper left panel in Figure 7.11 shows that a series of consecutive violent crackdowns from government authorities over a period of 180 days causes a marked increase in violent competition between criminal organizations in the first two months. Then, the series stabilizes with a response of approximately eight daily events of violence between criminals per each additional event of violent enforcement. The upper right panel shows that the violent response of the state against violent competition between DTOs also increases in the first two months of hostilities between criminals. State violence stabilizes after 60 days and responds with 3.5 events of violent law enforcement for each additional event of criminal competition. The lower left panel shows that criminal organizations deploy a sustained response against the state when government authorities use violent enforcement. The time series of criminal retaliation stabilizes after the first month with a response of about 5.8 attacks against the state per every additional crackdown conducted by government authorities. Finally, the lower right panel shows that even after six months of direct hostilities from criminal organizations, the state does not seem to respond with the use of violence to counter criminal attacks. In general, none of the impulse response functions analyzed in Figure 7.11 show that violence declines within a period of six months of sustained hostilities. In consequence, there is no empirical support for the argument that the punitive strategy of the Mexican government is capable of reducing violence in the long run.

7.5 Discussion of Results

The statistical analysis of this chapter relies on vector autoregressive (VAR) models. This type of time series analysis enables reliable predictions to be generated about future behavior of a violent process by incorporating the effect of previous events from the same time series as well as dynamic and reciprocal effects from other time series

affecting the outcome. In this context, the VAR analysis thus takes into account what happened in the past to inform the behavior of violent trends in the future. In addition, the statistical analysis relies on cumulative orthogonal impulse response functions (COIRF) to analyze the behavior over time of a violent process as it is affected by external shocks from other time series.

State Action Leads to Violence Among Criminals

The statistical analysis of this section provides strong support for the theoretical expectation that increasing levels of law enforcement are associated with higher levels of conflict between rival criminal organizations. According to the formal model, state actions disrupt the relative military balance among criminals by weakening the target DTO, which improves the relative military position of a challenger DTO. This non-neutral effect of law enforcement is capable of motivating an invasion by an indirectly-empowered challenger DTO onto the weakened group, thus triggering a wave of violent competition among rival criminal organizations as they try to capture and defend valuable territories.

The impulse response analysis reveals that a single event of violent law enforcement has a lasting effect on violence among DTOs capable of generating a series of confrontations among criminals that continues for more than 40 days. The dynamic analysis also shows that the use of violent law enforcement, seizures of criminal assets, and arrests of suspected members of criminal organizations have the most disrupting effects on violent competition between DTOs. In particular, the results indicate that after a sustained campaign of 40 days of consecutive violent crackdowns by government authorities, one additional event of violent law enforcement generates about 7.1 events of violence between criminal organizations that same day. By the end of the punitive campaign, 40 consecutive events of violent law enforcement will have triggered a cumulative count of 153 events of violence between DTOs.

Some of the statistical results fail to provide support for the hypothesis that non-violent state action generates violence between criminal organizations. The impulse response analysis did not show that drug interdiction and seizures of guns have any impact on the levels of violence between criminal organizations. These findings are contrary to the results of Figure 6.15 in Chapter 6, which indicate that increasing levels of drug seizures and confiscation of weapons have a large positive effect on violence among DTOs. However, it is important to note that the statistical analyses used in these two chapters are substantially different and their estimates are not directly comparable. The empirical strategy in Chapter 6 relies on an instrumental variable (IV) approach for a time-series cross-sectional (TSCS) data structure using municipality–days as the unit of analysis. In contrast, the empirical strategy of the present chapter uses a VAR model for the dynamic analysis of data daily data aggregated at the national level. Future research will focus on desegregating the dynamic analysis of VAR at the state and municipal levels to assess the effect of violent and non-violent enforcement on violence among criminals. Besides the differences in terms of units of analysis between these two empirical approaches, the key difference rests on the plausibility of a causal claim. The IV design constitutes a stronger quasi-experimental identification strategy capable of overcoming problems of endogeneity and providing more plausible claims of causal inference. In contrast, causality in VAR analysis refers to the temporal effects of one variable over another without the characteristics of a quasi-experimental design.

Criminal Hostilities Against the State

Another important finding of the impulse response analysis is evidence about the aggressive behavior of organized criminals as they react against the state when the government uses violent law enforcement. According to the results, the last crackdown of a consecutive series of violent law enforcement over 40 days generates an immediate reaction of about 5.2 attacks by DTOs against state authorities. By the

end of this punitive campaign, state security forces would have suffered a cumulative count of 172.2 retaliations from DTOs. This aggressive behavior from criminal organizations is more intense when criminals react to violent law enforcement than to non-violent enforcement tactics.

The difference in the magnitude of the response from criminal organizations suggests that DTOs are somewhat more tolerant to non-violent than to violent security tactics. However, when the government authorities use lethal force against them, organized criminals launch an overwhelming reaction against the state. What explains such an aggressive reaction from criminal organizations?

Interviews conducted during fieldwork suggest several mechanisms to explain the intensity of this behavior. One explanation argues that organized criminals have greater firepower than most state security forces, especially at municipal and state level. Criminals can easily smuggle military style weapons across the U.S. border to supply their forces with assault rifles and grenade launchers. This argument is consistent with the argument of Dube et al. (2013) about the increase of violence in Mexico after the expiration of the Federal Ban on Assault Weapons in the U.S. The argument about sophisticated weaponry also has resonance in a larger theoretical explanation about the role of material resources for conducting collective dissent (McCarthy and Zald, 1977). The ample financial resources derived from illicit markets give DTOs the ability to collect sufficient military, human and material resources to launch aggressive offensives against the state. A similar use of illicit contraband has been identified as an important factor to explain the duration of civil wars (Fearon, 2004).

At the sub-national level, heavily armed criminals outgun poorly equipped police forces who usually carry old shotguns and small caliber handguns: weakly armed security forces become easy targets of criminal violence. This argument is supported by news reports stating that municipal police are often outgunned by criminal orga-

nizations who usually ambush them (Redacción de AFP, 2012), or use death squads to hunt and kill municipal police officers (Pedraza, 2013), often using extreme forms of violence when killing them (Redacción del Universal, 2010). The weapons superiority of criminal organizations was recognized by federal authorities, and motivated President Calderón to launch a program called *Subsidio para la Seguridad en los Municipios* (SUBESMUN) in 2008 (see Secretaría de Gobernación, 2013). As often reported by the press, most SUBESMUN resources are used for buying weapons and ammunition to augment the tactical equipment supplies of local municipal police forces (Mexico Seguridad, 2013). Future research should examine whether improvements in the punitive capacity of the state at sub-national level had an effect on deterring retaliatory attacks by DTOs.

Other witnesses are skeptical about the argument of criminal military superiority. Although these interview subjects recognize that DTOs have high caliber weapons, they point out that Army and Navy military personnel, and Federal Police officers, are much better equipped and trained than state and municipal police forces. Therefore the argument of military superiority of criminal organizations does not apply equally to security forces at different levels. These contrasting arguments suggest an area of future research; namely, disaggregating and identifying reciprocal actions and reactions between criminal organizations and security forces at different levels.

Another not mutually exclusive argument suggests that criminal organizations can easily attack the security forces of the state not only because some of them are militarily inferior but because they are easy to identify and ambush. There are several news reports about security forces being ambushed by criminal groups (Covarrubias, 2010; Notimex, 2010; Redacción de AFP, 2012). DTOs usually rely on a large network of spotters spread across their territory to provide timely information about the situation on the ground. In the criminal jargon these type of informants are known as “*halcones*” (falcons). The *halcones* are not usually employed for drug

trafficking activities or for committing violence; their job is simply to stay alert and immediately notify their superiors whenever they spot an Army convoy, police car or any other kind of relevant “unusual” activity. Criminal organizations usually make use of taxi drivers as spotters (Martínez, 2013). These taxi driver informants are called “*garrapatas*” (ticks) and they contribute by spotting or following security forces (Prados, 2013). According to witness accounts from police officers interviewed in this research, using taxis as spotters is a convenient strategy for DTOs because taxi drivers are a legal business and constitute a large network of observers roaming the streets. If the taxi notices that police officers realize that they are being followed by a *garrapata*, the taxi usually drops the chase and is replaced by a different taxi from the same network a few blocks ahead.³ There are reports that DTOs also use corrupt transit police officers as informants (La Policiaca, 2013). In addition, according to Bishop Raúl Vera, a religious leader and well-known human rights activist, criminal organizations also recruit children approximately aged twelve to work as *halcones*; they give them a cell phone and pay them \$50 dollars a week (Proceso, 2013).

Moderate Use of State Violence

Another interesting finding of the statistical analysis is that conflict between DTOs increases the punitive response from government authorities, but the magnitude of the response varies by government tactics. Criminal competition substantially increases non-violent responses from the state in the form of arrests and seizures of drugs, weapons and assets. However, the violent response from the state is moderate. This finding contributes to a broader literature on state repression analyzing the different tactics used by government authorities to confront challengers. One possible explanation of the moderate use of state violence as a response to conflict

³In these cases, police officers usually turn off their radio communications and switch to cell phone because it is likely that the official frequency is being tapped by criminals. They then call for reinforcements to put an unit behind the *garrapata* that is following them. This leads to what police officers call a “who-follows-whom” sequence.

between criminal groups may be rooted in the political characteristics of the state. The “domestic democratic peace” argument advanced by Davenport (2009*b*) claims that democratic political systems are less repressive than authoritarian regimes for three main reasons: democracies have alternative ways of imposing control, leaders suffer political sanctions for engaging in violent repression, and democracies have stronger institutions to control coercive power. The analysis of different repressive tactics also indicates that democracy is more effective in limiting the use of lethal force than other non-violent restrictions (Davenport, 2004). This argument is consistent with the discussion about the different costs of applying violent and non-violent enforcement tactics in Section 2.4 of the theoretical chapter. Although there is discussion about the extent of the democratic consolidation of the Mexican political system, there is a broad consensus among scholars and analysts that Mexico is a democratic system, especially after the political alternation of the executive in 2000. Democratic norms or institutions might thus help to explain the moderate use of violent law enforcement employed by the Mexican state to counter the wave of violence among criminal organizations.

An alternative but not mutually exclusive explanation of the moderate use of violence to impose order among DTOs could be made on the basis of rational choice calculations about the costs and benefits of state actions (Lichbach, 1987, 1998; Mason and Fett, 1996). According to this approach, state authorities moderate the use of violent enforcement based on the strategic expectations about the deleterious effect of violent law enforcement. The results indicate that the use of violent tactics to fight crime generates a large increase of violence between criminal organizations and also motivates a substantial number of counterattacks against the state. Probably, the pernicious consequences of violent law enforcement motivate government authorities to self-restrain the use of lethal force when trying to contain conflict between DTOs. In any case, the empirical finding about the moderate use of state violence

in the Mexican war on drugs should be explored by further theoretical and empirical analysis.

The Languid State

Finally, one of the most surprising findings of this chapter is the languid behavior of the Mexican state when directly challenged by criminal organizations. The empirical results of this chapter show that even after 40 continuous attacks perpetrated by criminal organizations against the state, government authorities do not seem to react with violent or non-violent tactics against criminals. The testimony of one high-level police officer interviewed in this research is illustrative of this finding. When asked about the apparent languid behavior of the state he was not surprised and said “We do not fall for provocation. Of course, we respond if we are attacked. But my men go out there to do their duty, not to look for revenge.”

This result is puzzling because the literature on state repression has invariably found that perceived or actual threats to the state trigger repressive reactions from government authorities. Studies on the dissent–repression nexus have found mixed results for the effect of state coercion on dissent. The use of repression sometimes deters challengers and other times exacerbates contentious behavior (Lichbach, 1987). However, as claimed by Davenport, Johnston and Mueller (2005, viii), “moving in the opposite direction, from protest to repression, only one relationship has ever been identified: dissent increases the application of state coercion.” The consistency of this finding is such that “in every statistical examination of the subject, dissent increases repressive behavior” (Davenport, 2009*b*, 39).

Part of the explanation might lie in the self-restraining argument of the “domestic democratic peace” discussed earlier. The statement offered by the high-level police officer stressed the role of duty and institutions in guiding the behavior of security forces. Another part of the explanation about the languid behavior of the state might also rest on the non-political nature of criminal organizations. As discussed in

Section 1.2, organized criminals are primarily motivated by economic goals, and use violence for preserving the power structures that enable them to extract rents from illegal markets. It may be that government authorities do not react with the severity and alacrity usually expected by researchers on state repression because criminal organizations do not represent a direct threat to the political system. In any case, this finding about the languid behavior of the Mexican state in reaction to direct attacks by criminal groups calls into question the universal applicability of the “law of coercive responsiveness” and suggests the need for further theoretical and empirical investigation.

CHAPTER 8

CONCLUSION

This research provides theoretical foundations and solid empirical evidence specifying the conditions of why, how, when, where, by whom, to what extent and for how long violence constitutes a valuable form of behavior for organized criminals. Located in a Hobbesian tradition of conflict, this research shows that violence in Mexico emerged as the consequence of the collapse of order. In the absence of regulation mechanisms, the disrupting effect of state actions unleashed a war of all-against-all. As indicated by the central argument, democratization eroded the system of incentives that had allowed a peaceful configuration between the state and criminal organizations for several decades. Under the new system of political incentives, democratization gave authorities motivations to fight crime, which triggered an unprecedented wave of violence between the state and organized criminals and between rival criminal groups fighting to control drug-strategic territories.

A central contribution of this study is the integrated effort of conceptualizing, measuring and estimating violence as a dynamic and interactive manifestation of conflict operating within structural factors. In order to understand the escalation and geographic concentration of violence, it is necessary to grasp both its external

factors and its internal processes. This research provides theoretical reasons and empirical evidence showing that the largest share of violence is caused by confrontations between rival criminal groups trying to seize control over territories that grant access to enormous economic benefits. In consequence, violence tends to cluster around valuable areas favorable for the reception, production and international distribution of drugs. The opportunities to seize control over those territories are primarily generated by the state through the implementation of punitive law enforcement operations that weaken target criminal organizations and indirectly empower their rivals.

This research addresses the urgent need to understand the wave of drug violence in Mexico by analyzing three distinct, yet interrelated aspects of this conflict; the onset, escalation and geographic distribution and concentration of organized criminal violence.

8.1 Why do Politicians Decide to Fight Criminal Organizations After Having Peacefully Coexisted With Them?

Theoretical expectations

To explain the onset of the war on drugs, the theoretical explanation claims that democratization disrupts the peaceful configurations that enable coexistence between corrupt government authorities and criminal organizations in contexts of authoritarian rule. In addition, democratization motivates politicians to enforce the law against criminals. To sustain this claim, the formal model argues that in an authoritarian regime government authorities receive more benefits from corrupt agreements than from enforcing the law against criminals. In contrast, political actors in a democratic system obtain more political benefits from enforcing the law than from making and adhering to corrupt agreements with criminals. This argument is based on a set

of premises relating to the number of political actors and temporal expectations of tenure in office.

Authoritarian regimes are characterized by a reduced number of political actors and the prospect of long terms in power due to the lack of elite circulation. The small number of political actors reduces the costs of collective action, thus facilitating bargaining and reducing the costs of bribes. A limited number of actors also facilitates collective action among corrupt politicians, reduces the chances of defection, and increases the probability of sanctions for non-compliers. A cohesive hierarchical chain of command facilitates the implementation of agreements and compliance across the government structure. The lack of effective elite circulation through electoral means favors credible expectations about future benefits for complying with the pact. Finally, the likelihood of a long term in office increases the credibility of future sanctions for not complying with the agreement. The direct implication of this system of incentives is the lack of enforcement against crime.

In contrast, democratic regimes are characterized by a large number of political actors with time-limited terms in office due to effective elite circulation. The increased number of actors augments the costs of collective action and the costs of bribes. A large number of actors also reduces the possibility of monitoring defection and the probability of sanctioning non-compliers. The entrance of new actors at various levels of government disrupts the chain of command, thus reducing the feasibility of implementing corrupt agreements. In addition, effective elite circulation through electoral means reduces the duration and stability of agreements. Elections also introduce uncertainty about the next actor in office, thus hindering the expectations of long-term agreements.

Democratization also takes the incentives for political survival out of the hands of the elite and makes the prospects for their political careers dependent on the support that politicians can win from the electorate. Democratization thus generates

personal incentives for politicians to provide public goods such as public security. In addition, new political actors have incentives to enforce the law as a way to signal their difference from old corrupt politicians. The theoretical explanation also argues that government authorities obtain political benefits from implementing harsh security policies in times when their legitimacy is threatened by political strain. These factors all serve to erode the prospects of peaceful coexistence between political actors and organized criminals and motivate government authorities to fight crime.

Empirical results

This research presents both qualitative and quantitative evidence in support of the argument about the onset of the Mexican war on drugs. Evidence shows that democratization increased the number of relevant political actors at all levels of government and favored the effective circulation of political elites. In consequence, democratization subverted the political structures that enabled the existence of non-aggressive agreements between authorities and criminals. In addition, democratization subverted the preexisting system of political incentives and generated a new configuration favoring law enforcement, thus motivating government authorities to fight crime.

The process tracing analysis elucidates the historical sequence that led to the emergence and consolidation of a system of incentives that favored the peaceful coexistence between criminals and corrupt government authorities during the political hegemony of the PRI. This analysis shows how political order emerged after the Mexican revolution with the formation of the PRI as a political agreement to regulate access to power in a peaceful manner. This pact gave relative autonomy to local leaders at the periphery, who benefited from the economic opportunities created by Prohibition in the U.S. At the peak of its political hegemony, the PRI imposed order on the criminal sector as well as in the political sphere. The political elite centralized an extensive network of criminals not only to obtain economic gains from illicit sectors but also to monitor clandestine political activities that could threaten the

regime. To instill and impose discipline on criminals, the PRI relied on a centralised hierarchical system of political incentives aligned with the overall government and party structures. The effectiveness of this system depended on the concentration of power in the political elite and on the hegemonic presence of the party in all government branches across levels of government. In addition, the recurrent use of electoral fraud and mass electoral mobilization through vote buying and clientelism prevented the circulation of political elites outside the PRI, thus favoring the stability of the pacts and incentives for long-term compliance.

The historical evaluation also sheds light on the erosion and subsequent collapse of order. According to the analysis, the process of democratization slowly but substantially eroded the hegemony of the PRI and subverted the system of political incentives that had enabled it to maintain order in the criminal sector. Thirty years of gradual electoral reforms allowed the entrance of opposition parties at all levels of government and the effective circulation of elites. The diversity of party labels at the federal and local levels disrupted the chain of command that made those agreements feasible. Sound rules of electoral competition dissolved the certainty of a PRI victory and introduced uncertainty about establishing corrupt agreements with the new political actors. By the time the presidential transition occurred in 2000, political diversity at sub-national level was entrenched. Most importantly, increasing political competition infused by democratization generated personal incentives for authorities to fight crime in an effort to gain citizen support. Finally, the historical assessment analyzes the conditions under which president Calderón dispatched the Army to fight drug organizations in an effort to boost his legitimacy after a contested election tainted by accusations of fraud. This massive deployment of troops generated a profound disruptive effect on the already precarious equilibrium among drug trafficking organizations in Mexico.

The statistical analysis also provides strong support for the theoretical expectations about increased law enforcement caused by democratization. The quantitative analysis indicates that increasing the effective number of political parties at the presidential level increases the use of violent law enforcement against criminals. Increasing the effective number of political parties also increases the number of arrests, seizures of criminal assets, events of drug interdiction and seizures of weapons. In addition, as expected from the theory, a change from a unified government at federal and sub-national level generates a substantial increase in the levels of violent enforcement, although its effect on non-violent tactics is less acute. Finally, the statistical analysis provides a surprising finding about the effect of political strain on law enforcement. The results indicate that a narrow margin of electoral victory increases the levels of violent law enforcement but has the opposite effect on non-violent tactics. This finding suggests that violent enforcement is used as a last resort in periods of political strain. In general, the statistical analysis supports the theoretical argument that democratization erodes peaceful agreements and motivates government authorities to fight crime.

Implications

To some sectors of the population, the authoritarian past came to be remembered in a more favorable light when the PRI hegemony managed to maintain order and security. During the presidential campaign of 2012, billboards on the streets presented slogans presumably attributed to the PRI saying “against the ineptitude of dealing with the drug trafficking, the experience of bargaining with them (PRI)” (Robles de la Rosa, 2012). Even president Calderón expressed his concern about the PRI returning to power and falling into a corrupt relationship with organized crime as an effort to pacify the country. As Calderón stated in an interview with the New York Times, “there are many in the PRI who think the deals of the past would work now” (The New York Times, 2011). Eventually, in July 2012, the PRI won

the election by a comfortable margin of 6.6 percent against the PRD, whereas the PAN was relegated to a distant third position. The newly elected president, Enrique Peña Nieto, repeatedly stated that his administration has no intentions to negotiate with drug trafficking organizations (Villamil, 2012). However, the question still is relevant. Would the PRI, or any other party in the presidency, be able to negotiate peace with criminal organizations in a democratic context? Probably not. The protracted process of democratization eroded the authoritarian characteristics of the PRI dominant era well beyond the presidential office and deeply affected the system of incentives throughout the entire political system.

There are two key ingredients that would be necessary for a non-aggression agreement to be feasible: political homogeneity across government tiers and a long time horizon for the stability of such pact. None of those factors exist in the current democratic political system in Mexico. The diversity of political actors is well entrenched at the municipal level, as well as in elections for governors and state legislatures. The plurality of political actors is also deeply rooted at the federal level in the Chamber of Deputies and the Senate. With such a large number of political actors across government tiers, it would be incredibly difficult to coordinate the necessary actors and align their interests behind a consistent effort of government authorities to negotiate with organized criminals. Even if such complex coordination is achieved, the recurrent elections at the municipal, state and federal levels are likely to bring new political actors to government positions, which would require renewed efforts of coordination from the government side. In addition to the characteristics of political plurality and elite circulation in a democratic regime, the current structure of the organized criminal sector might not be conducive to negotiations with government authorities. In contrast to the reduced number of large criminal organizations operating in the country during the heydays of PRI hegemony, the Mexican war on drugs witnessed the multiplication and expansion of criminal organizations. The plurality of criminal

organizations would impose enormous difficulties of coordination and alignment of incentives for a peaceful agreement with government officials. In consequence, such a pact is not likely to be feasible.

8.2 Why Does Drug-Related Violence Escalate so Rapidly?

Theoretical expectations

The escalation of violence is based on the mechanics of a contest success model for territorial competition. According to the theory, increased levels of law enforcement trigger an escalation of conflict between authorities and criminals, and violence between rival criminal groups. The action of the state has a highly disruptive effect on the relative military balance among criminal organizations. Law enforcement actions weaken the capability of a criminal group to protect its territory, which can motivate an invasion from a competing criminal group that observes a weaker rival. The equilibrium conditions indicate that violence committed by criminal organizations – against either the state or a rival group – primarily depends on the value of the territory in dispute, although another determining factor is the severity of military damage inflicted on them and their ability to recover from it. The core element of the model is that criminals will engage in violence as long as the economic benefits obtained from capturing or defending the territory are worth the fight. The model is used for deriving a set of empirical implications that are tested in the data. The two main hypotheses are that law enforcement triggers violent competition between criminal organizations and that it also generates criminal retaliation against the state. The basic derivatives of the model are extended to a generalized punitive campaign where the state simultaneously battles several criminal groups. The implications remain consistent with respect to the disturbing effects of enforcement on competition

among criminals and violent retaliation against the state, but suggest that law enforcement will generate a substantially larger wave of violence between rival criminal organizations than will attacks against the state. Together, the synergy of these mechanisms has produced a Hobbesian war of all-against-all.

Empirical results

An empirical evaluation of the micro-mechanisms of violence suggested by the theory requires dealing with the challenge of endogeneity. To minimize this risk, the identification strategy relies on a quasi-experimental instrumental variables research design. The statistical analysis provides strong confirmation of the deleterious effect of law enforcement on violence between criminal groups. Increasing the levels of violent law enforcement generates an exponential increase in the number of violent confrontations among rival criminal organizations. In addition, the results reveal that non-violent tactics also generate violence between criminal groups. Moreover, the effect of non-violent tactics is stronger than the effect of the use of lethal force. In particular, drug interdiction and seizures of weapons generate dramatic spikes of violence. The statistical model also confirms the theoretical expectation for the effect of military damage – measured by U.S. production of assault weapons – and recovery capability – measured by unemployment – on the levels of violence among criminals.

The statistical analysis also relies on time-series techniques to assess the dynamic and reciprocal interactions between the various processes of violence over time. Using forecasting techniques of vector autoregressive (VAR) models and cumulative orthogonal impulse response functions (COIRF), this approach shows that law enforcement actions have a highly disturbing and enduring effect. The results show that a sustained campaign of violent law enforcement conducted over several days generates a dramatic escalation of violence among organized criminals that accumulates over time. In addition, sustained law enforcement efforts relying on the use of lethal force generate a cumulative aggressive reaction from criminals against government authori-

ties. However, the effect of law enforcement on violent competition between criminals is substantially larger than the effect on criminal retaliation against the state. The results provide strong support for the theory in terms of the direction and magnitude of the disturbing effect of law enforcement and generate new insights about its lasting effects. The analysis of the temporal dynamics of conflict also provides novel findings about the state's response to violent criminal behavior. The results show that a sustained wave of confrontations between criminals generates a larger reaction from the state in terms of non-violent tactics than in the use of lethal force. In particular, government authorities primarily react by arresting criminals and seizing drugs, but state violence is rarely used. One of the most surprising findings of the dynamic analysis reveals the languid behavior of the state when directly challenged by organized criminals. The results show that a sustained campaign of attacks against the state generates no response from government authorities in terms of violent or non-violent tactics, and actually manages to deter government efforts to seize drugs.

Finally, the statistical analysis reveals that most structural factors suggested by alternative explanations offer limited analytical leverage for understanding the highly dynamic characteristics of violence. This finding confirms the importance of conceptualizing and empirically evaluating violence from a micro-dynamic perspective. The results show no support for the explanations usually advanced by government authorities to justify the war on drugs. The argument about the erosion of the social fabric – measured by the number of divorces and the percentage of young mothers (ages 12–19) – shows no impact on the levels of violence among criminals. The argument about increased drug consumption in Mexico – measured by the number of hospitalizations due to drug abuse – fails to find support across any model specification. The prices of drugs in the U.S. market do not show any effect on the levels of criminal violence. Finally, the statistical model reveals that violent competition between criminal groups is more intense in states characterized by high economic

development than in poor states. The result is robust across different model specifications and different law enforcement tactics. This finding is consistent with the theoretical expectations of the model about the value of strategic territories. Most importantly, this finding challenges mainstream explanations of political violence and criminal behavior emphasizing the role of low levels of economic development as a key determinant of violence.

Implications

This research provides a sound theoretical explanation supported by rigorous empirical evidence about the deleterious effects of implementing quasi-military strategies to fight drugs. The unprecedented use of force to counter organized criminal groups launched by president Calderón triggered a massive wave of drug related violence in Mexico. The analysis of different law enforcement tactics conducted in this research can help to address some policy recommendations for government authorities.

Results invariably show that violence delivered by the state has a disruptive effect on criminal organizations as it is capable of generating spirals of violence among rival criminal groups. The basic intuition behind the rationalist approach of law enforcement advanced by Becker (1968) indicates that intensifying the severity and probability of sanctions against criminals increases the costs of engaging in criminal activities, thus expecting to reduce such behavior. However, this rationalist approach is wrong for explaining large scale organized criminal violence. Instead of imposing unbearable costs – as high as the cost of being killed – the use of violent law enforcement generates opportunities for rival criminal organizations to launch an invasion on a weakened target organization in order to control a valuable territory, thus instigating violence among criminal organizations. In consequence, the efforts to fight crime through the use of state violence have the counter productive consequence of exacerbating violence among criminals.

The empirical assessment in Chapter 6 shows that drug interdiction triggers episodes of violence among criminal organizations. However, as discussed in that chapter, the prevalence of drug consumption in Mexico is remarkably low. The vital problem in Mexico is not drug use, the problem is violence. Instead of focusing on seizing drugs, which in turn generate more violence against the state and among criminal organizations, the priority for government authorities should be on reducing the levels of violence.

The statistical analysis also provides evidence about the importance of the capability of inflicting military damage of criminal organizations. In particular, results indicate that the increased availability of assault weapons in the U.S. is associated with higher levels of violence in Mexico. The right to keep and bear arms in the U.S. is a highly political issue and efforts of gun regulation face fierce opposition from citizens, interest groups and political actors. In this sense, efforts of Mexican government authorities to lobby in favor of gun control would not only encounter the indifference of large sectors of the U.S. public about the deaths generated by these guns on the Mexican side, but might also face the discredit from gun supporters and the political consequences for trying to intervene on such a sensitive issue. However, there are a few things Mexican government authorities can do for trying to reduce the flow of assault weapons into Mexico. One strategy might be requesting U.S. government authorities to increase the number of southbound security check points on main border crossing areas. Another strategy could be to strengthen security checks on the Mexican side of the border and customs in an effort to reduce the flow of illicit weapons.

The responsible implementation of public policies in any sector should not ignore the negative consequences of conducting such policies. Economists refer to these effects as “negative externalities” and political scientists use the term “unintended consequences.” Regardless the specific terms used, the fact is that the implementation

of a large scale punitive policy against organized crime generated an unprecedented wave of violence in Mexico. Responsible government authorities must not neglect the consequences of implementing security policies with these characteristics. Rendering the social, economic and, most importantly, the human costs as acceptable casualties in service for a political cause would certainly constitute a perverse calculation.

Governments face no easy policy choices in terms of confronting organized crime. However, due to the deleterious consequences of the implementation of a large-scale punitive campaign against criminal organizations in Mexico, it is time to consider alternative security policies prioritizing harm reduction. A promising alternative is the implementation of a “dynamic concentration” approach to fight crime proposed by Kleiman (2009). The basic intuition behind this security policy indicates that if government authorities are not capable of controlling all different criminal organizations at the same time, it is preferable for authorities to concentrate their efforts on a specific criminal organization. To do so, Kleiman proposes a strategy based on three central axes. First, it is crucial to define a specific criteria to target criminal organizations. For the Mexican case, the criteria should be the levels of violence, not the size of the organization nor the amount of drugs it transports. In doing so, authorities should focus on the most violent criminal organizations. Second, authorities must effectively communicate the criteria and the organizations that meet such characteristics. In that way, authorities would indicate that they are going after the most violent organizations. Third, instead of fighting all criminal groups at the same time, a more efficient use of limited capabilities is to concentrate law enforcement efforts on the selected criminal group. In this way, the probability and severity of state actions against the selected target become more credible. Once violence from that specific organization is reduced, authorities can move on to the next one in the list. As indicated by Kleiman (2011), when deterrent threats are sufficiently credible and clearly communicated, they generate incentives for criminal groups to reduce the

overall levels of violence to the extent that the dynamic concentration approach does not need to be carried out very often. Security analysts such as Guerrero (2010a) consider that the implementation of Kleiman's dynamic concentration approach is an attractive option for the Mexican case, yet there are no clear signs that Mexican government authorities are reorienting their security policies towards this approach.

8.3 Why is Violence More Concentrated in Some Areas Than in Others?

Theoretical expectations

In order to explain the geographic distribution and concentration of organized criminal violence, the model explicitly incorporates a measure of territorial value as a key determinant of conflict. Departing from the assumption that criminals are primarily motivated by economic gains, the model indicates that criminal organizations are willing to engage in violent confrontations to capture or defend strategic territory that give them access to profitable illicit activities. In this way, the value of a territory serves as a contextual factor comprising the highly dynamic and interactive micro-mechanisms of violence between the state and criminals and among rival criminal organizations. The equilibrium conditions of the model indicate that drug trafficking organizations will engage in violent behavior as long as the economic benefits of capturing or defending a specific territory are worth the cost. In consequence, violence tends to concentrate in and around drug-valuable territories.

Empirical results

The statistical analysis also provides support for the theoretical expectation arguing that valuable territories are likely to experience higher levels of violence among criminal organizations. The results indicate that violence among criminal organizations is more intense in areas favorable for the production of drugs, reception of

shipments along the Gulf of Mexico and the Pacific coast, and at entry spots to the U.S. market located along the northern border of Mexico. In addition, the results show that violence between criminal groups increased after the September 11 terrorist attacks when the U.S. increased security along the border. The statistical analysis provides another remarkable set of findings, namely that the disrupting effect of violent law enforcement on criminal competition is contingent on the strategic value of the territory. The results indicate that increasing the use of violent enforcement in areas of high production of illicit crops generates more violence between criminals than in areas that do not produce drugs. In addition, the intensification of enforcement along the Pacific and the Gulf coasts generates substantially more violent competition between organized criminal groups than in territories away from the coast. Finally, increasing the use of lethal force along the U.S.–Mexico border generates more violence in areas favorable for international distribution of illicit drugs than away from the border. In all these cases, as government efforts to fight crime intensify in strategic areas favorable for drug-related activities, the levels of violence between criminal organizations increase exponentially. These findings provide strong support for the assumption that criminal organizations are primarily motivated by economic incentives. The results also show that the opportunities for confrontations between criminals generated by law enforcement have more disrupting effects in valuable territories than in non-strategic areas. Finally, these findings reinforce the importance of integrating the macro and micro-determinants of violence in order to understand the dynamic mechanisms of conflict contained in large structural factors.

Implications

Due to its geographic location next to the U.S., Mexico is particularly affected by the economic attractiveness of the world's largest drug consumption market. As long as there is a large demand of drugs in the U.S. and anti-drug regulations in the U.S. consider drugs as illicit commodities, there will be drug traffickers willing to kill and

die for obtaining the enormous profits associated with supplying the U.S. demand of drugs. The economic benefits generated by illegal markets constitute the driving force behind the strategic value of some territories favorable for the reception, production and international distribution in Mexico. In addition, it has been argued that the strategic importance of Mexico as a drug-trafficking route increased as the U.S. increased the aerial and maritime monitoring of drug transportation routes through the Caribbean. Unfortunately, in the short term, it is not realistic to expect that the U.S. will conduct a radical change in its drug policies by focusing on attending the consumption as a problem of public health rather than a national security concern, or by decriminalizing drugs at the federal level. This situation, represents a challenge for Mexican government authorities since the economic value of drug-valuable territories in Mexico is externally defined by U.S. drug policies and the characteristics of international drug routes.

However, there are a few things that Mexico could do to reduce the risk of violence associated with these strategic territories. As indicated in this research, increasing law enforcement in drug valuable areas generates intense waves of violence among criminal groups. The direct implication of this result is the recommendation of minimizing disruptive law enforcement actions in drug-valuable territories as a strategy to reduce violence. In addition, Mexican government authorities would benefit from engaging in a serious, evidence-based and open debate about adopting alternative legal and regulatory drug regimes in the country. More importantly, Mexican government authorities should play a more active role in the ongoing efforts led by the Organization of American States (OAS) on rethinking drug policies from a coordinated and regional perspective. These efforts include exploring possible scenarios for implementing alternative drug regulatory frameworks and even entertaining the possibility of abandoning the use of punitive counter-narcotic policies in some coun-

tries heavily affected by the production and transportation of drugs (Organization of American States, 2013).

8.4 Contributions

Theoretically, this research redefines the study of organized criminal violence within a broader literature of conflict research by calling the attention of scholars to the study of this pervasive and highly lethal form of violence and by providing direct contributions to the field. Based on an explicit set of scope conditions and assumptions, this research advances a formal model for the micro-dynamics of conflict among multiple actors operating within structural contexts. The emphasis on theoretical desegregation allows to specify the conditions for the behavioral manifestation of violence. According to the model, opportunities for violence among rivals are unintentionally generated by the intervention of a third actor. This analytical framework could help to understand the challenges of combatting organized criminal violence in the developing world, especially in new democracies. In addition, the mechanisms of conflict laid out in this model could contribute to analyzing the micro-dynamics of violence in other types of conflicts.

Empirically, this research contributes to the analysis of conflict by presenting “Organized Criminal Violence Event Data in Mexico 2000–2010” (OCVED), a novel data set of event data comprising daily geo-referenced information on who did what to whom, when and where in the Mexican war on drugs. With more than 9.9 million observations covering all Mexican municipalities over a time span of eleven years, this database contributes to the recent trend of using “big data” for conflict research. The use of fine-grained data also provides unprecedented analytical leverage for testing the micro-mechanisms of violence derived from the theoretical model, thus contributing to the efforts of the EITM program bridging theoretical developments and

empirical inferences. As discussed in the statistical assessment, the use of micro-level data reveals the highly dynamic and interactive character of violence and challenges mainstream explanations that focus primarily on structural factors.

Methodologically, this research relies mainly on a rigorous quantitative assessment of violence, but it also incorporates deep insights gathered through several months of fieldwork in Mexico. The research makes a deliberate effort to address the empirical challenges of causal inference generated by the endogenous relationships between dynamic and interactive processes of violence. The use of a quasi-experimental research design helps increase confidence about the causal inferences generated by the statistical assessment. In addition, the use of impulse–response analysis helps to disentangle the dynamic and lasting effects of different processes of violence.

Technologically, this research brings together cutting-edge advances in computer science with recent methodological developments in conflict research to develop *Eventus ID*, a novel automated protocol for coding event data from text in Spanish. This software helps researchers to reduce the financial and labor costs associated with manual coding strategies, thus favoring the creation of new databases on a wide variety of topics. In addition, the accuracy of event coding from sources in Spanish generates an unprecedented possibility for coding timely, detailed information written in this language.

Substantially, this research contributes to the task of observing and understanding organized criminal violence in Mexico. It offers a robust explanation and solid empirical evidence about the causes, mechanisms, magnitude, scope, and length of the wave of criminal violence caused by the implementation of a full-fledged military campaign to fight crime in Mexico. More broadly, the results of this research challenge the international paradigm that encourages the implementation of punitive strategies to fight drugs.

8.5 Looking Ahead

This research has accomplished its goal by providing some answers to urgent questions about the onset, escalation and concentration of organized criminal violence in Mexico. The theoretical foundations and empirical results should be subjected to close scrutiny by other researchers in order to advance our understanding of this complex and pressing phenomenon. As this research seeks to provide some answers, it also opens the door to further theoretical and empirical questions. The extension of this project constitutes a research agenda in its own right that will be accomplished through four tasks: bridging, disaggregating, expanding and reversing.

Bridging

The development of the study of the micro-dynamics of organized criminal violence requires building a bridge between carefully crafted theoretical developments and fine-grained evidence. Some of the empirical findings that emerged out of this research set a base for further theoretical development. The most important of these findings is the seemingly languid behavior of the state when directly challenged by criminal organizations. In contrast to the theoretical expectation of the “law of coercive responsiveness,” we should expect the state to react with the use of repression to counter or neutralize hostile actors. However, the results indicate that the state barely reacts when directly attacked by criminal organizations.

Another area of future research requires building bridges between diverse methodological approaches to the study of organized criminal violence. With the exception of the macro-historical analysis of the emergence, consolidation and collapse of order, this research relies heavily on the quantitative analysis of violence. Further extensions of this work will incorporate the qualitative analysis gathered during fieldwork to disentangle fine-grained causal mechanisms operating behind the general trends identified through quantitative analysis. However, the integration of qualitative in-

sights and quantitative regularities faces the challenge of acquiring systematic and reliable qualitative information in the midst of an active conflict. Journalists can testify to the lethality of drug-related violence against “those who know too many details.” Therefore, research should be conducted maximizing security conditions.

Disaggregating

Further research on drug-related violence will also involve theoretical and empirical disaggregation. One of the directions that this research will take is towards the disaggregation of criminal organizations. So far this research has treated criminal organizations as a homogeneous category. This decision was primarily based on theoretical grounds with the objective of generating a general encompassing explanation about their motivations and behavior that goes well beyond narratives relating to the current period. However, clearly not all criminal groups are the same. After identifying a set of common characteristics of criminal organizations, the next step will be to focus on analyzing variation between the different criminal groups in terms of their levels of violence, the brutality of their tactics, the different histories of territorial expansion and their different reactions towards law enforcement.

Another direction disaggregation will take is to look more carefully at the state. Future research will analyze the behavior of the different federal and sub-national security forces and agencies. Further research should analyze variations in their use of violent and non-violent tactics, as well as the effect of those tactics on criminal behavior. A breakdown of state actors also requires generating theoretical ideas and empirical information about principal-agent relations between political authorities and security agents across the different levels of government.

Expanding

One of the methodological contributions of this research is the development of Eventus ID. This tool can be used to expand the present work in various directions. The most immediate task will be to update the data base of organized criminal vio-

lence in Mexico. This is crucial for providing a public good to analyze the dynamics of violence in Mexico in a timely manner. This task is particularly urgent because at the time of this writing, the Mexican government had recently stopped generating and updating publicly available data on organized criminal violence. Another task will be to launch an ambitious collaborative project for replicating the event coding strategy implemented for Mexico in this research in other Latin American countries. This task would provide a massive amount of fine-grained data to conduct comparative analysis of organized criminal violence across Latin America. Such an empirical platform would set the foundations for theoretical and empirical developments about the domestic and transnational behavior of criminal organizations and different state responses. A third research direction would be to expand the use of Eventus ID to code different types of event data to analyze dissent–repression dynamics in Latin America. In addition, contingent on collaboration with other regional experts, Eventus ID’s coding algorithms could be adapted for analyzing information in other languages.

Reversing

This project is primarily focused on analyzing the *causes* of large-scale organized criminal violence. However, future research developments will focus on “reversing the terms of the equation” in order to analyze the *consequences* of drug-related violence. Studying the effects of drug-related violence is part of an emerging research agenda on human security. In order to make progress, this research agenda should rely on sound theories and rigorous empirical analysis to assess the effects of organized criminal violence on the prospects of economic development, the protection of human rights, and the expectations of democratic governance. Analyzing the effect of organized criminal violence on each of these sectors constitutes a research agenda in its own right. Addressing these topics is of paramount importance for understanding and meeting urgent global challenges.

APPENDIX A

A.1 Infolatina Query

("crimen organizado" OR "delincuencia organizada" OR AFI OR amapola OR arma* OR armas OR asesin* OR atac* OR ataque OR capo OR cartel OR cocaina OR cuerp* OR crim* OR delincuen* OR decapit* OR dispar* OR drog* OR ejecucion* OR ejecuta* OR ejercito OR enfrenta* OR herid* OR mariguana OR marina OR mata OR mata* OR mato OR militar* OR muert* OR narco* OR PFP OR pistol* OR polici* OR restos OR rifl* OR secuestr* OR sicari* OR SSP OR tortur* OR zeta*) NOT (*Qaeda OR Oppenheimer OR "apoyo al campo" OR "Banco de Mexico" OR Laden OR "bolsa Mexicana" OR "canasta basica" OR "Carlos Marin" OR Aristegui OR "Gomez Leyva" OR invitado OR Dresser OR "desastre natural" OR "desastres naturales" OR Bartolome OR Fondevilla OR forestal OR "JAQUE MATE" OR Chabat OR "Fuentes Aguirre" OR Zuckermann OR Curzio OR "liga mexicana" OR lector OR Meyer OR Loret OR "Luis Rubio" OR Merino OR "medio ambiente" OR "Obra publica" OR "Obras publicas" OR "Plaza Publica" OR "regreso a clases" OR Sarmiento OR "sintesis de medios" OR "sintesis de prensa" OR "sintesis informativa" OR "tala clandestina" OR taxi OR "templo mayor" OR tolvana OR "toma clandestina" OR accidente OR actor OR actriz OR acuerdo OR adelata OR Afganistan OR aguacero OR AH1N1 OR alimento OR AMLO OR anuncia OR aprueba OR atropella OR bacteria OR ballena OR beatificacion OR belleza OR bono OR bronquitis OR caiman OR calor OR cancer OR campeonato OR cantante OR carnaval OR ciclista OR cine OR clima OR colera OR comentario OR comisionado OR cortocircuito OR cultura OR debate OR delfin OR deporte OR desbordamiento OR dialogo OR ebrio OR ecologia OR educacion OR Egipto OR empresa OR escritor OR espectaculos OR estrellas OR Europa OR eutanasia OR evenenado OR felicita OR festejo OR fiscal OR frio OR futbol OR Gaddafi OR ganancia OR granizo OR gripa OR gripe OR inaugura OR indigna OR infarto OR influenza OR infraccion OR infraccion OR Inglaterra OR intoxicado OR inundacion OR invito OR Irak OR islam OR juego OR jugar OR justific* OR laboral OR Latinoamerica OR Libia OR llam* OR afirm* OR nieg* OR exig* OR reclam* OR critic* OR promet* OR llueven OR lluvia OR Marruecos OR medicament* OR medicin* OR metrobus OR Mitofsky OR modernizacion OR multa OR multa* OR mundial OR msica OR nepotismo OR nuclear OR Obama OR olimpiada OR opinion OR Osama OR Paulette OR pelicula OR peticion OR pirata OR pirotecnicos OR PROFEPA OR promo* OR propon* OR rabia OR reclam* OR reconoc* OR religi* OR reproch* OR ring OR rugido OR sarampion OR sindica* OR sismo OR supervisa OR talamontes OR Tabaco OR teatro OR temperatura OR terremoto OR tormenta OR torneo OR trascendio OR tuberculosis OR urge OR urgen OR utilidad* OR vacacio* OR varicela OR veneno OR videojuego OR viru* OR EZLN OR EPR OR Zapatist* OR nota diplomatica OR fraude OR subcomandante marcos OR ambulantes OR pescado OR tortuga OR IFE OR dia del trabajo OR desvio de recursos OR campeonato OR dictador OR suicid* OR casas de bolsa OR Iraq OR hipotec* OR Appo OR Appistas OR Boletin de prensa OR misa OR (reforma & (energetica OR laboral OR politica OR tributaria)))*

A.2 Number of Information Sources by Year



Figure A.1. Number of information sources by year

A.3 List of Information Sources

This is the complete list of information sources used in this research. It contains a total of 105 sources including:

- 4 from federal government agencies
- 32 from local government agencies
- 11 national newspapers
- 58 local newspapers

TABLE A.1:
LIST OF INFORMATION SOURCES

Source type	Name of information source
Federal government agencies: 4	
	Army: Secretaría de la Defensa Nacional (SEDENA) Federal Police: Secretaría de Seguridad Pública (SSP) Navy: Secretaría de Marina Armada de México (SEMAR) Attorney General: Procuraduría General de la República (PGR)
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

Continued on next page

TABLE A.1 – *Continued from previous page*

Source type	Name of information source
	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

Continued on next page

TABLE A.1 – *Continued from previous page*

Source type	Name of information source
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

Continued on next page

TABLE A.1 – *Continued from previous page*

Source type	Name of information source
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

A.4 List of Mexican States

TABLE A.2

LIST OF MEXICAN STATES

Code	Name	Short name	Abbreviation	Code	Name	Short name	Abbreviation
1	Aguascalientes	AGS	Ags.	17	Morelos	MOR	Mor.
2	Baja California	BC	B.C.	18	Nayarit	NAY	Nay.
3	Baja California Sur	BCS	B.C.S	19	Nuevo León	NL	N.L.
4	Campeche	CAMP	Camp.	20	Oaxaca	OAX	Oax.
5	Coahuila	COAH	Coah.	21	Puebla	PUE	Pue.
6	Colima	COL	Col.	22	Querétaro	QRO	Qro.
7	Chiapas	CHIS	Chis.	23	Quintana Roo	QROO	Qroo.
8	Chihuahua	CHIH	Chih.	24	San Luis Potosí	SLP	S.L.P.
9	Distrito Federal (Mexico City)	DF	D.F.	25	Sinaloa	SIN	Sin.
10	Durango	DUR	Dur.	26	Sonora	SON	Son.
11	Guajuato	GTO	Gto.	27	Tabasco	TAB	Tab.
12	Guerrero	GRO	Gro.	28	Tamaulipas	TAM	Tam.
13	Hidalgo	HGO	Hgo.	29	Tlaxcala	TLAX	Tlax.
14	Jalisco	JAL	Jal.	30	Veracruz	VER	Ver.
15	Estado de México	MEX	Edomex.	31	Yucatán	YUC	Yuc.
16	Michoacán	MICH	Mich.	32	Zacatecas	ZAC	Zac.

A.5 Map of Mexican States

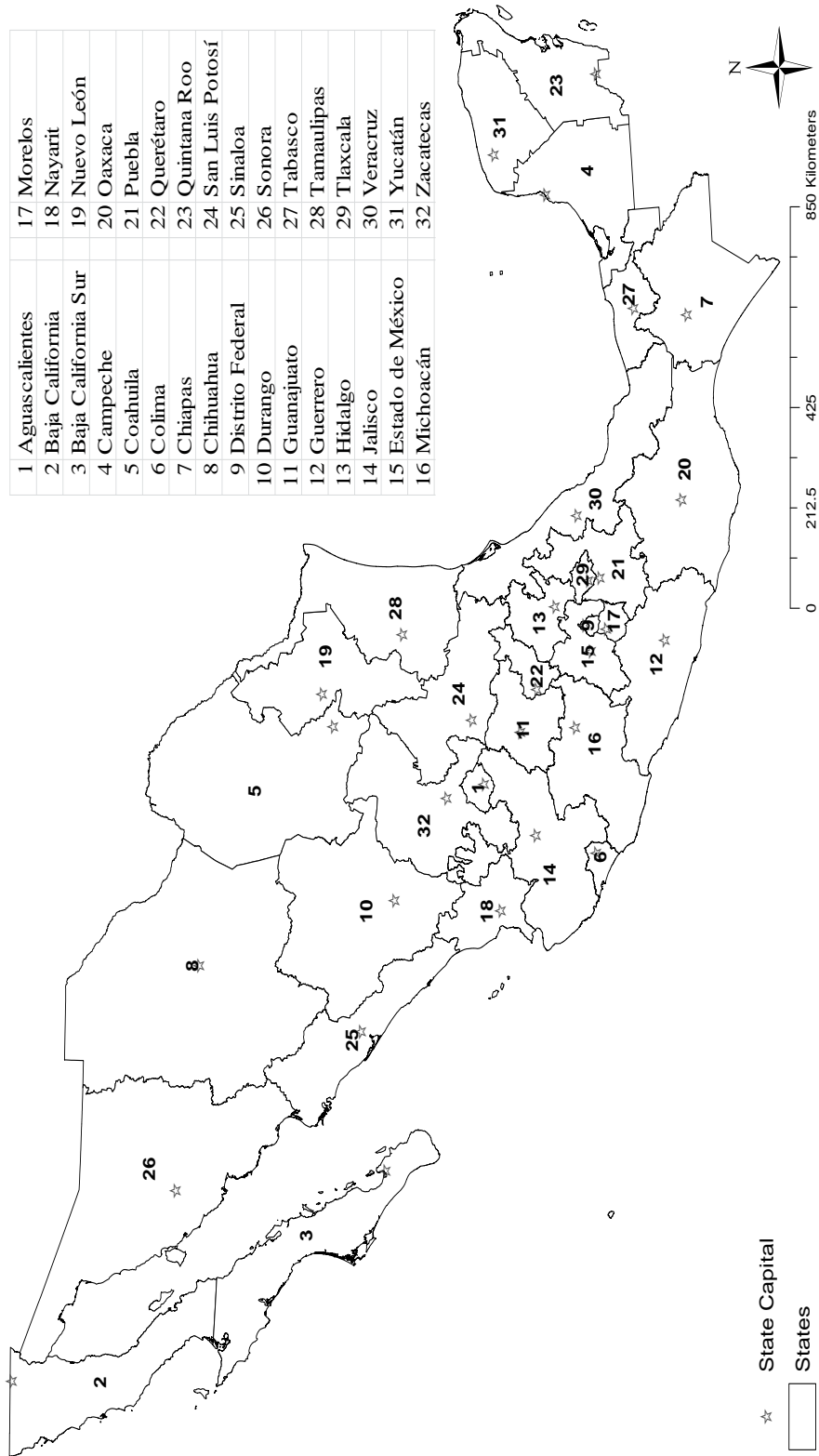


Figure A.2. Map of Mexican states

A.6 Descriptive Statistics of Data at Municipal Level on a Daily Basis

TABLE A.3:
DESCRIPTIVE STATISTICS OF DATA AT MUNICIPAL LEVEL
ON A DAILY BASIS

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Arrests	9,868,208	0.006	0.121	0	60
Arrests (predicted)	9,868,208	0.092	0.059	0.01	0.40
Cocaine Price	9,868,208	163.903	29.141	128.32	231.97
Competition	9,868,208	0.005	0.114	0	36
Competition (predicted) struc.	9,833,864	0.033	0.057	0.0003	1.49
Corruption	9,868,208	22.677	12.321	0	56.90
Divided government	9,868,208	1.181	0.589	0	2
Divorce	9,868,208	25.437	174.684	0	7054
Drug markets	9,868,208	1.241	16.610	0	740
Drug Production	9,868,208	0.417	0.766	0	3
Effective number of Parties	9,868,208	3.080	0.198	2.91	3.32
GDP State log	9,868,208	19.101	0.757	17.09	21.49
Gulf	9,868,208	0.114	0.317	0	1
Margin of victory	9,868,208	0.053	0.048	0.01	0.23
North	9,868,208	0.055	0.227	0	1
Pacific	9,868,208	0.145	0.352	0	1
Population log	9,868,208	9.364	1.527	4.53	14.41
Poverty	9,868,208	0.000	0.996	-2.38	4.50
Retaliation	9,868,208	0.002	0.052	0	11
Rifles	9,868,208	15.911	2.602	12.85	22.49

TABLE A.3: *Continued*

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Seizure of assets	9,868,208	0.002	0.056	0	16
Seizure of assets (predicted)	9,868,208	0.040	0.031	0.00	0.25
Seizure of drugs	9,868,208	0.008	0.144	0	26
Seizure of drugs (predicted)	9,868,208	0.039	0.024	0.00	0.20
Seizure of guns	9,868,208	0.002	0.058	0	20
Seizure of guns (predicted)	9,868,208	0.017	0.022	0.00	0.27
Teenage mothers	9,833,864	0.141	0.068	0	1
Unemployment	9,868,208	2.911	1.560	0.2	9.7
Violent enforcement	9,868,208	0.001	0.033	0	9
Violent enforcement (predicted)	9,868,208	0.009	0.015	0.0	0.23
9/11	9,868,208	0.846	0.361	0	1

Notes:

“predicted” refers to $e^{X\beta}$ where $(X\beta)$ is the predicted log of expected counts

“struc.” refers to the predicted outcome of the structural Model 5 in Table 6.1

A.7 Descriptive Statistics of Data at the National Level on a Daily Basis

TABLE A.4:
DESCRIPTIVE STATISTICS OF DATA AT NATIONAL LEVEL
ON A DAILY BASIS

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Violent enforcement	4018	1.52887	3.673342	0	58
Competition	4018	11.82106	18.59076	0	164
Retaliation	4018	3.74216	6.65784	0	63
Arrests	4018	15.73868	15.0746	0	127
Seizure of assets	4018	5.054007	6.491895	0	110
Seizure of drugs	4018	20.37382	19.60744	0	176
Seizure of guns	4018	4.251618	6.68392	0	63
Drug production	4018	0.4172612	0.0650845	0.3147394	0.52443
State GDP log	4018	19.1005	0.3274759	18.5609	19.51432
Poverty	4018	0.0001695	0.0011577	-0.0014269	0.0029951
Population log	4018	9.364474	0.0255989	9.336298	9.41745
Rifles	4018	1591124	260266.2	1284554	2248851

A.8 Hospitalizations by Drug Intoxication

Total number of hospital discharge records where the diagnostic indicates intoxication of cannabis, cocaine, opium, hallucinogens, solvents and multiple or other drugs (Secretaría de Salud, 2012a).

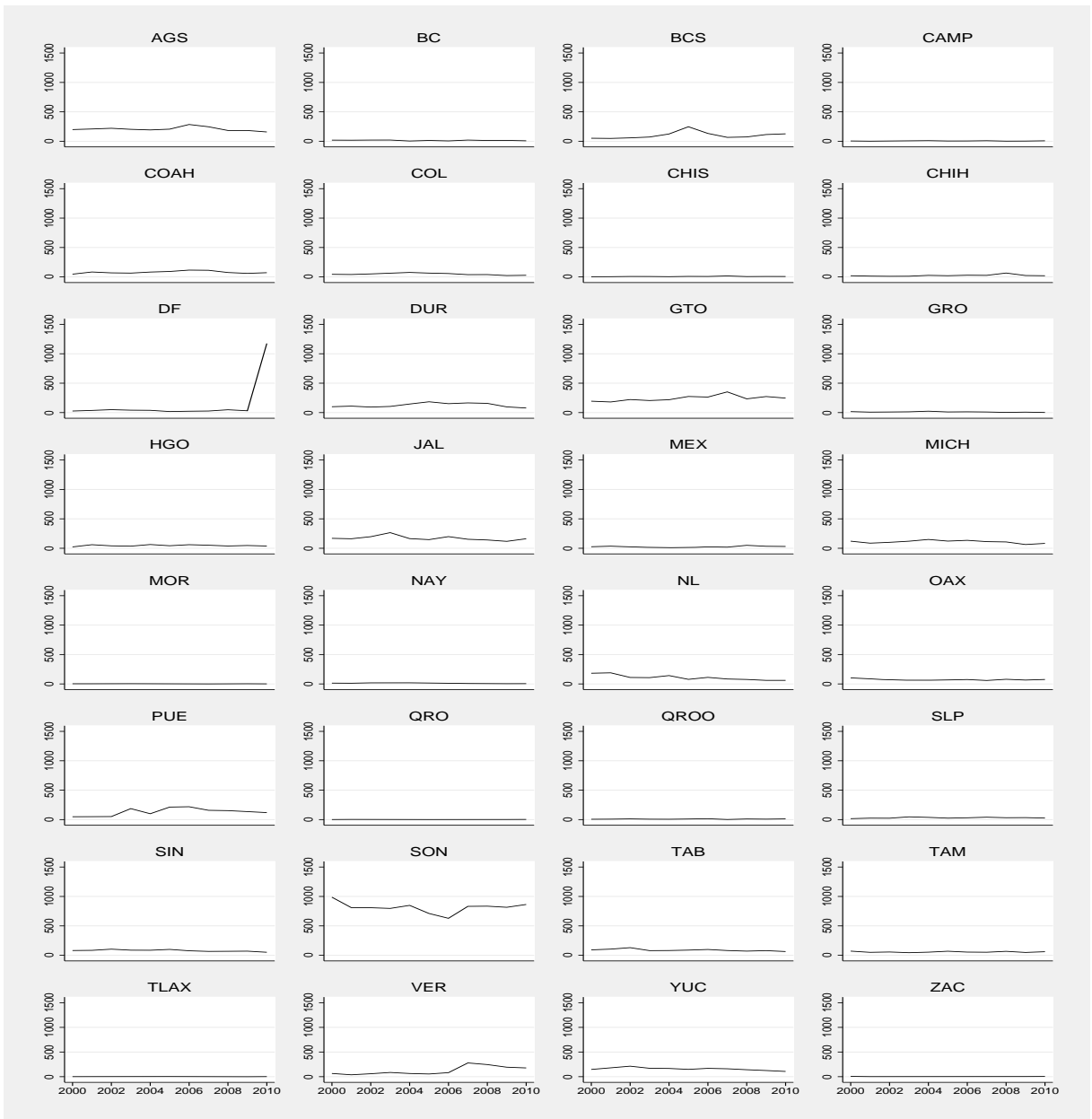


Figure A.3. Hospitalizations by drug intoxication at state level

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