

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

Marco Alcocer^{12*}

¹University of California, San Diego

²ITAM

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

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

²To 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.

³This 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.

⁴Durán-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:

$$Y_{it} = \delta_{it}D_{it} + X'_{it}\beta + \lambda'_i f_t + \epsilon_{it} \quad (1)$$

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, δ_{it} estimates the heterogeneous treatment effect on municipality i at time t , X'_{it} is a vector of observed covariates, λ'_i is a vector of unknown factor loadings, f_t denotes a vector of unobserved common factors, and ϵ_{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

⁵Data 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.

⁶Because 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.

	<i>Dependent variable:</i>		
	Cartel strength	Cartel number	Cartel war
	(1)	(2)	(3)
Police Reform	-0.346 (0.239)	-0.730*** (0.207)	-0.370*** (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

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

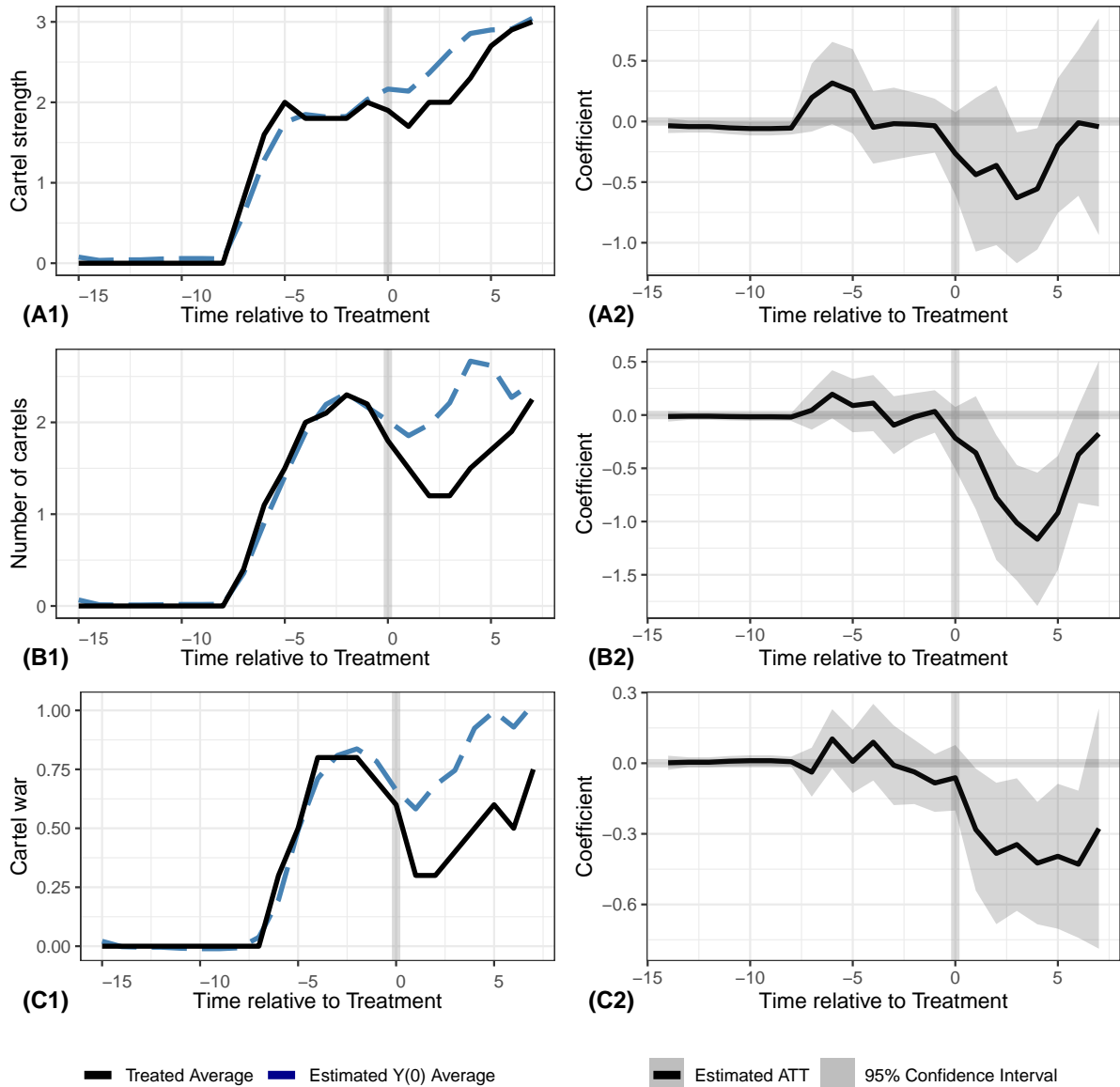


Figure 1: Average outcome trends for treated and synthetic control groups (left column) and average treatment effect on the treated (ATT) of police reform increasing intergovernmental coordination on cartels with 95% confidence intervals (right column). (A1-A2) Cartel strength, (B1-B2) number of cartels,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

⁸Appendix 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.

	<i>Dependent variable:</i>			
	Violent theft rate	Non-violent theft rate	Homicide rate	Young men homicide rate
	(1)	(2)	(3)	(4)
Police Reform	-1.883** (0.782)	-1.387 (1.019)	0.941* (0.528)	0.498* (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 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

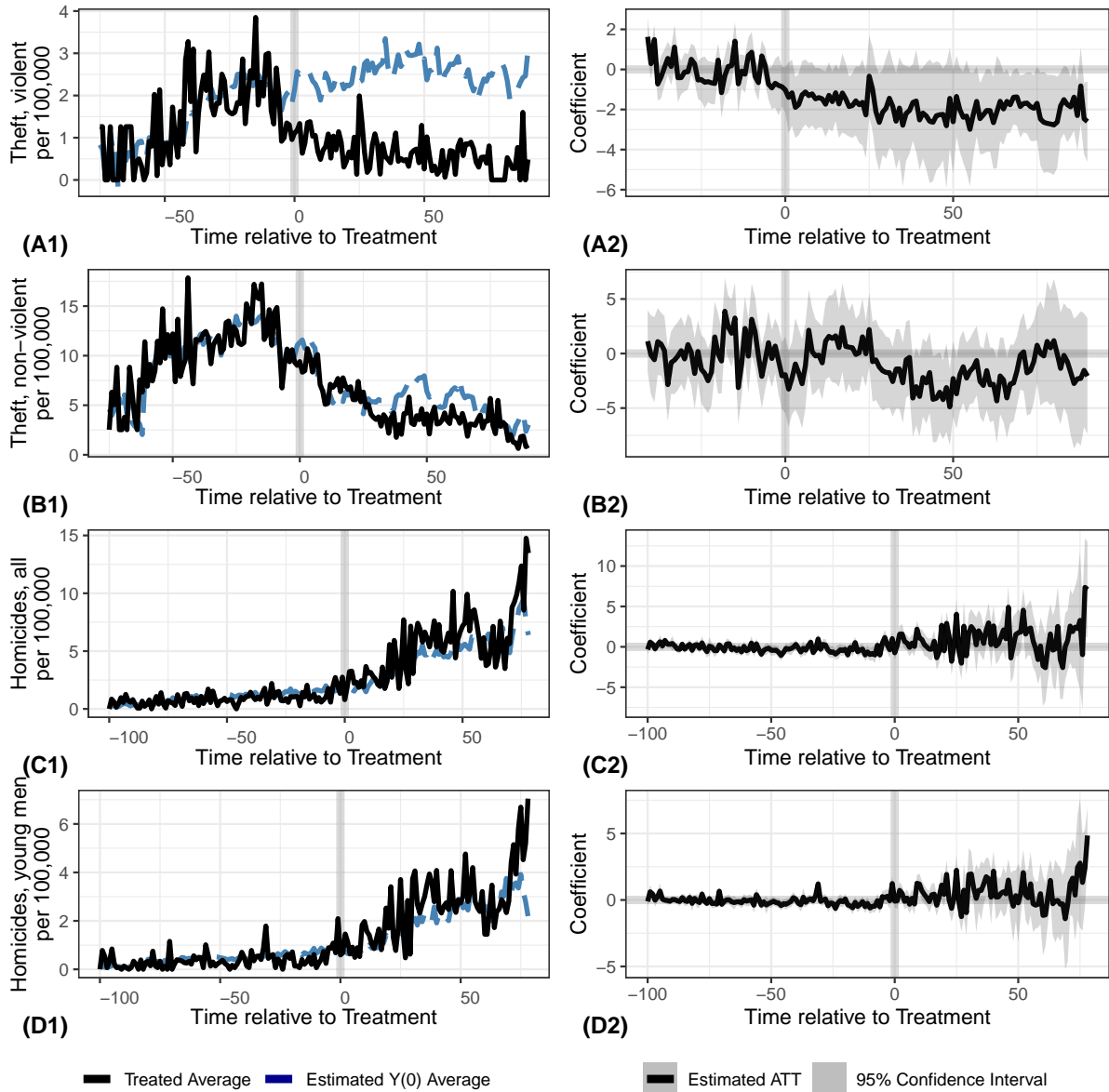


Figure 2: Average outcome trends for treated and synthetic control groups (left column) and average treatment effect on the treated (ATT) of police reform increasing intergovernmental coordination on crime and violence with 95% confidence intervals (right column). (A1-A2) Violent theft rate, (B1-B2)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

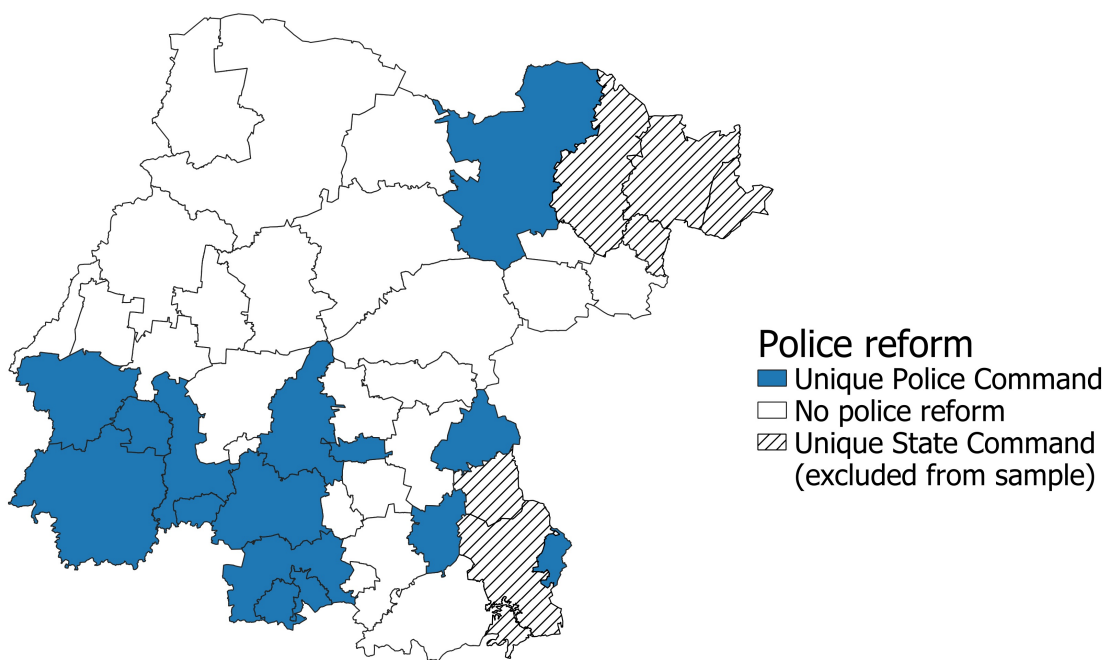


Figure A1: Municipalities in Guanajuato that adopted Unique Police Command at any point, only adopted Unique State Command, did not implement any police reform.

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	Cuerámbaro	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

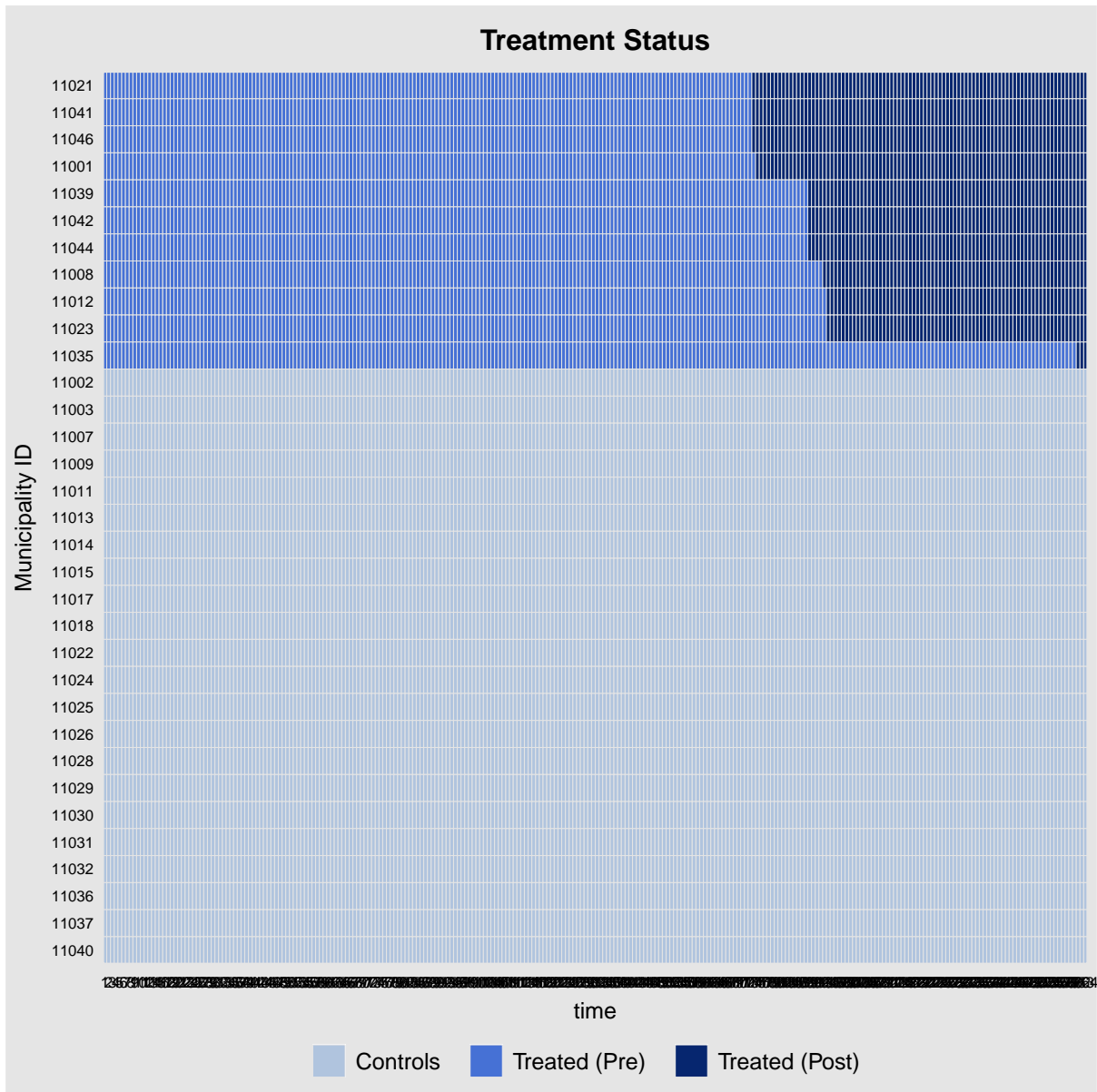


Figure A3: Treatment assignment by municipality for municipality-month analysis.

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