# Increasing Intergovernmental Coordination to Combat Crime: Evidence from a Police Reform in Mexico

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**Abstract**

Latin America is the most violent region in the world with many countries also suffering from high levels of criminality, including the presence of powerful criminal organizations. Identifying government responses that improve citizen security is imperative. I examine whether increasing intergovernmental coordination between police agencies affects crime and violence. This study leverages the staggered implementation of a police reform that increased coordination between state and local police agencies and detailed data on criminal organizations and criminality in the Mexican state of Guanajuato. Using the generalized synthetic control method, I find that the reform reduced the presence of criminal organizations and the prevalence of violent theft, but increased homicides. I conclude that intergovernmental police coordination can play an important role in explaining when and where the state can effectively enforce the rule of law in violent contexts.
**Keywords:** Intergovernmental coordination, police, criminality, Mexico

## 1 Introduction

Latin America is the most violent region in the world (Roser and Ritchie, 2013), in large part driven by powerful criminal organizations (Global Initiative Against Transnational Organized Crime, 2021). Yet, many enforcement policies implemented in the region to counter criminality have proved counterproductive and instead exacerbate violence and crime (Dell, 2015; Lessing, 2017; Osorio, 2015; Calderón et al., 2015). Identifying government responses that address improve citizen security is therefore imperative. A leading argument is that intergovernmental coordination is a key factor explaining when and where the state is able to effectively fight crime and violence (Rios, 2015; Trejo and Ley, 2016; Durán-Martínez, 2015, 2017; Alberti et al., 2022). Yet, existing studies focus almost exclusively on the role that party alignment across levels of government play in influencing intergovernmental coordination and have largely overlooked the role of the police, precisely the enforcement arm of the state designed to address everyday crime and violence.

This study analyzes whether coordination between enforcement agencies of different levels of government also plays an important role in combating criminality in violent contexts. To analyze the effects of intergovernmental coordination between enforcement agencies on crime and violence, I leverage a police reform that increased coordination between local and state level police agencies in Mexico, a country where levels of criminality are particularly high. The reform was specifically designed to increase coordination between these enforcement agencies in their efforts to counteract organized crime and reduce high-impact crimes.

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Using original data on the staggered implementation of the police reform in the central Mexican state of Guanajuato, detailed panel data on criminality between 2000 and 2021, and the generalized synthetic control (GSC) method (Xu, 2017), I find that increasing intergovernmental policing coordination reduced the number of cartels by 0.73, a reduction of 0.65 standard deviations (SDs), and the prevalence of cartel wars by 37%, a 0.83 SD reduction. I also find that it reduced violent theft rates by 0.66 SDs, but also simultaneously increased homicide and cartel-related homicide rates by 0.22 SDs.

These findings support existing evidence that intergovernmental coordination on security issues plays an important role in explaining when and where the state can effectively counter criminal organizations and crime, though it contradicts existing works on intergovernmental coordination because it increases violence–the very outcome existing studies argue it decreases. Yet, the increase in violence is consistent with other studies finding that government enforcement against criminal organizations tend to increase violence. More broadly, the results suggest that intergovernmental coordination may be an important part of improving governance and citizen security in violent contexts.

## 2 Intergovernmental coordination and public security

A leading argument in the literature of Latin America is that intergovernmental coordination is a key factor explaining when and where the state is able to effectively fight crime and violence, including criminal organizations (Rios, 2015; Trejo and Ley, 2016; Durán-Martínez, 2015, 2017; Alberti et al., 2022). Specifically, scholars have argued that party politics can lead to parties in power at higher levels of government to prioritize security support for copartisans at the local level and/or neglect supporting local jurisdictions governed by rival parties, both of which result in better security outcomes in politically aligned municipalities (Trejo and Ley, 2016; González and Cáceres, 2019; Alberti et al., 2022). Similarly, other scholars have argued that political alignment between levels of government is one important factor that can facilitate security coordination and lead to better public security provision and lower levels of criminality (Rios, 2015; Durán-Martínez, 2015, 2017).

Yet, the scope of intergovernmental coordination has been almost exclusively limited on the role of party politics in existing studies, and have largely overlooked the role of the police, precisely the enforcement arm of the state designed to address everyday crime and violence. This study highlights another important component of intergovernmental coordination meant to address public security: coordination between enforcement agencies of different levels of government. That is, that enforcement agencies coordinating strategies, information, operations, and identity, can lead them to be more efficient in combating criminality by unifying their efforts. This argument follows that of Durán-Martínez (2015, 2017), who argues that a state's "[e]nforcement efficacy depends on the ability to coordinate enforcement actions and thus should increase as power within the security apparatus is more cohesive" (Durán-Martínez, 2015, 1382). However, while Durán-Martínez (2015, 2017) focuses on a multi-pronged concept of coordination, this study focuses specifically on the role of coordination between enforcement agencies.

These expectations lead to the following hypotheses:

> H1: Increased intergovernmental coordination between enforcement agencies decreases cartel presence.

> H2: Increased intergovernmental coordination between enforcement agencies decreases crime and violence.

# 3 Insecurity and police reform in Mexico

Mexico is a federal system with three levels of government (federal, state, and municipal), each with its own police forces. Through the early 2000s, violence by criminal organizations, also known as "cartels" in Mexico, began to rise in certain hot-spots—those key for drug trafficking. As a response, newly-elected president Calderon declared war against drug traffickers in December 2006 and deployed thousands of federal troops throughout the country. While the government crackdown was spearheaded by the federal government, state police also became important actors for implementing the crackdown (Trejo and Ley, 2020). As has been widely documented, this policy fragmented Mexico's cartels (Guerrero-Gutiérrez, 2011), increased violence (e.g., Ríos, 2013; Osorio, 2015; Trejo and Ley, 2020; Calderón et al., 2015), increased cartel violence against the state (Lessing, 2017), pushed cartels to expand beyond their strongholds (Alcocer, 2022), and resulted in cartels diversifying beyond drug trafficking and into new activities (Alcocer, 2022), among others.

This rise in criminality, evolution and sophistication of crime (organized and unorganized), increasing number of local police being killed, and numerous corruption scandals linking local police with criminal organizations raised serious concerns about the effectiveness of local police, the heterogeneity of local policing practices, and poor intergovernmental coordination between police departments (Domínguez Ramos, 2018). In response, two different police reforms with the central purpose of increasing coordination between local, state, and federal police were proposed, debated, and rejected in the national congress between 2010 and 2014. The first reform was called Unique Command (Mando Unico) and entailed the federal police taking operational command of state police, and state police taking operational command over local police that passed certain quality controls and full command over local police that did not meet these controls (Instituto Belisario Domínguez, 2015). The second reform, called Mixed Police Command (Mando Policial Mixto), came after widespread opposition to another reform, Unique Police Command (Mando Unico Policial), which would disband local police altogether. The reform would allow local police that met certain criteria to continue operating under the operational control of state police, and disband those that did not (Instituto Belisario Domínguez, 2015).

Despite the police reforms not being adopted at the federal level, they served as a template for various states and municipalities that independently decided to implement them. By the 2018, 71.5% of Mexico's 2,457 municipalities had implemented some version of the police reform (López, 2018). However, the lack of a federal mandate has meant that its implementation has been decentralized and uneven geographically, with some states and municipalities adopting it and not others, temporally, with states and municipalities adopting it at different times, and in kind, with different municipalities adopting different versions of the reforms. This also means that no dataset exists identifying where, when, or how the police reforms have been implemented, and thus, to the best of my knowledge, no systematic analysis has been done. We therefore lack evidence of the reform's impact on crime and violence, the very outcomes it was designed to address.

## 3.1 Case: police reform in the state of Guanajuato

Due to the data constraints, this paper focuses on the state of Guanajuato, a state in central Mexico with historically low levels of criminality and no significant cartel presence. Starting in 2008, however, criminal groups began entering the state and caused crime and violence to increase substantially. In response to the high levels of violence and crime, some municipalities in the state began to adopt police reforms to increase intergovernmental police coordination starting in 2014. Since then, 21 of its 46 municipalities adopted some form of the reform. Two types of reforms were implemented: (1) Unique Police Command (Mando Unico Policial or MUP), and (2) Unique State Command (Mando Unico Estatal or MUE). These municipalities are shown in Appendix Figure A1. Six municipalities implemented MUE, where local police

were disbanded and the state police took over local policing. These municipalities are excluded from the analysis in this study because MUE is different in kind from MUP.

Under the MUP reform, local police continued to operate but state police were given operational command over them. In these municipalities, local governments continued to hold administrative power over local police but operational command was turned over to state police through the appointment of a member of the state police as police chief. Consequently, state police could unify and coordinate guidelines, protocols, and operations with local police. For example, when describing this process, a local mayor said, "[t]here was a meeting between local police, transit police, state police, the Red Cross, and firefighters precisely to talk about the topic of coordination... this has allowed us to ensure that MUP has optimal communication and coordination to attend reports together with the emergency agencies" (Redacción, 2022).

# 4 Data

## 4.1 Treatment: police reform increasing intergovernmental coordination

Data which municipalities have implemented MU, its different versions, and the timing of its adoption across Mexico does not exist. In this paper I focus on the central state of Guanajuato. Through in-depth qualitative research on each of Guanajuato's 46 municipalities, I create a hand-coded dataset identifying the municipalities that adopted MUP and the timing of the implementation. I draw on data from municipal and state government official documents, statements by government officials reported in media outlets, and journalistic reports, and news articles. For each municipality, I identify (1) whether they adopted MUP or MUE at any time before December 2021, (2) if they did, the month and year that they implemented them, (3) if they rescind MUP or MUE, the month and year they did so, (4) if they re-implemented MUP or MUE, the month and year they did so, and (5) if they changed from MUP to MUE or the inverse, the month and year they did so. The resulting data is a municipality-month panel dataset identifying the months, if any, that each municipality had MUP or MUE. In this study I focus on MUP and thus exclude the municipalities that implemented MUE.[1] For the analysis on the effect of MUP on cartel activity, which is measured at the municipality-year level, this dataset is also aggregated to the municipality-year level.[2]

## 4.2 Dependent variable: cartel presence

To analyze whether MUP impacted cartels, I use hand-coded data on cartel presence in Guanajuato from Alcocer (Alcocer, 2023). This dataset collects information on the universe of cartels operating in Guanajuato between January 2000 and December 2021, including the municipalities they operated in, how well established they were in a municipality, and the relationships between them (rivals, allies, neutral). This data was created using extensive qualitative research and fieldwork and measures various aspects of cartel presence in the state of Guanajuato.

For this study, I rely on three measures from this dataset: (1) how well established cartels are in a municipality (or cartel strength), (2) the number of cartels operating in a municipality, and (3) whether two or more cartels are actively contesting a municipality. For the first variable, I use the measure of how well established each cartel is in a given municipality per year (no presence ¡ cell presence ¡ weak presence ¡ strong presence) to identify the strongest presence in each municipality-year. For the second variable, I use a simple count of the total number of cartels operating in a municipality per year. Finally, using the group-dyad and geographic presence

[1] Substantively, MUE does not tell us the effects of intergovernmental coordination. Methodologically, there are too few observations with MUE to estimate effects.

[2] To determine the start year, I adopt the following procedure: (1) if MUP was implemented by July in year $t$, the start year is set as $t$, (2) if MUP was implemented in August or later in year $t$, the start year is set to $t + 1$.

data, I identify municipality-years where cartels are actively fighting over a municipality.[3]

### 4.3 Dependent variable: crime and violence

To analyze the effect of MUP on crime, I use official data on two of the most prevalent types of crimes in Mexico: theft and homicides. First, I use data on the monthly incidences of crime per municipality from the National Public Security System (SESNSP) and on population from the 2010 census (INEGI) to create two variables: (1) monthly rates of violent theft per 100,000 inhabitants, and (2) monthly rates of nonviolent theft per 100,000 inhabitants. Data for these crimes is available from January 2011 to December 2021. While both measure the prevalence of crime, the former indicates a different modus operandi than the latter, that is, the willingness to use physical coercion that may be more visible, and likely entails harsher legal penalties.[4]

Second, I use monthly mortality data from Mexico's Statistical Agency (INEGI) to measure homicide prevalence in two ways. First, I use all homicides to calculate the monthly homicide rate for each municipality from January 2000 to December 2020. Second, Calderón et al. (2015) show that homicides of young men (males between the ages of 15-39) correlate highly, temporally and geographically, with homicides perpetrated by cartels. I therefore use the homicide rate of young men for each municipality from January 2000 to December 2020 to measure cartel-related homicides.

### 4.4 Controls

To control for intergovernmental coordination due to party politics and isolate the effect of intergovernmental coordination by enforcement agencies, I use local and state level election data from Magar (2018) to create three dummy variables that vary across time: whether the mayor shares political affiliation with (1) the governor and not the president, (2) the president and not the governor, and (3) the governor and the president. An important covariate is the capacity of local police. If implementing MUP affects the capacity of police, then effects we see could be due to this and not increased coordination. To control for police capacity, I use official data on the number of individuals at the municipal level assigned to public security. The data comes from federal censuses of local governments conducted in 2011, 2013, 2015, 2017, 2019, and 2021 (INEGI) and impute values for the missing years using data from the previous year's census. Election cycles have been shown to be critical for cartel activity (CITE), so I control for election years. Finally, cartels in Guanajuato primarily fight over the illicit oil theft market (Alcocer, 2022), so I control for municipalities with oil pipelines.

For the models estimating the effect of the police reform on crime and violence, I also use the data on cartels from Alcocer (2023) as control variables since cartel dynamics tend to drive crime. For these models I use four control variables: (1) the number of cartel cells operating in a municipality, (2) the number of cartels with weak presence in the municipality, (3) the number of cartels with strong presence in the municipality, and (4) a dummy variable denoting whether two or more cartels were actively fighting over the municipality.

Descriptive statistics for sample analyzing the effect of intergovernmental coordination on cartels is shown in Table 1, while those analyzing effects on crime and violence are shown in Table 2.

[3]This variable is different in kind from the variable using the number of cartels in a municipality because two or more cartels can operate in the same territory without active conflict. As the data from Alcocer (2023) shows, there are a number of cases where cartels are neutral or even allied and operate in the same spaces.

[4]Durán-Martínez (2015, 2017) argues that there is a strategic logic behind criminal organizations choosing to use more visible forms of crime and that it largely depends on the credibility of government enforcement.

Table 1: Summary statistics for analysis of police reform on cartel activity.

| | n | mean | sd | min | max |
|---|---|---|---|---|---|
| MUP | 726 | 0.088 | 0.284 | 0 | 1 |
| Cartel presence strength | 726 | 1.110 | 1.186 | 0 | 3 |
| Number of cartels | 726 | 0.908 | 1.115 | 0 | 5 |
| Cartel war | 726 | 0.275 | 0.447 | 0 | 1 |
| Log population | 726 | 11.078 | 0.919 | 8.805 | 13.293 |
| Log economically inactive pop. | 726 | 10.095 | 0.935 | 7.565 | 12.545 |
| Governor from rival party | 726 | 0.430 | 0.495 | 0 | 1 |
| President from rival party | 726 | 0.534 | 0.499 | 0 | 1 |
| Governor and president from rival party | 726 | 0.295 | 0.456 | 0 | 1 |
| Individuals in local public security | 726 | 174.843 | 185.047 | 0 | 1,280 |

Table 2: Summary statistics for analysis of police reform on crime and violence.

| | n | mean | sd | min | max |
|---|---|---|---|---|---|
| MUP | 8,712 | 0.092 | 0.288 | 0 | 1 |
| Violent theft rate | 4,356 | 1.573 | 2.865 | 0 | 32.233 |
| Non-violent theft rate | 4,356 | 10.119 | 9.369 | 0 | 89.955 |
| Homicide rate | 8,316 | 1.713 | 4.272 | 0 | 104.948 |
| Cartel-related homicide rate | 8,316 | 0.753 | 2.315 | 0 | 59.970 |
| Number of cartel cells | 8,712 | 0.197 | 0.477 | 0 | 3 |
| Number of weak cartels | 8,712 | 0.556 | 0.790 | 0 | 4 |
| Number of strong cartels | 8,712 | 0.154 | 0.376 | 0 | 2 |
| Cartel war | 8,712 | 0.275 | 0.447 | 0 | 1 |
| Log population | 8,712 | 11.078 | 0.919 | 8.805 | 13.293 |
| Log economically inactive pop. | 8,712 | 10.095 | 0.934 | 7.565 | 12.545 |
| Governor from rival party | 8,712 | 0.430 | 0.495 | 0 | 1 |
| President from rival party | 8,712 | 0.534 | 0.499 | 0 | 1 |
| Governor and president from rival party | 8,712 | 0.295 | 0.456 | 0 | 1 |
| Individuals in local public security | 8,712 | 174.843 | 184.930 | 0 | 1,280 |

# 5 Research design

Estimating the effect of the police reform that increased intergovernmental coordination on public security outcomes is not straightforward given that criminality likely plays a role in whether and when some municipalities chose to adopt the policy reform, so the parallel the difference-in-differences (DID) parallel trends assumption is unlikely to hold.[5]

To address this concern, this study uses the generalized synthetic control (GSC) method (Xu, 2017), which builds on the synthetic control method (Abadie et al., 2010, 2015) and the interactive two-way fixed effects model (IFE) (Bai, 2009). GSC allows the estimation of the average treatment effect on the treated (ATT) of a staggered treatment on an outcome, in this case, of police reform on crime. In essence, the GSC method creates counterfactuals for treated units by using pre-treatment observations to weight control units so they look similar to the treated units and pre-treatment outcome trends approximate each other. Appendix 3 and 4 discuss in more detail how the treated and control groups were selected and shows the timing that each treated unit received treatment. GSC has clear advantages over other approaches in this case. First, it allows for non-random interventions with staggered adoption, relaxes the parallel trends assumption required by DID, generalizes the synthetic controls method to allow multiple treated units, works well when there is a small number of treated units, and allows for treatment effect heterogeneity across units.

I estimate two separate models since the data on cartel presence is at the municipality-year level, while the data on crime is at the municipality-month level. All models are estimated using the following specification:

$$Y_{it} = \delta_{it} D_{it} + X_{it}^{'} \beta + \lambda_{i}^{'} f_t + \epsilon_{it} \tag{1}$$

where $Y_{it}$ denotes the outcome of interest in municipality $i$ at time $t$, $D_{it}$ is the treatment indicator that takes on the value of 1 for municipalities that adopted the police reform once they implemented the reform and 0 otherwise, $\delta_{it}$ estimates the heterogeneous treatment effect on municipality $i$ at time $t$, $X_{it}^{'}$ is a vector of observed covariates, $\lambda_{i}^{'}$ is a vector of unknown factor loadings, $f_t$ denotes a vector of unobserved common factors, and $\epsilon_{it}$ are the error terms for municipality $i$ at time $t$. The number of factors are selected using a cross-validation procedure that minimizes the mean square prediction error (MSPE). Standard errors are estimated using bootstrapping with 1,000 runs. Finally, all models are estimated using Expectation Maximization algorithm.

For the analysis estimating the effect of the police reform on cartel presence, $t$ denotes years, $Y_{it}$ denotes different measures of cartel presence, and $X_{it}^{'}$ includes controls for sociodemographic characteristics (log(population) and log(economically inactive population)), local police capacity (number of individuals assigned to public security duties at the municipal level), and political factors (whether mayors share the same party as the governor, with the president, or both).[6] Again, the interactive two-way fixed effects also control for any common shocks and unobserved time-invariant and time-varying covariates.

For the models estimating the effect of the police reform on crime, $Y_{it}$ denotes different measures crime (rates per 100,000 of violent theft, non-violent theft, homicides, and homicides of young men), $t$ denotes months for $Y_{it}$ and $D_{it}$, and $X_{it}^{'}$ includes municipality-specific controls for cartel presence (number of cartels with cell, weak, and strong presence, and whether cartels were actively contesting the municipality), sociodemographic characteristics (log(economically

[5]Data shows that municipalities that adopted the reform had, on average, better established cartel presence, more cartels, and more cartel wars. However, they also had lower levels of violent and non-violent theft, and similar levels of homicides. Thus, if criminality influenced the adoption of the reform, it was cartel activity and not levels of crime.

[6]Because local elections occur in all municipalities during the same years, the year fixed effects control for election cycles. Similarly, because oil pipelines do not vary across time, unit fixed effects controls for having pipelines.

inactive population)), local police capacity (number of individuals assigned to public security duties at the municipal level), and political factors (whether mayors share the same party as the governor, with the president, or both).

# 6 Results

Table 3 shows the average ATT over all time periods for increased intergovernmental coordination on different measures of cartel presence. Figure 1 plots both the average outcomes of the treatment and synthetic control units before and after the implementation of MUP to show parallel trends (plots A1, B1, and C1), and the ATT per period with 95% confidence intervals to visualize the effect over time (plots A2, B2, and C2).[7]

Table 3: Average treatment effect on the treated (ATT) of increased intergovernmental coordination on cartels averaged across treatment period.

| | *Dependent variable:* | | |
|---|---|---|---|
| | Cartel strength | Cartel number | Cartel war |
| | (1) | (2) | (3) |
| Police Reform | −0.346 | −0.730*** | −0.370*** |
| | (0.239) | (0.207) | (0.105) |
| Municipality FE | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes |
| Unobserved factors | 1 | 1 | 1 |
| Period | 2000-2021 | 2000-2021 | 2000-2021 |
| Observations | 726 | 726 | 726 |
| Treated Muns | 10 | 10 | 10 |
| Control Muns | 23 | 23 | 23 |
| *Note:* | | | *p<0.1; **p<0.05; ***p<0.01 |

Looking at average ATT results, Table 3 shows that intergovernmental coordination had an overall negative effect on cartels, that is, it weakened their presence. First, the effect of MUP on the strength of cartel presence is negative but not statistically significant. However, MUP does decrease the number of cartels operating in municipalities by almost three quarters of a cartel, which is a 0.65 SDs decrease. Moreover, results show that MUP also decreased the prevalence of cartels fighting in the municipality by 37%. This reduction in cartel wars is consistent with the decrease in number of cartels in a municipality.

When looking at the effects per period in Figure 1, however, we see that MUP does decrease the strength of cartel presence, though these results are only statistically significant the third and fourth years after its implementation. When it comes to the number of cartels and wars between cartels, there is also a negative effect but the effect is more immediate. MUP decreases the number of cartels by the second year and cartel wars within a year. Yet, while the effect on cartel wars appears to hold after five years, the effects on cartel strength and number of cartels is lost after five and six years, respectively.

Turning to the effects of increased intergovernmental coordination on crime and violence, Table 4 shows the average ATT over all time periods and Figure 2 plots both the average outcomes of the treatment and synthetic control units before and after the implementation of

[7] Appendix Tables A2, A3, and A4 show the ATT results used to create plots.

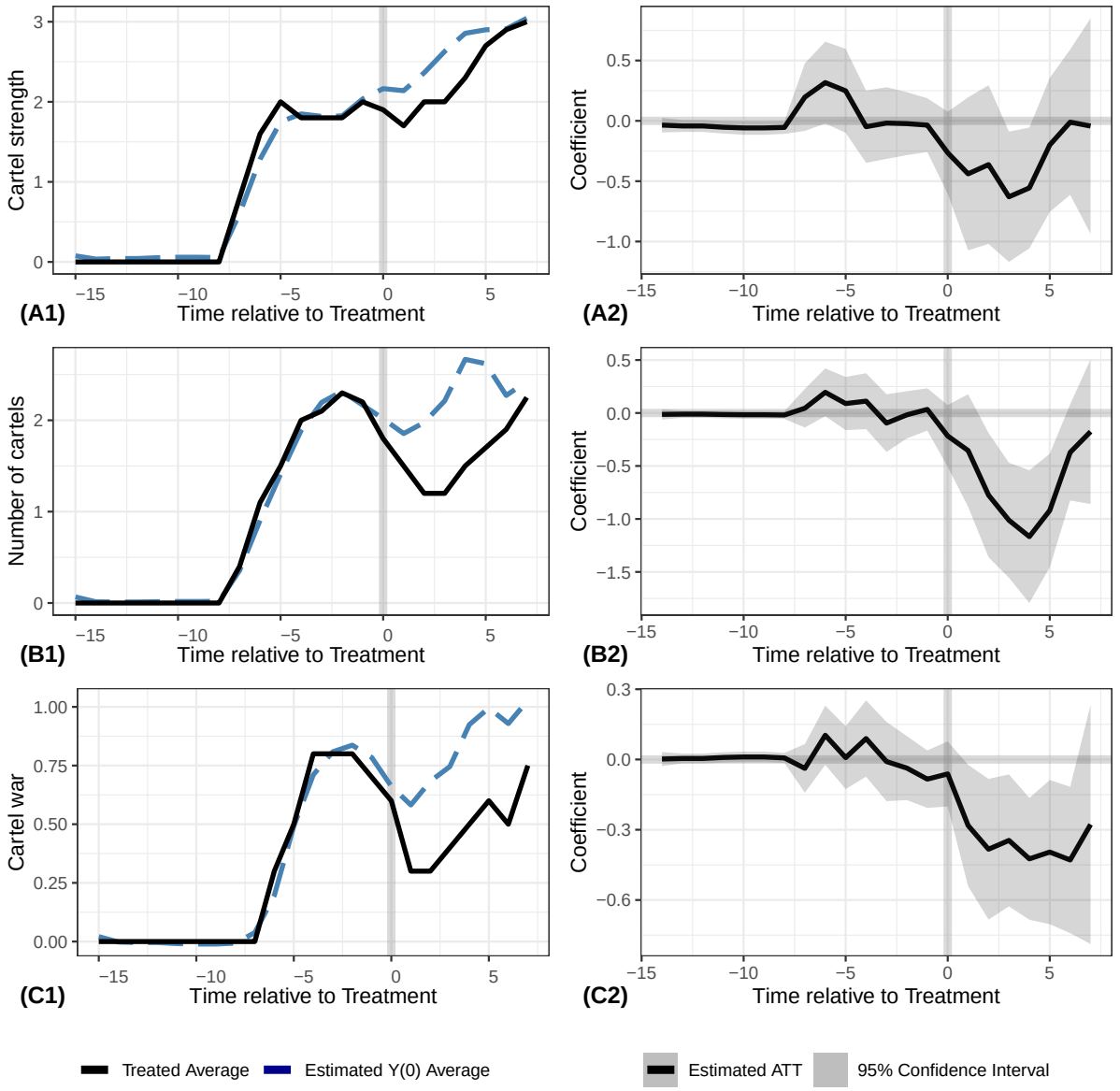


Figure 1: Average outcome trends for treated and synthetic control groups (left column) and average treatment effect on the treated (ATT) of police reform increasing intergovernmental coordination on cartels with 95% confidence intervals (right column). (A1-A2) Cartel strength, (B1-B2) number of cartels, (C1-C2) cartel war.

MUP to show parallel trends (plots A1, B1, C1, and D1), and the ATT per period with 95% confidence intervals to visualize the effect over time (plots A2, B2, C2, and D2).[8]

Average ATT results in Table 4 show that increased intergovernmental coordination reduces both violent and non-violent theft, though only the former is statistically significant. First, MUP decreased the violent theft rate by -1.88, which corresponds to a reduction of 0.66 SDs. Second, estimates suggest that MUP decreased both overall homicide rates and cartel-related homicide rates by 0.94 and 0.5, respectively, and these results are statistically significant at the 0.1 level. These effects are important, as they imply an increase of 0.22 SDs in both homicide and cartel-related homicide rates.

Looking at the temporal effects shown in Figure 2, MUP has an almost immediate negative–by

[8]Appendix Tables A5, A6, A7, and A8 show the ATT results used to create plots.

Table 4: Average treatment effect on the treated (ATT) of increased intergovernmental coordination on crime rates averaged averaged across treatment period. Crimes measured per 100,000 inhabitants.

| | *Dependent variable:* | | | |
|---|---|---|---|---|
| | Violent theft rate | Non-violent theft rate | Homicide rate | Young men homicide rate |
| | (1) | (2) | (3) | (4) |
| Police Reform | $-1.883^{**}$ | $-1.387$ | $0.941^{*}$ | $0.498^{*}$ |
| | (0.782) | (1.019) | (0.528) | (0.276) |
| Municipality FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Unobserved factors | 0 | 1 | 2 | 1 |
| Period | 1/2011-12/2021 | 1/2011-12/2021 | 1/2000-12/2020 | 1/2000-12/2020 |
| Observations | 4356 | 4356 | 8316 | 8316 |
| Treated Muns | 11 | 11 | 10 | 10 |
| Control Muns | 22 | 22 | 23 | 23 |
| *Note:* | | | | $^{*}$p<0.1; $^{**}$p<0.05; $^{***}$p<0.01 |

the third month–and lasting effect on violent theft. However, like its effects on cartels, MUP only reduces non-violent theft after three years and revert back to no effect after four years. The effects on violence are similar from those of violent theft in that there is a short-term (two month) statistically significant effect, but differ in that MUP has a positive effect on homicides and cartel-related homicides. Yet, this effect mostly disappears after about 3.5 years.

### 6.1 Interpretation of findings

The motivation behind increasing intergovernmental police coordination in Mexico was to combat organized crime and reduce high-impact crimes. Moreover, by giving operational control to state police, who focus more on high-impact crimes than local police, the focus of local police likely shifted to some degree away from policing street crimes to to combating organized crime and high-impact crimes. In this context, increasing intergovernmental police coordination accomplished one of its primary goals (at least within the first five years of its implementation): it weakened cartel presence, reduced the number of cartels, decreased the incidence of cartels wars, and lowered violent crime. These results are consistent with the idea that effective intergovernmental coordination can help the state better combat criminality.

However, the police reform also increased violence. This is consistent with most studies of Latin America that show that many enforcement policies implemented to combat criminality have proved counterproductive and increased violence. These results suggest that the mechanisms offered by the literature to explain why government interventions against crime often exacerbate the incentives that criminal organizations have to use violence are present in this case as well, though further research is needed to identify precisely which mechanisms are causing the increase in violence.

These mixed results–decrease in cartel activity and violent crime but increase in violence–may explain why some advocates defend the reform while opponents deem it a failure. Yet, the results presented in this study are of Guanajuato and it is not clear how the results would generalize to other settings. As previously stated, despite some form of MU being implemented in most municipalities in Mexico, they differ in form. Moreover, Guanajuato is a state ruled by

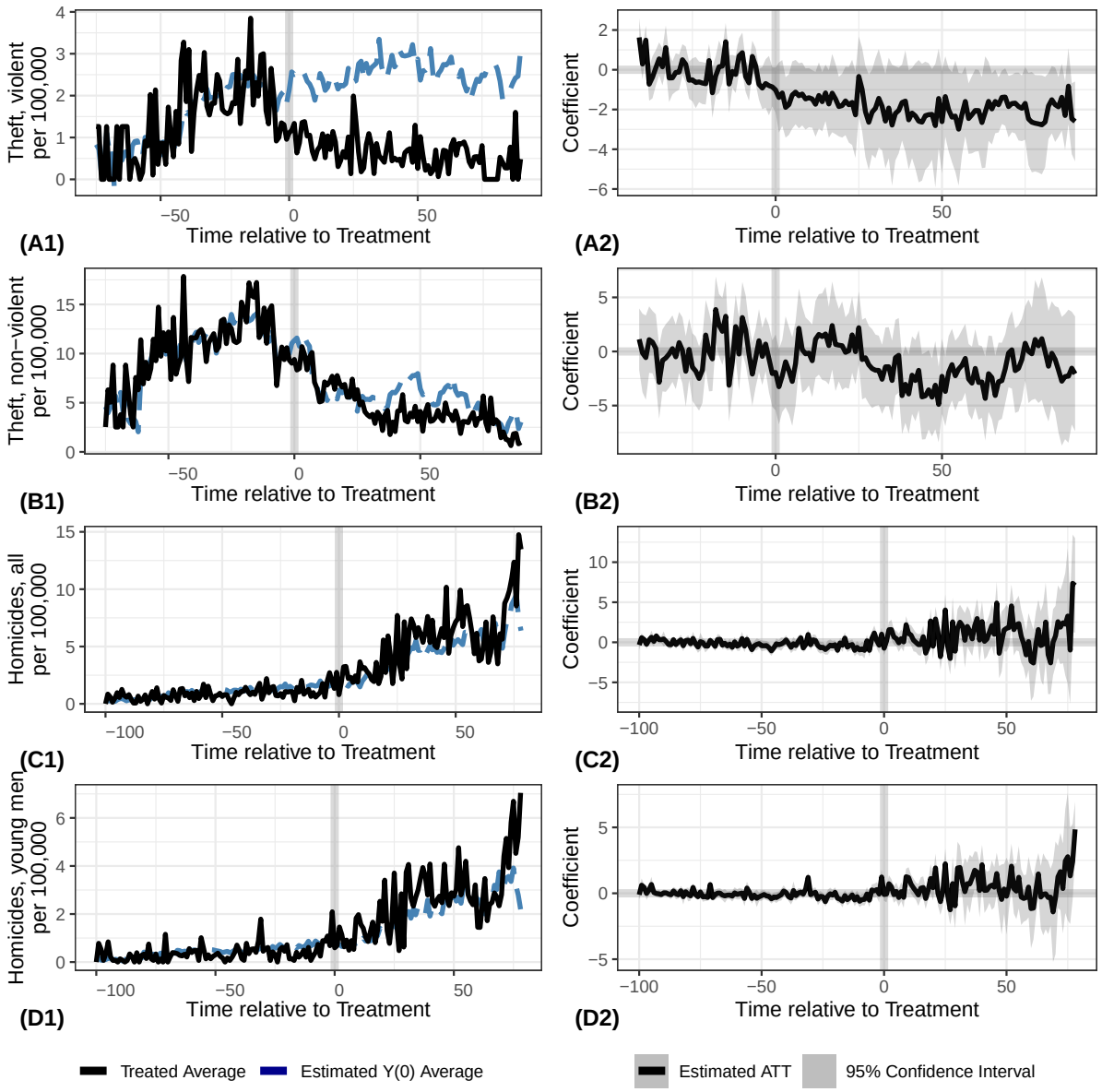


Figure 2: Average outcome trends for treated and synthetic control groups (left column) and average treatment effect on the treated (ATT) of police reform increasing intergovernmental coordination on crime and violence with 95% confidence intervals (right column). (A1-A2) Violent theft rate, (B1-B2) non-violent theft rate, (C1-C2) homicide rate, (D1-D2) cartel-related homicide rate.

the conservative party at the state level, a party that has been associated with hard-on-crime policies, and has a state police that is well respected and considered by most as professional.

## 7 Discussion

Addressing crime and violence to improve citizen security is a critical issue in Latin American politics and has important implications for the rule of law and governance. A key factor identified by the literature that can help address these challenges is intergovernmental coordination. While existing literature has focused on the role that vertical political alignment has in improving intergovernmental coordination, the impact of police coordination across levels of government

has remained overlooked.

This study examines a police reform in Mexico that increased intergovernmental coordination between state and local level police departments and finds that this reform reduced cartel activity and violent crime, but increased violence in the state of Guanajuato. These results have important policy implications, as they indicate that increasing intergovernmental coordination between police agencies can be an effective strategy to combat criminal organizations and some forms of crime. Yet, the policy also increases violence, indicating that this policy has both benefits and costs for citizen safety that need to be considered. Nevertheless, these findings are important given the extensive literature highlighting the negative externalities that other enforcement policies have had in the region.

The findings of this study further support the evidence that intergovernmental coordination on security issues plays an important role in explaining when and where the state can effectively enforce the law to counter crime and violence. It also suggests that an additional dimension of intergovernmental coordination that should receive more attention is coordination between enforcement agencies of different levels of government.

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# A Police Reform in Mexico

Between 2010 and 2014, three different police reforms were proposed, debated, and rejected in the national congress, two of which had the central purpose of increasing coordination between local, state, and federal police. First, President Calderon proposed a police reform in 2010, called "Single Command" (Mando Unico), to the Mexican legislature in which the federal police would take operational command of state police, and state police of would take operational command over local police that passed certain quality controls and take the over local police that did not meet these controls (Instituto Belisario Domínguez, 2015). The Executive Secretary of the National Public Security System explained at the time that under this reform "all the police forces in the country would be obligated to have better coordination in order to give citizens, anywhere in the national territory, better security conditions" (NTX, 2010). This reform was specifically designed to increase coordination between federal, state, and local police, as they would share an identity, information, operations, control, and strategies, among others. The reform would affect all 32 state police and over 2,000 local police. The reform was killed in its congressional committee.

In 2014, President Peña Nieto proposed a bill called Unique Police Command (Mando Unico Policial) that would disband the over 1,800 local police that existed at the time and give all local level policing responsibilities to state police forces. Widespread opposition to this reform led to an alternative proposal called Mixed Police Command (Mando Policial Mixto), which would increase coordination between state and local police by allowing local police that met certain criteria to continue operating, though under the operational control of state police. Police that did not meet these criteria would be eliminated and replaced by the state police. Yet, like the two previous attempts, this proposed reform was not approved by its congressional committee and never made it to the floor for a vote.

# B Police Reform in Guanajuato

Figure A1 shows the map of Guanajuato and the municipalities that, at some point between January 1, 2000 and December 31, 2021, adopted Unique Police Command, only adopted Unique State Command and not Unique Police Command, and those that did not adopt any police reform. This is the sampling frame from which the treatment and control groups are drawn from (see next section).

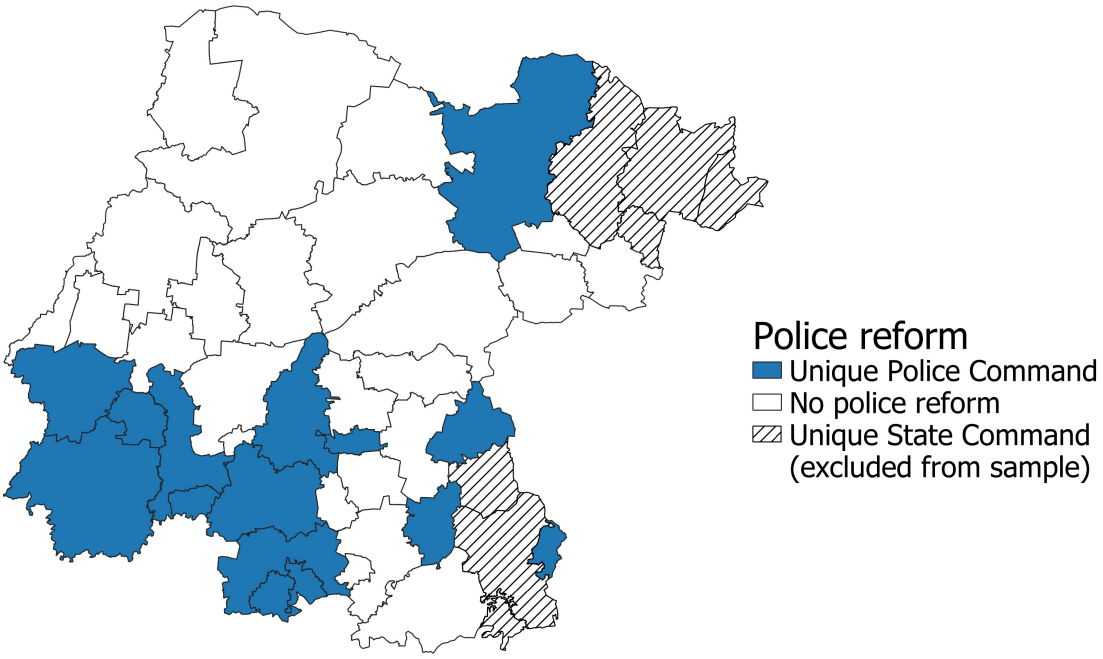


Figure A1: Municipalities in Guanajuato that adopted Unique Police Command at any point, only adopted Unique State Command, did not implement any police reform.

# C Identifying treatment and control units

The first step of the GSC method is identifying the treated and control units that will be used to create the counterfactuals. In total, 15 of Guanajuato's 46 municipalities adopted MUP at some point. However, two municipalities only adopted it for one year and then revoked it, one adopted it for three years and then revoked it, and one adopted it for four years and then revoked it. The last to adopt it, and the only one to do so after 2018, did so in October 2021, so it is excluded from the year-municipality sample. Therefore, the final municipality-year data has 10 municipalities that adopted the treatment, and the municipality-month data has 11. To construct the control group, I exclude any municipality that implemented MUE (six municipalities) and the municipality of Leon, which is by far the largest municipality in the state of Guanajuato. I exclude Leon because it does not share common support with the rest of the sample for most covariates, and the GSC method could use this data to erroneously extrapolate a counterfactual. This process leaves 23 municipalities in the control group that is used to create the counterfactuals. Appendix Table A1 lists these municipalities and whether they are part of the treatment or control group, while Appendix Figures A2 and A3 visualize the timing each treated unit received treatment.

# D Treatment status

Table A1: List of municipalities in sample.

| Municipality ID | Municipality name | Ever treated |
|---|---|---|
| 11001 | Abasolo | 1 |
| 11008 | Manuel Doblado | 1 |
| 11012 | Cuerámaro | 1 |
| 11021 | Moroleón | 1 |
| 11023 | Pénjamo | 1 |
| 11035 | Santa Cruz de Juventino Rosas | 1 |
| 11039 | Tarimoro | 1 |
| 11041 | Uriangato | 1 |
| 11042 | Valle de Santiago | 1 |
| 11044 | Villagrán | 1 |
| 11046 | Yuriria | 1 |
| 11002 | Acámbaro | 0 |
| 11003 | San Miguel de Allende | 0 |
| 11007 | Celaya | 0 |
| 11009 | Comonfort | 0 |
| 11011 | Cortazar | 0 |
| 11013 | Doctor Mora | 0 |
| 11014 | Dolores Hidalgo Cuna de la Independencia Nacional | 0 |
| 11015 | Guanajuato | 0 |
| 11017 | Irapuato | 0 |
| 11018 | Jaral del Progreso | 0 |
| 11022 | Ocampo | 0 |
| 11024 | Pueblo Nuevo | 0 |
| 11025 | Purísima del Rincón | 0 |
| 11026 | Romita | 0 |
| 11028 | Salvatierra | 0 |
| 11029 | San Diego de la Unión | 0 |
| 11030 | San Felipe | 0 |
| 11031 | San Francisco del Rincón | 0 |
| 11032 | San José Iturbide | 0 |
| 11036 | Santiago Maravatío | 0 |
| 11037 | Silao | 0 |
| 11040 | Tierra Blanca | 0 |

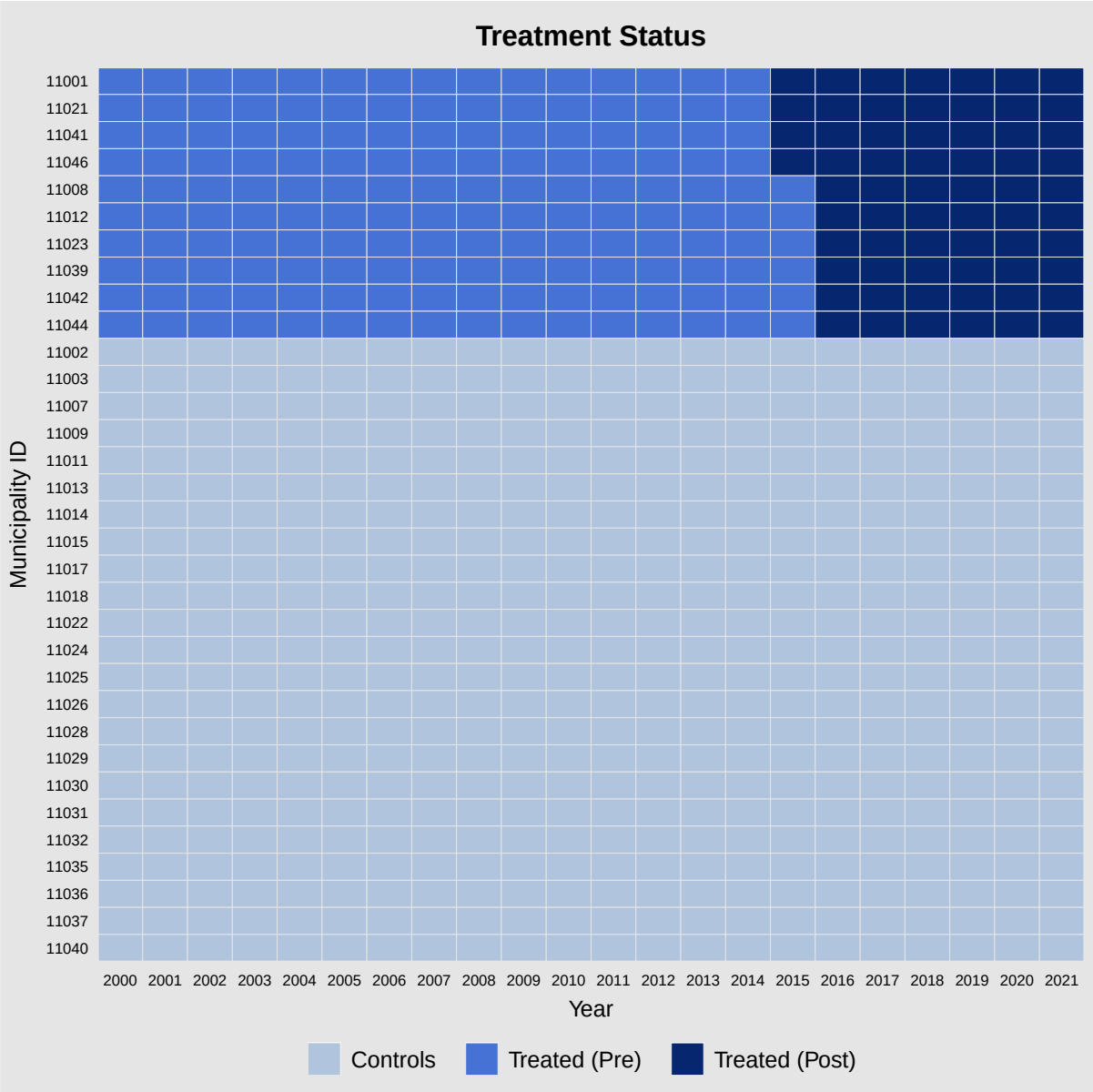


Figure A2: Treatment assignment by municipality for municipality-year analysis.

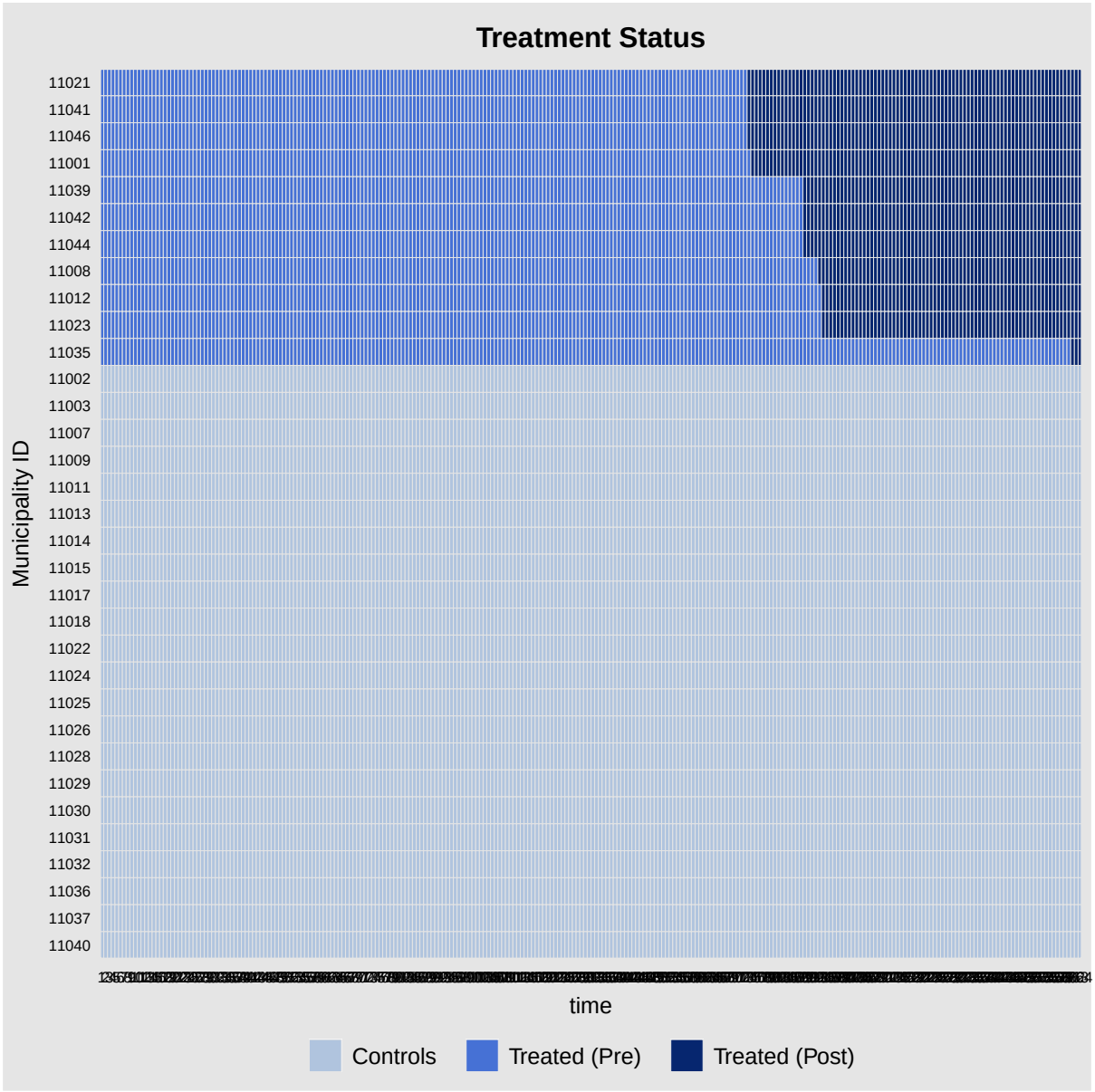


Figure A3: Treatment assignment by municipality for municipality-month analysis.

# E Effect on cartels per period results

Table A2: ATT effect of increased intergovernmental coordination on cartel strength of presence per treatment period.

| | ATT | S.E. | CI.lower | CI.upper | p.value | n.Treated |
|---|---|---|---|---|---|---|
| 0 | -0.265 | 0.174 | -0.605 | 0.076 | 0.128 | 0 |
| 1 | -0.439 | 0.323 | -1.073 | 0.195 | 0.175 | 10 |
| 2 | -0.362 | 0.336 | -1.020 | 0.295 | 0.280 | 10 |
| 3 | -0.629 | 0.275 | -1.169 | -0.089 | 0.022 | 10 |
| 4 | -0.556 | 0.255 | -1.056 | -0.056 | 0.029 | 10 |
| 5 | -0.199 | 0.283 | -0.755 | 0.356 | 0.481 | 10 |
| 6 | -0.011 | 0.307 | -0.613 | 0.591 | 0.972 | 10 |
| 7 | -0.043 | 0.456 | -0.936 | 0.850 | 0.924 | 4 |

Table A3: ATT effect of increased intergovernmental coordination on number of cartels per treatment period.

| | ATT | S.E. | CI.lower | CI.upper | p.value | n.Treated |
|---|---|---|---|---|---|---|
| 0 | -0.217 | 0.149 | -0.510 | 0.076 | 0.146 | 0 |
| 1 | -0.354 | 0.271 | -0.885 | 0.177 | 0.191 | 10 |
| 2 | -0.775 | 0.299 | -1.362 | -0.189 | 0.010 | 10 |
| 3 | -1.012 | 0.277 | -1.555 | -0.470 | 0.0003 | 10 |
| 4 | -1.167 | 0.320 | -1.793 | -0.540 | 0.0003 | 10 |
| 5 | -0.919 | 0.273 | -1.455 | -0.384 | 0.001 | 10 |
| 6 | -0.372 | 0.232 | -0.826 | 0.082 | 0.109 | 10 |
| 7 | -0.176 | 0.348 | -0.858 | 0.506 | 0.613 | 4 |

Table A4: ATT effect of increased intergovernmental coordination on cartel wars per treatment period.

| | ATT | S.E. | CI.lower | CI.upper | p.value | n.Treated |
|---|---|---|---|---|---|---|
| 0 | -0.062 | 0.071 | -0.201 | 0.077 | 0.385 | 0 |
| 1 | -0.282 | 0.132 | -0.541 | -0.023 | 0.033 | 10 |
| 2 | -0.383 | 0.153 | -0.683 | -0.083 | 0.012 | 10 |
| 3 | -0.346 | 0.144 | -0.627 | -0.064 | 0.016 | 10 |
| 4 | -0.424 | 0.133 | -0.684 | -0.164 | 0.001 | 10 |
| 5 | -0.395 | 0.157 | -0.703 | -0.087 | 0.012 | 10 |
| 6 | -0.429 | 0.159 | -0.742 | -0.117 | 0.007 | 10 |
| 7 | -0.278 | 0.260 | -0.788 | 0.233 | 0.287 | 4 |

# F Effect on crime and violence per period results

Table A5: ATT effect of increased intergovernmental coordination on violent theft rates per treatment period.

| Months relative to treatment | ATT | S.E. | CI.lower | CI.upper | p.value | n.Treated |
|---|---|---|---|---|---|---|
| 0 | -1.018 | 0.575 | -2.146 | 0.110 | 0.077 | 0 |
| 1 | -1.397 | 0.901 | -3.162 | 0.369 | 0.121 | 11 |
| 2 | -1.166 | 0.845 | -2.822 | 0.490 | 0.168 | 11 |
| 3 | -1.893 | 0.776 | -3.415 | -0.372 | 0.015 | 11 |
| 4 | -1.752 | 0.779 | -3.278 | -0.226 | 0.024 | 10 |
| 5 | -1.271 | 0.862 | -2.961 | 0.418 | 0.140 | 10 |
| 6 | -1.123 | 0.827 | -2.744 | 0.497 | 0.174 | 10 |
| 7 | -1.310 | 0.837 | -2.950 | 0.330 | 0.118 | 10 |
| 8 | -1.220 | 0.807 | -2.801 | 0.362 | 0.131 | 10 |
| 9 | -1.469 | 0.786 | -3.009 | 0.071 | 0.062 | 10 |
| 10 | -1.404 | 0.758 | -2.890 | 0.082 | 0.064 | 10 |
| 11 | -1.467 | 0.739 | -2.917 | -0.018 | 0.047 | 10 |
| 12 | -1.737 | 0.835 | -3.374 | -0.101 | 0.037 | 10 |
| 13 | -1.293 | 0.848 | -2.955 | 0.370 | 0.128 | 10 |
| 14 | -1.608 | 0.763 | -3.103 | -0.112 | 0.035 | 10 |
| 15 | -1.162 | 0.725 | -2.583 | 0.259 | 0.109 | 10 |
| 16 | -1.723 | 0.865 | -3.418 | -0.028 | 0.046 | 10 |
| 17 | -1.175 | 1.005 | -3.145 | 0.795 | 0.242 | 10 |
| 18 | -1.469 | 0.904 | -3.241 | 0.303 | 0.104 | 10 |
| 19 | -1.852 | 0.765 | -3.351 | -0.353 | 0.015 | 10 |
| 20 | -1.804 | 0.821 | -3.412 | -0.195 | 0.028 | 10 |
| 21 | -1.567 | 0.880 | -3.292 | 0.158 | 0.075 | 10 |
| 22 | -1.762 | 0.969 | -3.661 | 0.138 | 0.069 | 10 |
| 23 | -1.641 | 1.096 | -3.788 | 0.507 | 0.134 | 10 |
| 24 | -2.272 | 1.103 | -4.434 | -0.109 | 0.039 | 10 |
| 25 | -0.335 | 1.025 | -2.344 | 1.674 | 0.744 | 10 |
| 26 | -0.987 | 1.068 | -3.080 | 1.106 | 0.355 | 10 |
| 27 | -2.111 | 1.166 | -4.396 | 0.175 | 0.070 | 10 |
| 28 | -2.643 | 1.227 | -5.049 | -0.238 | 0.031 | 10 |
| 29 | -2.135 | 1.089 | -4.270 | -0.001 | 0.050 | 10 |
| 30 | -1.937 | 1.282 | -4.450 | 0.577 | 0.131 | 10 |
| 31 | -1.437 | 1.264 | -3.914 | 1.039 | 0.255 | 10 |
| 32 | -1.839 | 1.129 | -4.052 | 0.375 | 0.104 | 10 |
| 33 | -2.584 | 1.210 | -4.956 | -0.212 | 0.033 | 10 |
| 34 | -1.924 | 1.291 | -4.453 | 0.605 | 0.136 | 10 |
| 35 | -2.786 | 1.551 | -5.826 | 0.255 | 0.073 | 10 |
| 36 | -2.193 | 1.208 | -4.561 | 0.176 | 0.070 | 10 |
| 37 | -2.049 | 1.098 | -4.202 | 0.103 | 0.062 | 10 |
| 38 | -1.648 | 0.976 | -3.561 | 0.264 | 0.091 | 10 |
| 39 | -1.575 | 1.301 | -4.124 | 0.975 | 0.226 | 10 |
| 40 | -2.523 | 1.271 | -5.014 | -0.031 | 0.047 | 10 |
| 41 | -2.178 | 1.157 | -4.446 | 0.089 | 0.060 | 10 |
| 42 | -2.323 | 1.354 | -4.976 | 0.330 | 0.086 | 10 |
| 43 | -2.588 | 1.570 | -5.666 | 0.489 | 0.099 | 10 |
| 44 | -2.637 | 1.500 | -5.576 | 0.302 | 0.079 | 10 |
| 45 | -2.310 | 1.387 | -5.029 | 0.409 | 0.096 | 10 |
| 46 | -2.260 | 1.322 | -4.852 | 0.332 | 0.087 | 10 |
| 47 | -2.244 | 1.163 | -4.524 | 0.036 | 0.054 | 10 |
| 48 | -2.813 | 1.585 | -5.920 | 0.295 | 0.076 | 10 |
| 49 | -1.444 | 1.275 | -3.943 | 1.056 | 0.258 | 10 |
| 50 | -2.613 | 1.327 | -5.214 | -0.012 | 0.049 | 10 |
| 51 | -1.348 | 1.033 | -3.374 | 0.677 | 0.192 | 10 |
| 52 | -2.011 | 1.067 | -4.102 | 0.081 | 0.060 | 10 |
| 53 | -2.387 | 1.155 | -4.651 | -0.122 | 0.039 | 10 |
| 54 | -2.329 | 1.427 | -5.126 | 0.468 | 0.103 | 10 |
| 55 | -2.991 | 1.447 | -5.827 | -0.155 | 0.039 | 10 |
| 56 | -2.246 | 1.050 | -4.303 | -0.189 | 0.032 | 10 |
| 57 | -1.593 | 0.895 | -3.348 | 0.161 | 0.075 | 10 |
| 58 | -2.456 | 0.906 | -4.231 | -0.682 | 0.007 | 10 |
| 59 | -2.261 | 0.992 | -4.207 | -0.316 | 0.023 | 10 |
| 60 | -2.048 | 1.056 | -4.117 | 0.021 | 0.052 | 10 |
| 61 | -2.053 | 1.043 | -4.097 | -0.008 | 0.049 | 10 |
| 62 | -2.657 | 1.171 | -4.952 | -0.363 | 0.023 | 10 |
| 63 | -2.126 | 1.429 | -4.927 | 0.675 | 0.137 | 10 |
| 64 | -1.588 | 1.015 | -3.578 | 0.402 | 0.118 | 10 |
| 65 | -1.972 | 0.911 | -3.758 | -0.186 | 0.030 | 10 |
| 66 | -1.594 | 0.816 | -3.194 | 0.006 | 0.051 | 10 |
| 67 | -1.765 | 0.708 | -3.154 | -0.377 | 0.013 | 10 |
| 68 | -1.388 | 0.685 | -2.730 | -0.045 | 0.043 | 10 |
| 69 | -1.371 | 0.738 | -2.816 | 0.075 | 0.063 | 10 |
| 70 | -1.854 | 0.791 | -3.404 | -0.304 | 0.019 | 10 |

Table A6: ATT effect of increased intergovernmental coordination on non-violent theft rates per treatment period.

| Months relative to treatment | ATT | S.E. | CI.lower | CI.upper | p.value | n.Treated |
|---|---|---|---|---|---|---|
| 0 | -1.939 | 1.785 | -5.438 | 1.560 | 0.277 | 0 |
| 1 | -3.260 | 1.772 | -6.732 | 0.212 | 0.066 | 11 |
| 2 | -2.253 | 1.701 | -5.587 | 1.080 | 0.185 | 11 |
| 3 | -0.952 | 2.142 | -5.151 | 3.246 | 0.657 | 11 |
| 4 | -1.765 | 2.055 | -5.793 | 2.263 | 0.390 | 10 |
| 5 | -2.773 | 2.091 | -6.871 | 1.325 | 0.185 | 10 |
| 6 | -1.113 | 1.971 | -4.975 | 2.749 | 0.572 | 10 |
| 7 | 2.140 | 1.883 | -1.550 | 5.831 | 0.256 | 10 |
| 8 | 0.172 | 2.040 | -3.826 | 4.170 | 0.933 | 10 |
| 9 | -0.218 | 1.718 | -3.585 | 3.150 | 0.899 | 10 |
| 10 | -0.149 | 1.527 | -3.142 | 2.845 | 0.922 | 10 |
| 11 | -0.858 | 1.711 | -4.212 | 2.495 | 0.616 | 10 |
| 12 | 1.134 | 1.808 | -2.411 | 4.678 | 0.531 | 10 |
| 13 | 1.579 | 1.899 | -2.143 | 5.301 | 0.406 | 10 |
| 14 | 1.375 | 2.040 | -2.623 | 5.373 | 0.500 | 10 |
| 15 | 1.622 | 2.220 | -2.730 | 5.974 | 0.465 | 10 |
| 16 | 0.543 | 1.831 | -3.046 | 4.132 | 0.767 | 10 |
| 17 | 2.397 | 2.077 | -1.674 | 6.468 | 0.248 | 10 |
| 18 | 0.647 | 2.196 | -3.656 | 4.951 | 0.768 | 10 |
| 19 | 0.584 | 1.708 | -2.764 | 3.931 | 0.733 | 10 |
| 20 | 0.534 | 2.087 | -3.557 | 4.625 | 0.798 | 10 |
| 21 | -0.081 | 1.658 | -3.330 | 3.169 | 0.961 | 10 |
| 22 | 0.063 | 1.791 | -3.447 | 3.573 | 0.972 | 10 |
| 23 | 1.535 | 1.791 | -1.975 | 5.045 | 0.391 | 10 |
| 24 | -0.021 | 1.541 | -3.041 | 2.999 | 0.989 | 10 |
| 25 | 2.200 | 1.709 | -1.150 | 5.551 | 0.198 | 10 |
| 26 | -0.748 | 1.877 | -4.426 | 2.930 | 0.690 | 10 |
| 27 | -0.580 | 1.882 | -4.267 | 3.108 | 0.758 | 10 |
| 28 | -1.232 | 1.836 | -4.831 | 2.367 | 0.502 | 10 |
| 29 | -1.581 | 1.862 | -5.230 | 2.067 | 0.396 | 10 |
| 30 | -1.735 | 1.684 | -5.035 | 1.565 | 0.303 | 10 |
| 31 | -1.749 | 1.637 | -4.958 | 1.459 | 0.285 | 10 |
| 32 | -2.574 | 1.632 | -5.772 | 0.625 | 0.115 | 10 |
| 33 | -1.418 | 1.855 | -5.053 | 2.217 | 0.444 | 10 |
| 34 | -1.410 | 1.864 | -5.063 | 2.244 | 0.449 | 10 |
| 35 | -2.685 | 1.879 | -6.369 | 0.999 | 0.153 | 10 |
| 36 | -0.573 | 1.782 | -4.066 | 2.920 | 0.748 | 10 |
| 37 | -0.354 | 1.759 | -3.801 | 3.093 | 0.841 | 10 |
| 38 | -4.083 | 1.808 | -7.626 | -0.539 | 0.024 | 10 |
| 39 | -3.033 | 1.818 | -6.595 | 0.530 | 0.095 | 10 |
| 40 | -3.932 | 1.865 | -7.588 | -0.276 | 0.035 | 10 |
| 41 | -2.191 | 1.830 | -5.778 | 1.397 | 0.231 | 10 |
| 42 | -2.690 | 1.912 | -6.438 | 1.058 | 0.159 | 10 |
| 43 | -1.740 | 1.887 | -5.439 | 1.959 | 0.357 | 10 |
| 44 | -4.201 | 2.011 | -8.141 | -0.260 | 0.037 | 10 |
| 45 | -4.102 | 2.044 | -8.109 | -0.095 | 0.045 | 10 |
| 46 | -3.544 | 1.871 | -7.210 | 0.123 | 0.058 | 10 |
| 47 | -4.226 | 1.846 | -7.844 | -0.609 | 0.022 | 10 |
| 48 | -3.116 | 2.080 | -7.194 | 0.961 | 0.134 | 10 |
| 49 | -4.897 | 1.780 | -8.386 | -1.408 | 0.006 | 10 |
| 50 | -2.293 | 1.771 | -5.765 | 1.179 | 0.196 | 10 |
| 51 | -3.697 | 1.636 | -6.904 | -0.490 | 0.024 | 10 |
| 52 | -1.942 | 1.711 | -5.296 | 1.412 | 0.256 | 10 |
| 53 | -1.213 | 1.691 | -4.528 | 2.102 | 0.473 | 10 |
| 54 | -2.248 | 1.652 | -5.487 | 0.991 | 0.174 | 10 |
| 55 | -1.626 | 1.534 | -4.632 | 1.381 | 0.289 | 10 |
| 56 | -1.280 | 1.664 | -4.541 | 1.981 | 0.442 | 10 |
| 57 | -0.637 | 1.621 | -3.813 | 2.540 | 0.695 | 10 |
| 58 | -2.549 | 1.654 | -5.790 | 0.693 | 0.123 | 10 |
| 59 | -2.928 | 1.724 | -6.307 | 0.451 | 0.089 | 10 |
| 60 | -1.562 | 1.848 | -5.184 | 2.060 | 0.398 | 10 |
| 61 | -2.868 | 1.760 | -6.316 | 0.581 | 0.103 | 10 |
| 62 | -2.817 | 1.689 | -6.127 | 0.492 | 0.095 | 10 |
| 63 | -4.344 | 1.982 | -8.229 | -0.460 | 0.028 | 10 |
| 64 | -2.054 | 1.802 | -5.586 | 1.477 | 0.254 | 10 |
| 65 | -2.418 | 1.963 | -6.264 | 1.429 | 0.218 | 10 |
| 66 | -4.071 | 1.870 | -7.736 | -0.407 | 0.029 | 10 |
| 67 | -2.789 | 1.840 | -6.395 | 0.817 | 0.130 | 10 |
| 68 | -2.704 | 1.793 | -6.218 | 0.811 | 0.132 | 10 |
| 69 | -1.614 | 1.626 | -4.801 | 1.573 | 0.321 | 10 |
| 70 | -0.147 | 1.614 | -3.310 | 3.016 | 0.928 | 10 |

Table A7: ATT effect of increased intergovernmental coordination on homicide rates per treatment period.

| Months relative to treatment | ATT | S.E. | CI.lower | CI.upper | p.value | n.Treated |
|---|---|---|---|---|---|---|
| 0 | -0.741 | 0.438 | -1.601 | 0.118 | 0.091 | 0 |
| 1 | 0.169 | 0.466 | -0.745 | 1.084 | 0.716 | 10 |
| 2 | 1.571 | 0.508 | 0.576 | 2.567 | 0.002 | 10 |
| 3 | 1.597 | 0.628 | 0.365 | 2.828 | 0.011 | 10 |
| 4 | 0.665 | 0.472 | -0.261 | 1.591 | 0.159 | 10 |
| 5 | 0.476 | 0.489 | -0.482 | 1.434 | 0.330 | 10 |
| 6 | -0.065 | 0.582 | -1.206 | 1.075 | 0.911 | 10 |
| 7 | 0.463 | 0.577 | -0.668 | 1.595 | 0.422 | 10 |
| 8 | 0.047 | 0.609 | -1.147 | 1.241 | 0.939 | 10 |
| 9 | 2.189 | 0.541 | 1.129 | 3.250 | 0.0001 | 10 |
| 10 | 1.104 | 0.560 | 0.006 | 2.202 | 0.049 | 10 |
| 11 | 0.908 | 0.630 | -0.327 | 2.144 | 0.150 | 10 |
| 12 | 0.275 | 0.715 | -1.126 | 1.677 | 0.700 | 10 |
| 13 | -0.012 | 0.612 | -1.211 | 1.187 | 0.984 | 10 |
| 14 | -0.295 | 0.664 | -1.597 | 1.007 | 0.657 | 10 |
| 15 | -0.286 | 0.717 | -1.691 | 1.118 | 0.689 | 10 |
| 16 | 0.702 | 0.697 | -0.665 | 2.069 | 0.314 | 10 |
| 17 | -1.352 | 0.753 | -2.828 | 0.123 | 0.072 | 10 |
| 18 | -0.601 | 0.754 | -2.079 | 0.878 | 0.426 | 10 |
| 19 | 2.665 | 0.786 | 1.124 | 4.207 | 0.001 | 10 |
| 20 | -0.492 | 0.797 | -2.054 | 1.070 | 0.537 | 10 |
| 21 | 2.909 | 0.768 | 1.403 | 4.415 | 0.0002 | 10 |
| 22 | 1.303 | 0.751 | -0.170 | 2.775 | 0.083 | 10 |
| 23 | -1.793 | 0.848 | -3.454 | -0.131 | 0.034 | 10 |
| 24 | 0.230 | 0.899 | -1.532 | 1.992 | 0.798 | 10 |
| 25 | 4.036 | 1.001 | 2.075 | 5.997 | 0.0001 | 10 |
| 26 | -0.531 | 0.973 | -2.438 | 1.375 | 0.585 | 10 |
| 27 | -2.024 | 1.024 | -4.031 | -0.017 | 0.048 | 10 |
| 28 | 2.553 | 1.552 | -0.489 | 5.595 | 0.100 | 10 |
| 29 | -1.113 | 1.187 | -3.438 | 1.213 | 0.348 | 10 |
| 30 | 1.777 | 1.196 | -0.568 | 4.122 | 0.137 | 10 |
| 31 | 2.508 | 1.115 | 0.323 | 4.692 | 0.024 | 10 |
| 32 | 2.067 | 1.067 | -0.024 | 4.158 | 0.053 | 10 |
| 33 | 0.249 | 1.736 | -3.153 | 3.651 | 0.886 | 10 |
| 34 | 1.989 | 1.292 | -0.543 | 4.521 | 0.124 | 10 |
| 35 | 1.404 | 1.294 | -1.131 | 3.939 | 0.278 | 10 |
| 36 | 0.425 | 1.082 | -1.696 | 2.547 | 0.694 | 10 |
| 37 | 2.059 | 0.960 | 0.178 | 3.940 | 0.032 | 10 |
| 38 | 2.967 | 1.254 | 0.511 | 5.424 | 0.018 | 10 |
| 39 | 0.275 | 1.420 | -2.509 | 3.058 | 0.847 | 10 |
| 40 | 2.591 | 1.264 | 0.114 | 5.068 | 0.040 | 10 |
| 41 | 0.117 | 1.152 | -2.141 | 2.375 | 0.919 | 10 |
| 42 | 0.403 | 1.115 | -1.782 | 2.588 | 0.718 | 10 |
| 43 | 1.246 | 1.147 | -1.001 | 3.494 | 0.277 | 10 |
| 44 | 2.098 | 1.347 | -0.542 | 4.738 | 0.119 | 10 |
| 45 | 1.000 | 1.370 | -1.685 | 3.686 | 0.465 | 10 |
| 46 | 4.904 | 1.361 | 2.236 | 7.572 | 0.0003 | 10 |
| 47 | -1.379 | 1.576 | -4.468 | 1.710 | 0.382 | 10 |
| 48 | 0.077 | 1.916 | -3.679 | 3.832 | 0.968 | 10 |
| 49 | 1.533 | 1.355 | -1.123 | 4.188 | 0.258 | 10 |
| 50 | 1.744 | 1.486 | -1.169 | 4.656 | 0.241 | 10 |
| 51 | 1.832 | 1.244 | -0.605 | 4.270 | 0.141 | 10 |
| 52 | 4.543 | 1.357 | 1.883 | 7.204 | 0.001 | 10 |
| 53 | 1.577 | 1.643 | -1.642 | 4.797 | 0.337 | 10 |
| 54 | 2.163 | 1.617 | -1.006 | 5.333 | 0.181 | 10 |
| 55 | 2.341 | 1.768 | -1.124 | 5.806 | 0.185 | 10 |
| 56 | 0.762 | 1.685 | -2.541 | 4.065 | 0.651 | 10 |
| 57 | -0.177 | 1.536 | -3.187 | 2.833 | 0.908 | 10 |
| 58 | -1.574 | 1.542 | -4.597 | 1.449 | 0.308 | 10 |
| 59 | 0.101 | 1.805 | -3.436 | 3.639 | 0.955 | 8 |
| 60 | -2.359 | 2.524 | -7.305 | 2.587 | 0.350 | 7 |
| 61 | -2.586 | 2.130 | -6.760 | 1.589 | 0.225 | 7 |
| 62 | -0.195 | 2.046 | -4.206 | 3.816 | 0.924 | 7 |
| 63 | 1.599 | 1.879 | -2.084 | 5.282 | 0.395 | 7 |
| 64 | -0.414 | 2.190 | -4.706 | 3.878 | 0.850 | 4 |
| 65 | -0.244 | 2.606 | -5.352 | 4.864 | 0.925 | 4 |
| 66 | 2.529 | 2.512 | -2.395 | 7.453 | 0.314 | 4 |
| 67 | -1.537 | 2.519 | -6.474 | 3.400 | 0.542 | 4 |
| 68 | -2.570 | 1.981 | -6.453 | 1.312 | 0.194 | 4 |
| 69 | 0.005 | 2.106 | -4.123 | 4.133 | 0.998 | 4 |
| 70 | 0.792 | 1.918 | -2.968 | 4.552 | 0.680 | 4 |

Table A8: ATT effect of increased intergovernmental coordination on cartel-related homicide rates per treatment period.

| Months relative to treatment | ATT | S.E. | CI.lower | CI.upper | p.value | n.Treated |
|---|---|---|---|---|---|---|
| 0 | -0.087 | 0.244 | -0.566 | 0.392 | 0.722 | 0 |
| 1 | -0.061 | 0.321 | -0.691 | 0.569 | 0.850 | 10 |
| 2 | 0.726 | 0.326 | 0.086 | 1.366 | 0.026 | 10 |
| 3 | 0.494 | 0.297 | -0.088 | 1.077 | 0.096 | 10 |
| 4 | -0.103 | 0.313 | -0.716 | 0.511 | 0.743 | 10 |
| 5 | 0.142 | 0.345 | -0.533 | 0.818 | 0.680 | 10 |
| 6 | -0.324 | 0.347 | -1.004 | 0.356 | 0.350 | 10 |
| 7 | 0.124 | 0.364 | -0.590 | 0.839 | 0.733 | 10 |
| 8 | -0.309 | 0.403 | -1.099 | 0.480 | 0.442 | 10 |
| 9 | 1.258 | 0.310 | 0.651 | 1.866 | 0.00005 | 10 |
| 10 | 1.196 | 0.399 | 0.415 | 1.978 | 0.003 | 10 |
| 11 | 0.695 | 0.368 | -0.026 | 1.416 | 0.059 | 10 |
| 12 | 0.410 | 0.361 | -0.296 | 1.117 | 0.255 | 10 |
| 13 | 0.161 | 0.334 | -0.493 | 0.815 | 0.630 | 10 |
| 14 | -0.126 | 0.422 | -0.954 | 0.702 | 0.765 | 10 |
| 15 | 0.390 | 0.425 | -0.443 | 1.224 | 0.359 | 10 |
| 16 | 0.438 | 0.428 | -0.402 | 1.277 | 0.307 | 10 |
| 17 | -0.398 | 0.406 | -1.192 | 0.397 | 0.327 | 10 |
| 18 | 0.236 | 0.355 | -0.461 | 0.932 | 0.507 | 10 |
| 19 | 1.120 | 0.555 | 0.033 | 2.208 | 0.043 | 10 |
| 20 | 0.420 | 0.490 | -0.540 | 1.381 | 0.391 | 10 |
| 21 | 1.925 | 0.554 | 0.840 | 3.010 | 0.001 | 10 |
| 22 | -0.004 | 0.482 | -0.948 | 0.940 | 0.994 | 10 |
| 23 | -0.635 | 0.510 | -1.634 | 0.364 | 0.213 | 10 |
| 24 | 0.159 | 0.586 | -0.989 | 1.307 | 0.786 | 10 |
| 25 | 2.238 | 0.590 | 1.082 | 3.395 | 0.0001 | 10 |
| 26 | -0.164 | 0.612 | -1.363 | 1.035 | 0.789 | 10 |
| 27 | -1.254 | 0.570 | -2.370 | -0.137 | 0.028 | 10 |
| 28 | 0.736 | 1.035 | -1.292 | 2.764 | 0.477 | 10 |
| 29 | -0.954 | 0.865 | -2.649 | 0.742 | 0.270 | 10 |
| 30 | 1.918 | 1.015 | -0.071 | 3.907 | 0.059 | 10 |
| 31 | 1.957 | 0.843 | 0.304 | 3.610 | 0.020 | 10 |
| 32 | 0.849 | 0.569 | -0.265 | 1.964 | 0.135 | 10 |
| 33 | 0.121 | 1.306 | -2.439 | 2.682 | 0.926 | 10 |
| 34 | 0.732 | 0.808 | -0.853 | 2.316 | 0.365 | 10 |
| 35 | 0.705 | 1.132 | -1.514 | 2.925 | 0.533 | 10 |
| 36 | 1.185 | 0.784 | -0.353 | 2.722 | 0.131 | 10 |
| 37 | 1.753 | 0.730 | 0.322 | 3.184 | 0.016 | 10 |
| 38 | 1.599 | 0.781 | 0.068 | 3.130 | 0.041 | 10 |
| 39 | 0.213 | 1.041 | -1.827 | 2.253 | 0.838 | 10 |
| 40 | 2.168 | 0.764 | 0.670 | 3.666 | 0.005 | 10 |
| 41 | 0.219 | 0.871 | -1.488 | 1.927 | 0.801 | 10 |
| 42 | 0.234 | 0.714 | -1.165 | 1.633 | 0.743 | 10 |
| 43 | 0.504 | 0.628 | -0.726 | 1.734 | 0.422 | 10 |
| 44 | 0.621 | 0.954 | -1.249 | 2.490 | 0.515 | 10 |
| 45 | 0.460 | 0.780 | -1.068 | 1.988 | 0.555 | 10 |
| 46 | 1.498 | 0.806 | -0.081 | 3.078 | 0.063 | 10 |
| 47 | 0.204 | 0.948 | -1.654 | 2.063 | 0.829 | 10 |
| 48 | -0.470 | 1.357 | -3.130 | 2.191 | 0.729 | 10 |
| 49 | 0.329 | 0.973 | -1.578 | 2.236 | 0.735 | 10 |
| 50 | -0.221 | 1.491 | -3.144 | 2.701 | 0.882 | 10 |
| 51 | 0.494 | 0.892 | -1.256 | 2.243 | 0.580 | 10 |
| 52 | 2.059 | 0.872 | 0.350 | 3.768 | 0.018 | 10 |
| 53 | 0.351 | 0.963 | -1.537 | 2.240 | 0.715 | 10 |
| 54 | 0.165 | 1.080 | -1.951 | 2.281 | 0.878 | 10 |
| 55 | 1.216 | 1.209 | -1.154 | 3.586 | 0.315 | 10 |
| 56 | -0.286 | 1.083 | -2.408 | 1.836 | 0.792 | 10 |
| 57 | -0.394 | 0.900 | -2.158 | 1.369 | 0.661 | 10 |
| 58 | -0.323 | 0.889 | -2.065 | 1.418 | 0.716 | 10 |
| 59 | 0.474 | 1.179 | -1.836 | 2.784 | 0.688 | 8 |
| 60 | -1.160 | 1.531 | -4.160 | 1.840 | 0.449 | 7 |
| 61 | -1.124 | 1.211 | -3.498 | 1.250 | 0.354 | 7 |
| 62 | 0.261 | 1.023 | -1.744 | 2.265 | 0.799 | 7 |
| 63 | 1.471 | 0.810 | -0.117 | 3.060 | 0.069 | 7 |
| 64 | -0.286 | 1.207 | -2.651 | 2.080 | 0.813 | 4 |
| 65 | -0.075 | 1.587 | -3.185 | 3.035 | 0.962 | 4 |
| 66 | -0.039 | 1.369 | -2.723 | 2.644 | 0.977 | 4 |
| 67 | -0.323 | 1.414 | -3.093 | 2.448 | 0.820 | 4 |
| 68 | -0.297 | 1.103 | -2.459 | 1.865 | 0.788 | 4 |
| 69 | -1.414 | 1.940 | -5.217 | 2.389 | 0.466 | 4 |
| 70 | -0.353 | 2.180 | -4.625 | 3.919 | 0.871 | 4 |