
The Monopoly of Peace: Gang Criminality and Political Elections in El Salvador

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Abstract

Despite the growing body of qualitative evidence suggesting collusion between gangs and political parties in El Salvador, little has been done systematically at the national level. This paper studies the extent to which gangs affect political elections across El Salvador by identifying gang-controlled neighborhoods and focusing on homicides during electoral seasons as an influencing mechanism. To conduct our analysis, we geolocated the homicides reported daily in the registry of the National Civil Police from 2005 to 2019 in relation to electoral results reported at the polling-station level. We used the 2012 truce as an exogenous shock in crime revealing gangs' presence and used penitentiary data from the General Directorate of Prisons for robustness measures. We also interviewed four journalists and former campaign directors. Using Two-Way Fixed-Effect estimations, our results based on more than 450,000 weekly observations show a decrease in murders at the time of elections specifically in gang-controlled areas. We also find little to no effect of gang control on turnover. This suggests that gangs in El Salvador instrumentalize peace and not violence, if any instrument, to seek advantages. This finding is consistent with newspapers' investigations hinting that central parties mostly negotiate reductions in criminality during elections especially as crime systematically ranks first in voters' concerns according to polls. This is also in line with data from our own interviews suggesting that that local politician must often negotiate safe access to gang-controlled areas during their campaigns in exchange for various perks. Gang controlled territories have also been thoroughly mapped by the National Civil Police in 2014 and 2018. Based on these maps, our preliminary results from a geographic regression discontinuity design in San Salvador, the capital city, tend to support the hypothesis that gangs directly affect parties' electoral outcomes.

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1 Introduction

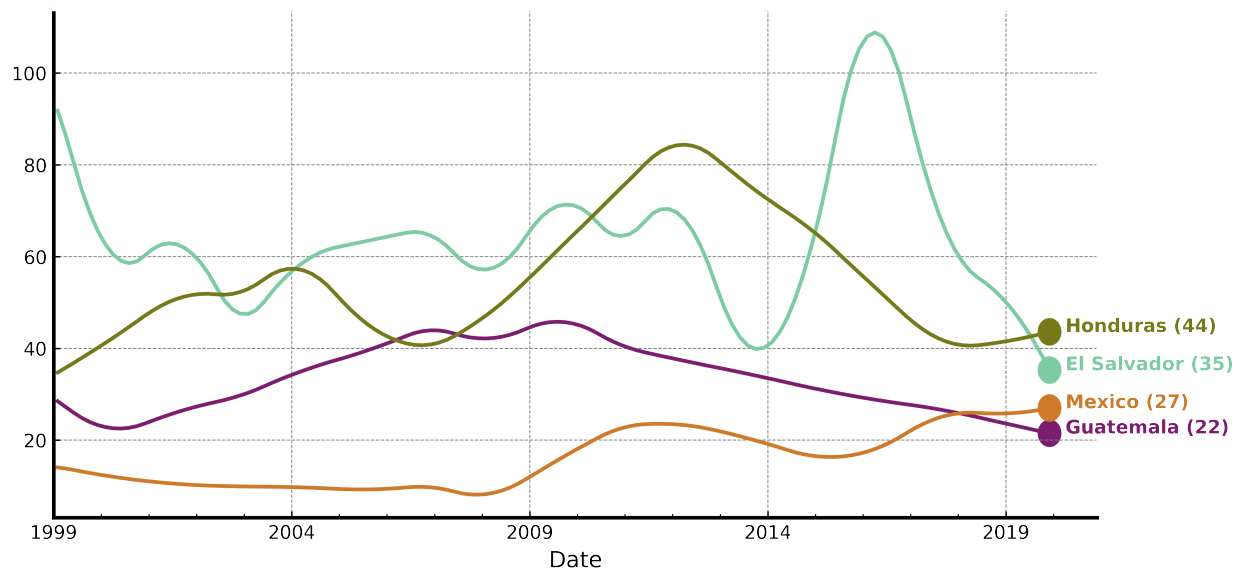
1.1 Gangs and democracy in El Salvador

Criminal structures in El Salvador influence the country's democratic processes, affecting the electoral results of the neighborhoods they control, which endangers democracy and affects the development of institutions in the country. El Salvador has been characterized as one of the most violent countries in Latin American. According to different authors, the economic costs as a percentage of GDP ranged between 6.5% and 16% (Jaitman et al., 2017; Peñate et al., 2016). The gangs are mainly responsible for the high level of crime. However, the influence of gangs in elections has been little studied, and neither has it been addressed as a public policy problem.

The main gangs in El Salvador are Mara 18 and MS-13, formed by Latin American migrants in Los Angeles. The gangs arose in poor neighborhoods with high rates of violence. During 1996, the US Illegal Immigration Responsibility Act substantially increased the number of deportations of these groups. Between 1998 and 2010, approximately 300,000 people with crime reports were deported to Central America. The massive deportations produced the spread of these criminal groups throughout Central America, with El Salvador being one of the most affected countries (Sviatschi, 2020). There are currently 9,000 and 100,000 gang members in the United States and Central America, respectively.

High crime due to gangs seriously affects Salvadorans. El Salvador has one of the highest homicide rates in the region. In 2015, the country reached a maximum peak that exceeded 100 homicides per 100,000 inhabitants, five times higher than the average for Latin America. According to data from the National Police, a third of homicides are due to gangs. Households in gang neighborhoods are seriously affected, a recent study reveals that they have lower income, education, and quality of homes, these differences did not exist before the consolidation of gangs in those areas (Melnikov, Schmidt-Padilla and Sviatschi, 2020). The gangs impose their own rules in the neighborhoods and limit the freedom of residents.

Figure 1: International homicide rate (per 100,000 people)



Source: Own elaboration based on data from the World Bank and InsightCrime

Gangs can jeopardize the democratic institutions that the country has built. El Salvador has managed to consolidate democracy after the civil war that ended in 1992. After the conflict, a two-party system was consolidated: the left-wing, the FMLN party, and the right-wing, the ARENA party. According to Freedom House, the country was considered democratically free until 2019 (currently it is considered partially free), contrary to neighboring countries such as Nicaragua, Guatemala, and Honduras and even surpassing other countries with better economic development such as Mexico, Ecuador, and Colombia in the index.

1.2 Truce and politicization of gangs

In 2012, the government facilitated a highly criticized truce dialogue between the main gang leaders in prisons. Journalistic investigations affirm that the government offered better conditions in the jails and less repression by the police in exchange to incentivize gang leaders to strike a truce among themselves. The truce became effective after

the March 2012 elections and led to a 48% decrease in murders within a month. Despite the significant drop, the public opinion remained mostly opposed to the truce. The government was blamed for giving political legitimacy to the gangs by engaging with them and indirectly reinforcing gangs' control over some territories by reducing police enforcement. Although murders reduced, petty crimes, extortions, and drug trafficking kept increasing (Lohmuller, 2015).

The truce was reversed starting 2014 after the victory of the FMLN at the presidential elections. In 2014, Salvador Sánchez Cerén from the left-wing party FMLN won the presidential elections by 6,364 votes only. Shortly after his election, his administration started backing up from the 2012 truce. Gang leaders were transferred again to maximum security prisons in January 2015, battalions of Special Forces were deployed in May 2015 to combat the gangs, and in August 2015, the two main gangs in El Salvador were declared “terrorist groups” by the Supreme Court. Criminality reached a new peak, with about 110 murders per 100,000 inhabitants reported in 2015, almost 1.5 times higher than pre-truce levels.

Despite the country's substantial democratic advances, politics has been implicated with gangs on multiple occasions, especially after the truce. Before the 2014 elections, a newspaper launched an investigation accusing political leaders of buying votes from gang leaders. Recently, two former mayors of San Salvador from the right-wing party were presented with arrest warrants for alleged negotiations with gangs. Freedom House also reports that gangs try to affect voters' behavior.

The truce consolidated the gangs' political agenda. In 2015, the two main gangs in El Salvador released a joint statement claiming that the FMLN almost lost the presidential elections because the party did not have the gangs' support (Gagne, 2015). In another joint statement, the gangs claimed that they would be open to negotiating a truce with the government (Reuters, 2015). In 2021, investigations by the U.S. Department of the Treasury (2021) indicate that the Government of Nayib Bukele has had negotiations with gangs to win elections. In other words, the truce shifted the conflict from between gangs competition to politically motivated violence.

1.3 Literature review

The ability for organized groups to sway political elections and policies by instrumenting violence has been demonstrated in many contexts across the literature. Dal Bó and Di Tella (2003) built a model within which ‘nasty’ groups can harass policymakers into implementing policies that benefit their interests instead of society’s. Building on these findings, Dal Bó and Di Tella (2006, 2007), show how a combination of money incentives (“plata”) and punishments (“plomo”) can reduce the quality of policymakers and increase corruption in weak judiciary systems.

In the south of Italy, Mafia violence appears to be the continuation of politics by other means. Consistent with Dal Bó and Di Tella (2003), Daniele and Dipoppa (2017) rely on media data to show that violence against local politicians increase in high organized crime regions mostly after elections, not before, especially when there is a change in local government. This suggests that mafia groups target newly elected politicians at the beginning of their mandate. Still in the context of Italy, Pinotti (2012) and Alesina, Piccolo and Pinotti (2019) find on the contrary that violence against politicians increase before national elections in those regions where organized crime exerts high influence. Political competition is also reduced in those regions and pre-election periods are even more violent when the outcome of an election is uncertain. This tends to prove that Mafia groups focus their action primarily before elections by deterring inconvenient politicians from running for office in the first place.

In Brazil, not only does organized crime stifle political competition, it also artificially increases participation from a coerced margin of the population. Bullock (2021) conducted interviews and analyzed blog posts to identify the effect of criminal dominance in favelas on local elections. He found that politicians may strike alliances with criminal groups, who will tilt the elections in their favors through two mechanisms: mobilizing voters they control (corralling) and preventing rival candidates from campaigning (gate-keeping). In areas controlled by organized crime, this translates into higher (coerced) participation and lower political competition. Blattman (2009) has also found that in Uganda

greater exposure to violence increases electoral participation, although the mechanisms are quite different. He points out that traumatic effects could boost personal growth and foster political activity. Bateson (2012) found that these results can be generalized to different geographic context, especially in Latin America.

In the context of El Salvador local elections, it is key to identify the specific mechanisms through which gangs affect political elections: broad violence against some part of the population, coerced participation, or reduced political competition? For this, we will rely on difference-in-difference models similar to the ones used in the empirical studies mentioned above. More innovatively, we will also use geographic regression discontinuities at the border of gang-controlled areas in San Salvador. Once the mechanisms clearly identified, we will be able to move on to political recommendations.

2 Data

Table 1: Data Summary

Source	Description	Geographic Unit	Time Span
Electoral Supreme Court	Electoral results	262 municipalities	1994 - 2019
Electoral Supreme Court	Electoral results	1500 voting centers	2012 - 2019
National Civil Police	Daily murders	262 municipalities	2005 - 2019
National Civil Police	Daily murders	1500 voting centers	2011 - 2019
Newspapers (elfaro.com)	Gang-controlled areas	Neighborhood	2014 & 2018
General Directorate of Prisons	Convicts' data	Neighborhood	2000 - 2020

2.1 Electoral results

2.1.1 Municipality level

To analyze the elections, we use municipal level results for the number of votes cast for each party. Based on these data, we created different measures of political outcome, such as electoral participation, votes for left and right parties, and whether incumbent parties stay in power. We also computed competitiveness indicators (see next section for more details). The data available includes all municipalities in El Salvador (262 units) and covers elections from 1994 to 2019.

2.1.2 Voting-center level

As a complement to the election results at the municipal level, we also use the electoral results for each voting center within El Salvador from 2012 to 2019 (1500 units per year, with their geographic locations and associated areas). This data allows us to create the similar indicators as those mentioned above at a more granular level.

2.2 Criminality data

2.2.1 Registry of the National Civil Police

We measure criminality based on the homicides reported at the municipal level in the daily registry of the National Civil Police (NPC). From this registry, the homicide rates are calculated at the municipal level for specific periods (weeks); non-culpable homicides have been excluded from this rate. The database was cross-verified with other sources of information such as the health system homicide data.

To match the homicide data with the voting centers, we counted the number of homicides that occurred within the neighborhoods (polygons) that must vote in each voting center.

We georeferenced a database of homicides since 2011 at the neighborhood level from the address text. We obtained a database of all the neighborhoods in El Salvador and their coordinates from the General Directorate of Statistics and Census. We couldn't use google to georeference the addresses because many of the neighborhoods aren't found on google yet.

2.2.2 General Directorate of Prisons

To validate and complement the analysis of the presence of gangs, we use data from the prisons. This data enables us to identify the main neighborhoods where convicted gang members lived before going to prison. We use the same methodology that we use for homicides to georeference the addresses of this base.

2.2.3 Gang-controlled areas in San Salvador

We obtained the controlled areas of the city of San Salvador and other surrounding municipalities for the years 2014 and 2018. In 2014, the digital newspaper El Faro published

the area of some gang-controlled neighborhoods in San Salvador, the capital city of El Salvador. The 2018 maps were created from reports from the National Civil Police. This data was used to run regression discontinuities by crossing gang-controlled areas and voting center locations.

3 Methodology

3.1 Identifying gang-controlled municipalities

3.1.1 Gang-related homicides

Along with the homicides and their approximate location, the daily registry of homicides made available by the National Police Committee also reports victims' occupations. Based on this, we identified gang-related murders by looking for victims either directly categorized as gang members or involved in extortion and drug trafficking. We also included murders committed against the police as markers of gang violence.

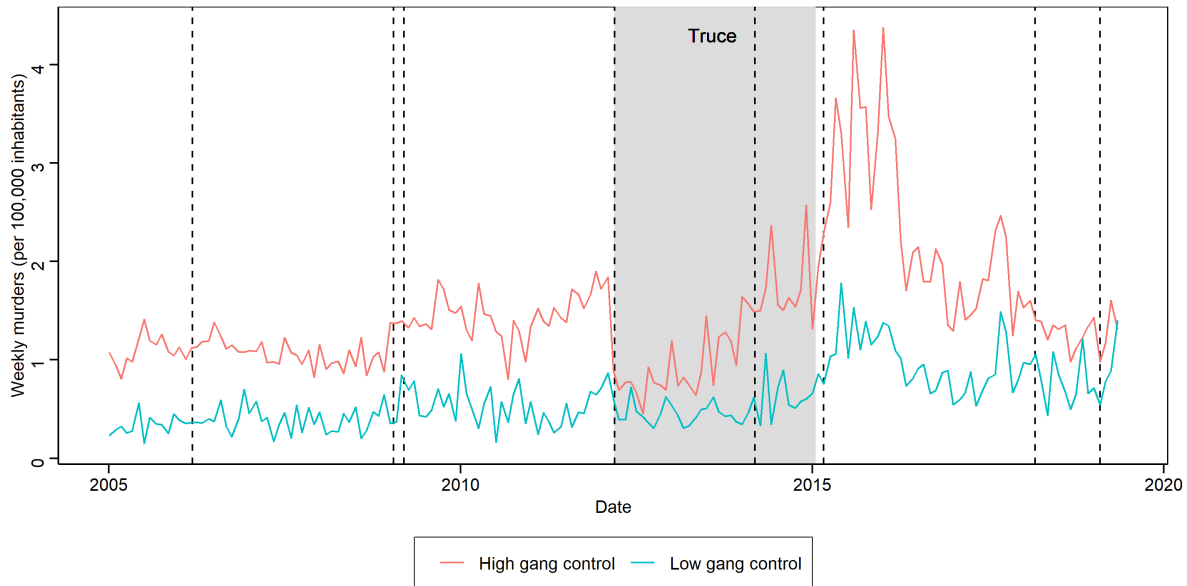
However, this measure of gang violence may present two problems. First, gang-related murders reported by the police may be a sign of gang weakness rather than gang control. In the municipalities where they wield enough influence, gangs might be able to act so that the homicides they commit don't get linked to them, or don't get reported altogether. High gang violence could also be the result of gangs struggling to keep their power over certain localities. Second, gang-related homicides are strongly correlated with the measure of homicides in general (correlation at .51). This poses endogeneity concerns when it comes to analyzing criminality in gang-controlled areas as measured through gang-related criminality.

3.1.2 The 2012 truce: an exogenous shock revealing gang control

To mitigate these identification concerns, we consider the variation in criminality brought by the 2012 truce. The government and gangs endeavoured to keep the negotiation process secret as long as they could. Gangs agreed to split some territories and committed to reducing violence. In exchange, the government conceded a reduction in police violence and economic stimuli for some designated localities (Lohmuller, 2015). As soon as the agreement was reached on March 9, 2012, national gang leaders, most of them from prisons,

sent orders to their members. This led to a sudden and exogenous variation in criminality, especially so in locations where gangs had an influence (see Figure 2).

Figure 2: Murder rate evolution: gang-controlled areas compared to non-gang-controlled areas



This exogenous shock in criminality enables us to identify the municipalities and voting centers where gangs had control in 2012. More specifically, we define gang-controlled locations as those where the relative decrease in murder rates, measured over a one-year period before and after the truce, was above the median.

3.1.3 Gang-control and truce: validity check

To verify the relevance of our indicator of gang-control, we associated the variation of criminality induced by the truce in 2012 with the number of gang-related murders before the truce since 2005 at the municipal level. Results are reported in table 2.

All estimates are positive and statistically significant, meaning that the municipalities where the criminality rate reduced the most following the truce are also those municipalities where gang-related murders were high before the truce. This correlation holds both looking at

short-time (column (1)) and longer time decreases (columns (2) and (3)).

These results tend to validate the two hypotheses that, first, the variation in criminality during the truce reveals gang-control at the time of the truce; second, that gang-related murders signify more the presence of gangs than their weakness.

Table 2: Criminality Reduction at the Truce and Gang-Related Murders in El Salvador

	Dependent variable		
	Gang-Related Murder Rate (2005-2012)		
	(1)	(2)	(3)
6-month decrease in crime at the truce	2.021* (1.139)		
1-year decrease in crime at the truce		2.848*** (.703)	
2-year decrease in crime at the truce			3.217*** (.780)
Observations	197	212	228
R ²	.010	.040	.046
Adjusted R ²	.005	.035	.042

*p<0.1; **p<0.05; ***p<0.01

Notes: This table reports the association between gang-related criminality prior to the truce (between 2005 and 2012) and the variation in murder rates due to the truce in 2012, measured over a 6-month, 1-year and 2-year window.

3.1.4 Alternative measures of gang presence and gang heterogeneity

Using the data we georeferenced based on the General Directorate of Prisons, we are able to identify the neighborhoods where gang members were sent to jail. This provides another metric of gang-presence that we use for robustness: neighborhoods where the number of convicted gang-members is above median.

We were also able to identify 124 gang leaders and their neighborhoods of origin among convicted gang members. We use this as a last robustness metric of gang-control: neigh-

neighborhoods where at least one gang leader was living before being convicted.

To avoid bringing gang wars from the streets to the prisons, prior to the truce, gang members used to be incarcerated in different penitentiaries based on their gang affiliation (Barrio-18 or MS-13). For this purpose, gang affiliation was systematically gathered in the data, which allows us to distinguish neighborhoods with a higher MS-13/Barrio-18 control.

3.2 Measuring political competition

Effectively measuring political competition has proved to be controversial due to the different alternatives used. Previous researchers have operationalized this concept in a variety of ways, with the empirical results often hinging on which measure is used (Aistrup, 2014). Based on a literature review, three main indicators stood out. The first (1) simply calculates the gap competition (difference in percentage points) of the first (F_{it}) and second place (S_{it}) in the elections (t) for each municipality (i).

$$(1) X_{it} = F_{it} - S_{it}$$

The second competitive indicator (2) considered is the Herfindahl-Hirschman index (HHI) that is usually used to measure the market concentration or level of competitiveness in an industry. In this case, when the indicator is closer to one then a single political party has monopolized the share of votes in the municipality; when it is close to zero, then the share of votes is similar between many political parties. The indicator is calculated as the sum of the square of the share (S_j) of each party (N).

$$(2) X_{it} = \sum_{j=1}^N S_j^2$$

The third indicator (3) was defined by Chakravarty et al. (2020), which measures the probability that randomly chosen voters have voted for different parties. In a municipality with

perfect competition, each voter has the same probability of voting for any party and the indicator would have a value of zero, whereas it will be close to one when voters choose the same party.

$$(3) C_{it} = \frac{|N|}{|N| - 1} \left[1 - \sum_{j=1}^N S_j^2 \right]$$

The advantage of this indicator is that it allows comparing the competitiveness of elections with different numbers of parties, which is convenient for the study since the number of parties has varied over time and across municipalities; hereafter referred to as the political competition index (PCI).

3.3 Regression models

3.3.1 Two Way Fixed Effect Estimations

Our main estimation rely on a two way fixed effect strategy at the voting center level where we use cumulatively year (v_t), week (w_t), and voting center (f_n) fixed effects. This allows us to identify variations in criminality independently from the expected level of criminality at a given time in a given place and better isolate the effect of electoral seasons and gang-control.

$$\begin{aligned} \text{Murder Rate}_{n,t} = & \alpha \text{ Electoral Season}_t \\ & + \beta \text{ Electoral Season}_t \times \text{Gang Control}_n \\ & + \gamma v_t + \sigma w_t + \tau f_n + \epsilon_{n,t} \end{aligned} \tag{1}$$

In the estimation above, the term Gang Control_n alone is absorbed in the voting center fixed effect f_n . In order to identify the distinctive effect of gang-control on outcomes such as political participation and specific parties' vote shares ($Y_{n,t}$), we also use a variation of

the above, where the voting center fixed effect becomes a municipality fixed effect \tilde{f}_m :

$$Y_{n,t} = \text{Gang Control}_n + \gamma y_t + \sigma w_t + \tau \tilde{f}_m + \epsilon_{n,t} \quad (2)$$

This estimation allows us to identify the specific effect of gang-control while controlling for location confounders at the municipality level. This does not allow for a proper inference but should at least eliminate a significant fraction of the omitted bias. For both estimations, we use robust standard errors clustered at the location times year level.

3.3.2 Geographic Regression Discontinuity

We use the maps of the areas controlled by gangs in 2014 and 2018 in San Salvador to identify whether the fact that voters have to vote in a gang-controlled area affects political outcomes at the voting center level. We use the same geographic regression discontinuity framework as Melnikov, Schmidt-Padilla and Sviatschi (2020).

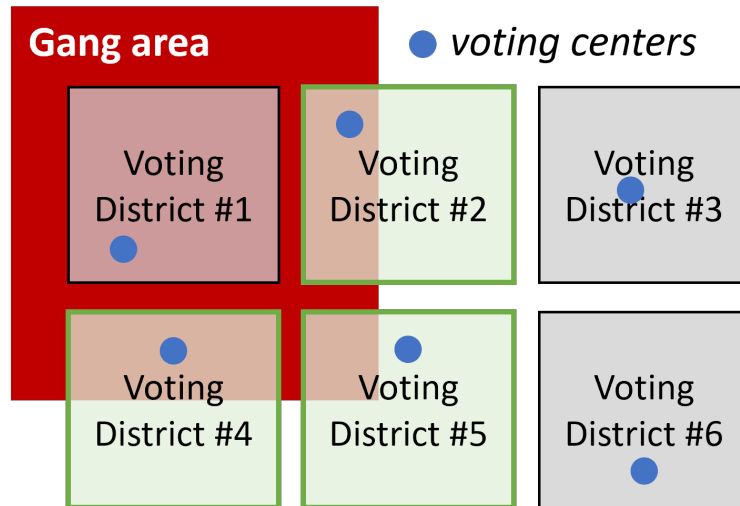
$$\begin{aligned} Y_n = & \alpha + \beta \mathbb{1}[\text{DistanceToGang} > 0]_n + \delta \text{DistanceToGang}_n \\ & + \rho \text{DistanceToGang}_n \times \mathbb{1}[\text{DistanceToGang} > 0]_n + \epsilon_n \end{aligned} \quad (3)$$

The independent variable belongs to the range of electoral outcomes such as participation, parties' vote share, and the previously described competition indicators (gap between the first and second most voted party, HH index, PCI). The Calonico et al. (2017) model was used to identify the optimal bandwidth in each regression, with a degree of polynomial 2 and with a triangular kernel. Other variations were considered to strengthen the analysis.

We focus more specifically on voting areas that overlap with gang-controlled territories, without being fully inside these territories (e.g., voting centers #2, #4, and #5 on Figure 3, but not voting center #1). This enables us to pool together voters who live inside gang territories, and may have specific characteristics and preferences, with voters living outside

of gang-controlled areas. By doing so, we can isolate the effect of voting centers being inside gang-controlled areas.¹

Figure 3: Qualifying Voting Centers in the Regression Discontinuity Design



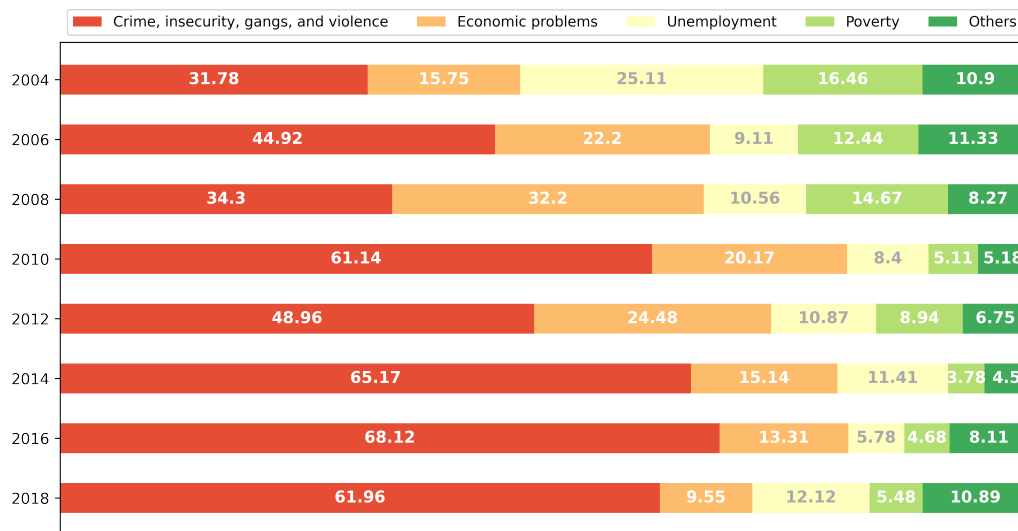
¹We are not able to display the detailed maps of gang-control for confidentiality reasons.

4 Gangs and political elections: mechanisms of action

4.1 Crime and voter preferences

According to *The AmericasBarometer* by the Latin American Public Opinion Project (LAPOP) (2004 - 2018), since 2004, Salvadorans report that the most severe problem in the country is crime, insecurity, gangs, and violence. This concern has increased since 2004, from 31.78% to 61.96% in 2018. Crime and insecurity seem to have remained the main problem for the country, even in times of economic recession. Hence, voters will tend to favor politicians who are able to reduce criminality.

Figure 4: Voters' main concerns in El Salvador



Source: The AmericasBarometer by the Latin American Public Opinion Project (LAPOP). 1,500 Salvadorans participate in the survey each year. The surveys are nationally representative.

4.2 Newspapers and official investigations

Given that crime remains the primary concern of Salvadoran voters, secretly negotiating with gangs to reduce homicides, probably the most high profile crimes, could be an effec-

tive strategy to attract voters. In 2012 indeed, the Government of El Salvador secretly facilitated a truce process between gang leaders. The truce was highly effective in reducing the high homicide rates: in just one month, homicides fell by 48%, an unprecedented drop in the country's recent history. In return, the Government agreed to improve prison conditions for gang leaders and reduced police control in some areas. The truce made it possible to recognize the gangs and legitimize power in their territories (Lohmuller, 2015).

The truce also proved to politicians that dialogue with gangs can be a solution to the high levels of criminality in the country. After the truce, in 2014, the former mayors of San Salvador, Norman Quijano and Ernesto Muyschondt, were accused of negotiating electoral favors with gang leaders (*Avanza causa penal contra políticos por pacto con pandillas en El Salvador*, 2020; Caceres, 2020). According to journalists from *El Faro*, former Mayor Norma Quijano offered to eliminate the anti-gang law and reduce police control in certain areas in exchange for support in the 2014 presidential elections.

According to investigation journalists, Martinez (2020) and Roberto Valencia, the actual number of negotiations between gangs and political leaders remains unknown. Using videos and audio leaks by gang members, journalist have been able to reveal many negotiations between politicians and gangs. In 2016, the leader of the Barrio 18 gang assured that all the parties engaged negotiations with gangs (Martinez, 2016) for the 2014 presidential election. This was also confirmed by the former mayor of San Salvador Ernesto Muyschondt in public statements (Labrador and Martinez, 2016).

More recently, the U.S. Department of the Treasury (2021) revealed that Osiris Luna, Vice Minister of Justice of the Nayib Bukele Government, had held secret negotiations with MS-13 and Barrio 18 gang leaders. According to the Treasury, in 2020, the Government offered financial incentives for the gangs to keep the number of homicides low and support the Nuevas Ideas party in the legislative and municipal elections of 2021. In addition, the Government of El Salvador offered special privileges to leaders in prisons such as cell phones and prostitutes. This is not the first time that members of the Nuevas Ideas party have been accused of negotiating with gangs. Martinez (2018) revealed that in 2015, delegates from

Nayib Bukele offered money to gang leaders not to disturb his candidacy.

Candidates also seem to be interested in the vote of gang members themselves. The exact number of gang members is currently unknown, but some estimates point toward 60,000 members and 500,000 support base (relatives and collaborators), which would represent 8 percent of the population of El Salvador (Zaidi, 2019; Raderstorf and Meléndez Sánchez, 2015; International Crisis Group, 2017). This number is significant, especially when considering that there was only 5,000 votes separating the winner from the defeated candidate at the 2014 presidential election.

4.3 Authors' interviews

To complement these reports, we conducted interviews with journalists and campaign managers. From these discussions, we understand that gangs seem to affect electoral results through (1) voters' preferences and (2) electoral participation. The following is based on what our interviewees have experienced or observed themselves on the field. This enables us to formulate hypotheses that we test quantitatively in the next section.

(1) Voters' preferences

- (a) Incumbent candidates can ask gang leaders to reduce homicides prior to the elections to improve the perception that voters have of them.
- (b) Gangs can prevent specific parties to campaign within the neighborhoods they control. Politicians need to negotiate safe access.
- (c) Gang leaders usually offer their members' votes to the candidates in exchange for several advantages (cash, in-kind favors, reduced police enforcement). Gangs can also ask their relatives to support a specific party.

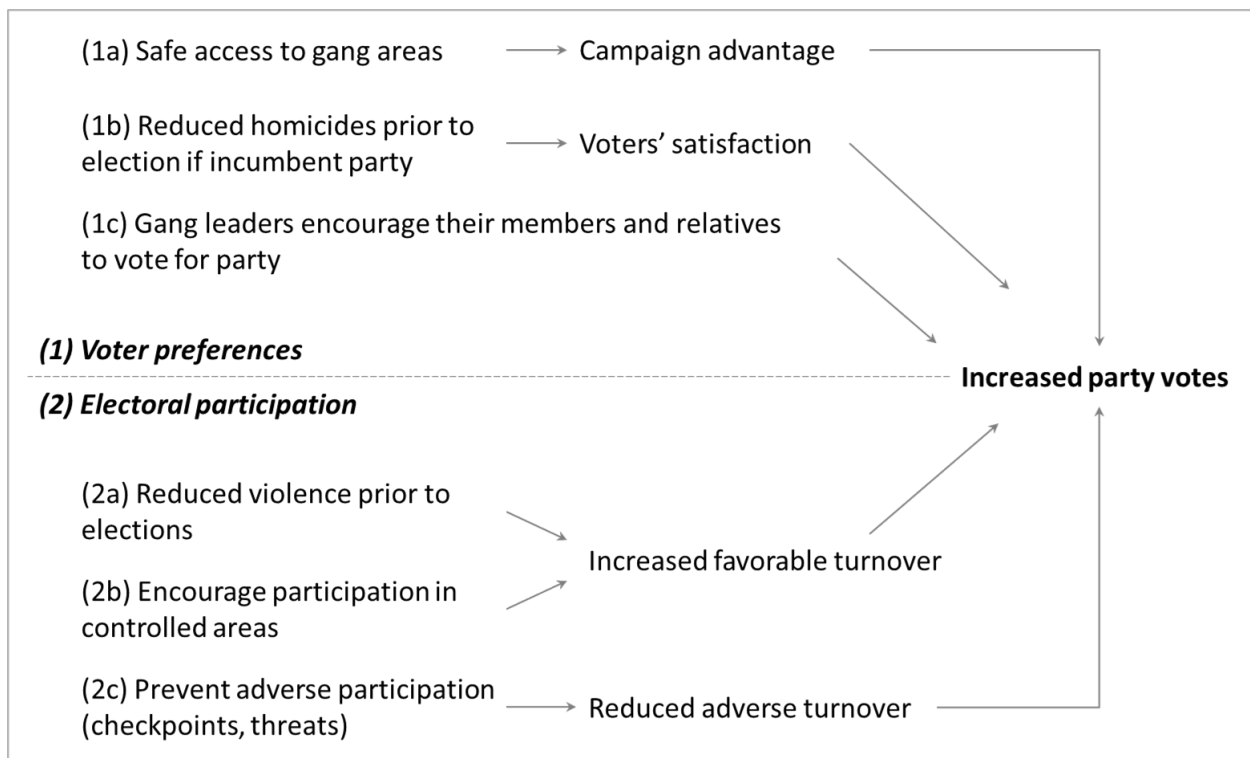
(2) Electoral participation

- (a) Gangs can increase violence prior to the elections to prevent people from voting. Conversely, they can also reduce violence to make people feel safer to vote.

- (b) Gang members may be collecting identity cards prior to the elections to prevent certain people from voting. They can also announce that they will check hands to verify that these people did not go to vote (voting centers mark voters' hands with ink to prevent multiple voting).
- (c) Gang members could prevent the movement of people on election day to the polling stations (using checkpoints for instance).

These mechanisms are also summarised below on Figure 5.

Figure 5: Gangs and political elections: potential mechanisms of action



5 Quantitative Results

5.1 Voter preferences

5.1.1 Buying peace: gang criminality during electoral seasons

Hypotheses (1a) and (1b) should translate into a reduction in criminality during electoral seasons, especially in gang controlled areas. To verify this, we use a Two Way Fixed Effect estimation as described in section 3.3.1 (Equation 1). We relate the weekly murder rate per 100,000 inhabitants to an indicator variable equal to 1 during electoral seasons. We define electoral seasons as the period starting 3 months prior to the elections and ending 3 months after, 3 months being the typical campaign duration in El Salvador. We also verify the robustness of our results using different time windows (see Appendix C).

Table 3 reports the results of this estimation. Columns (1) and (2) show that homicides tend to increase both before and after elections across El Salvador. In gang-controlled areas however, the homicide rate significantly reduces when compared to non gang-controlled areas (column (3)). We observe a similar pattern for gang-related murders (column (4)). This confirms the hypothesis that gangs use peace - or the absence of violence - rather than violence itself to weigh on political elections in El Salvador.

We excluded the 2012 and 2015 elections from this analysis to ensure that our estimates would not be biased by the particular events that unravelled these years. Indeed, the 2012 truce was struck three days before the elections and mechanically led to a strong reduction in criminality. Conversely, the FMLN government announced drastic measures against gangs two weeks before the 2015 elections, including the return to maximum security prisons for gang leaders and the deployment of special forces in gang areas. This was effectively the end of the truce, and the beginning of a new era of high crime (see Figure 2).

Table 10 in Appendix C reports the same analysis conducted with our alternative measures of gang-control: neighborhoods with a high number of convicted gang members, and gang

leaders' neighborhoods of origin. We observe similar results: criminality reduces in gang-controlled areas during elections. We also introduced gang-heterogeneity (columns (4) and (5)) and observe that this reduction in criminality is particularly significant in neighborhoods controlled by MS-13, less so in neighborhoods controlled by Barrio 18. MS-13's leadership is known to have a tighter control on its members (Lohmuller, 2015) as compared to Barrio 18 which suffers more internal divisions. Hence, MS-13 could be better positioned to negotiate agreements with parties themselves, especially during national elections.

Table 3: Criminality in Gang-Controlled Areas during Electoral Seasons

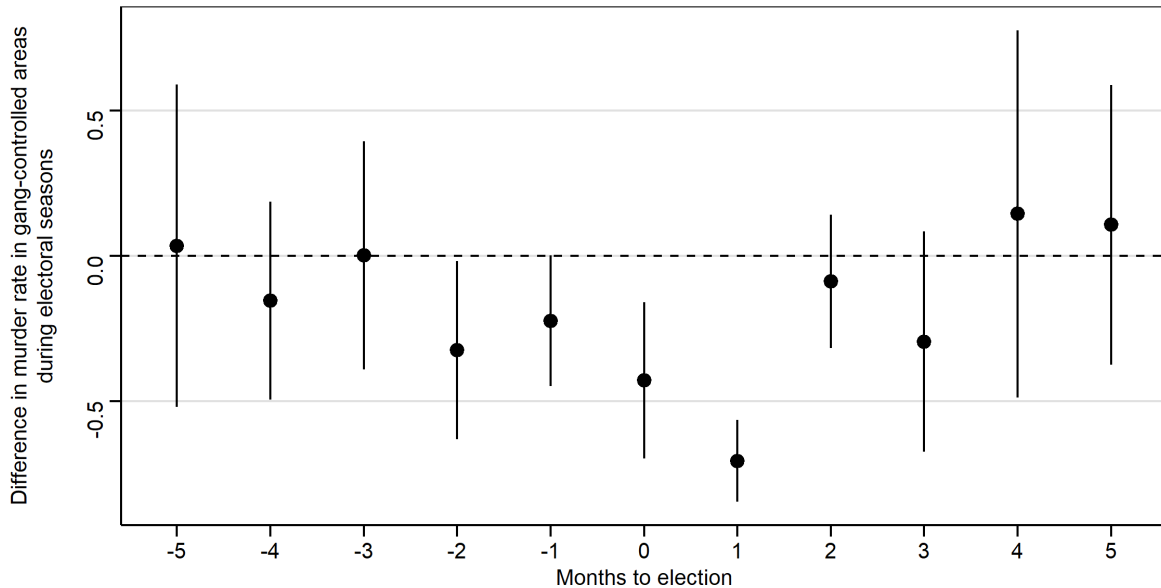
	Dependent variable			
	Homicide Rate (per 100,000 inhabitants)		Gang-Related	
	(1)	(2)	(3)	(4)
Electoral Season	.209** (.096)			
Before Election		.270** (.116)	.437*** (.116)	.193*** (.049)
After Election		.120 (.110)	.304*** (.107)	.123** (.051)
Before Election \times Gang-Control			-.347** (.131)	-.107* (.059)
After Election \times Gang-Control			-.381*** (.127)	-.188** (.072)
Time and Voting Center FE	Yes	Yes	Yes	Yes
Observations Mean	1.42	1.42	1.42	0.45
Observations	415,224	415,224	415,224	415,224
R ²	.055	.055	.055	.023
Adjusted R ²	.052	.052	.052	.019

*p<0.1; **p<0.05; ***p<0.01

Notes: This table reports the association between criminality and electoral season, specifically in gang-controlled areas between 2012 and 2019. Electoral season is an indicator variable equal to one 12 weeks before and after an election. The homicide rate is measured weekly and annualized per 100,000 inhabitants. Gang control is defined as the neighborhoods where the decrease in homicides due to the 2012 truce was above median. The 2012 and 2015 elections were removed from the sample because of outside events affecting the depending variable (resp. truce and end of truce)

Figure 6 plots the differential effect of gang-control on criminality during elections. The reduction in criminality during electoral seasons in gang-controlled areas seems particularly strong in the 2 months preceding and the month following an election.

Figure 6: Difference in Homicide Rate in Gang-Controlled Areas during Electoral Seasons



5.1.2 Party preferences in gang-controlled areas

Under hypothesis (1c), whether gang leaders only encourage their members and relatives to vote for a given party, or if they directly coerce voters, we expect to observe a difference in voting patterns in gang-controlled areas. In order to identify the specific effect of gang-control while still controlling for location fixed effects, we have relaxed the voting center level fixed effect and added a municipality fixed effect instead (see Equation 2). Each municipality encompasses on average 6 voting centers. Given that gangs' support for specific parties has changed overtime, we considered the different elections separately.

The results are reported in table 4. We observe that gang-controlled areas have voted signif-

icantly more for the FMLN party (left) in 2014 (column (1)) and against in 2019 (column (3)). Areas under gang influence have voted consistently against ARENA (right) across the period (columns (4) to (6)). The direction of the estimates is consistent with the claims that FMLN bought gangs' support in 2014 against ARENA and that Bukele's Nuevas Ideas party relied on gangs for the 2019 election against both FMLN and ARENA (see section 4.2).

The magnitude of the effects is rather large, between 0.9 and 2.5 percentage points, especially considering that FMLN won the 2014 election by 5,000 votes only. Appendix D shows that these results are consistent using alternative measures of gang-control. Even descriptive, these results support the broader hypothesis that gang influence may affect electoral results in some ways, whether legally or not.

Table 4: Party Preferences in Gang-Controlled Areas

	Dependent variable					
	FMLN (2014)	FMLN (2018)	FMLN (2019)	ARENA (2014)	ARENA (2018)	ARENA (2019)
	(1)	(2)	(3)	(4)	(5)	(6)
Gang-Control	1.529** (.668)	.906 (.692)	-1.369** (.604)	-1.284** (.626)	-.985 (.648)	-2.508*** (.594)
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations Mean	48.8	28	17.9	43.7	39.6	29.3
Observations	2,852	1,428	1,422	2,852	1,428	1,422
R ²	.475	.764	.663	.366	.763	.486
Adjusted R ²	.425	.715	.592	.307	.714	.378

*p<0.1; **p<0.05; ***p<0.01

Notes: This table reports the association between gang control and party specific votes in the 2014, 2018, and 2019 elections at the voting center level. Gang control is defined as the neighborhoods where the decrease in homicides due to the 2012 truce was above median. We added municipality fixed effects and clustered the standard errors by municipality.

5.2 Electoral participation

5.2.1 Criminality and electoral participation

In section 5.1.1, we found that gang-controlled areas experienced reduced violence during electoral seasons. To continue testing hypothesis (2a), we analyzed the association between homicides prior to elections to the electoral participation. We used year and voting center fixed effect to control for the expected turnover in specific locations in specific years. Table 5 shows that higher homicide rates prior to elections are associated with less turnover. However, only gang-related murders, 3 months and less prior to elections, seem to be statistically significant (columns (3) and (4)). This supports the hypothesis that gang violence may be influencing turnover.

5.2.2 Participation in gang-controlled areas

More specific to gang-controlled territories (hypothesis (2b)), we use the same framework as Equation 2 to study voters' turnover in gang controlled areas. Column (1) of Table 6 reports a statistically significant and positive effect of gang-control on voters' participation. Alternative measures of gang-control lead to consistent estimates, although not statistically significant (columns (2) and (3)). Potentially related to the reduction in criminality that we observe during electoral seasons, gang influence seems to be geared toward encouraging participation in the territories they control.

5.3 Geographic regression discontinuity - preliminary results

In order to present more causal evidence, we rely on the regression discontinuity model outlined in section 3.3.2. The following results are still preliminary. For this analysis, we use the maps of gang-controlled areas available for San Salvador in 2014 and 2018 along with the election results at the voting center level. In 2014, none of the candidates reached

Table 5: Electoral Participation and Crime

	Dependent variable			
	Electoral Participation			
	(1)	(2)	(3)	(4)
3-month Homicide Rate Prior to Election	-.002 (.001)			
6-month Gang Homicide Rate Prior to Election		-.005 (.002)		
3-month Gang Homicide Rate Prior to Election			-.004* (.002)	
1-month Gang Homicide Rate Prior to Election				-.002* (.001)
Election and Voting Center FE	Yes	Yes	Yes	Yes
Observations Mean	51.8	51.8	51.8	51.8
Observations	6,223	6,223	6,223	6,223
R ²	.635	.635	.635	.635
Adjusted R ²	.537	.537	.538	.537

*p<0.1; **p<0.05; ***p<0.01

Notes: This table reports the association between criminality 6 months, 3 months, and 1 month prior to an election and voters' turnout. The homicide rate is measured weekly and annualized per 100,000 inhabitants. We added election and voting center fixed effects and clustered the standard errors by election x voting center.

Table 6: Electoral Participation in Gang-Controlled Areas

	Dependent variable		
	Electoral Participation		
	(1)	(2)	(3)
Gang Control	2.258* (.995)		
High-Prisoners		.819 (.807)	
High-Leaders			1.249 (.910)
Election and Municipality FE	Yes	Yes	Yes
Observations Mean	51.8	51.8	51.8
Observations	7,978	7,978	7,978
R ²	.388	.383	.383
Adjusted R ²	.368	.363	.363

*p<0.1; **p<0.05; ***p<0.01

Notes: This table reports the association between gang control and voters' turnout. Gang control is defined as the neighborhoods where the decrease in homicides due to the 2012 truce was above median. High-Prisoners represents the neighborhood where the number of convicted gang members was above average. Gang-Leaders represents the neighborhoods of origins of convicted gang leaders. We added election and municipality fixed effects and clustered the standard errors by election x municipality.

the 50% vote share required to win. For this reason, a second round was held, which we also took into account in the estimations.

We were not able to identify any difference in participation, whether voting centers are located inside or outside gang-controlled territories (see Table 7). Nonetheless, tables 8 and 9 show that voting centers inside gang-controlled territories, although pooling voters both from inside and outside, present a significant distortion in political competition as compared to voting centers outside of gang-controlled areas. In 2014 and 2018, the vote gap between candidates ranked first and second in these voting centers was lower by 0.70 and 0.10 points respectively (columns (2)). These results are also illustrated graphically in Appendix E.

The differences in vote gap between first and second candidates are not significant for other years using the same maps (columns (1) and (3)). One explanation could be that gang territories' borders may have shifted over time. Prior to 2014, according to journalists, gang members were able to strengthen control of their territory thanks to the truce. After 2015 however, the Government launched a new Security Plan that may have modified gangs' territories.

Tables 13 and 14 in Appendix E present the results obtained using other measures of competitiveness (HH - Index and Political index). The results in 2014 remain significant, but not in 2018. The number of observations is quite low and could limit the correct interpretation of the results.

Table 7: Gang-Control Effect on Participation in 2014 and 2018 (RD)

	(1)	(2)
	Participation 2014	Participation 2018
Gang Control Area	-0.021 (0.025)	0.006 (0.026)
Robust 95% CI	[-.086 ; .031]	[-.044 ; .075]
Kernel Type	Triangular	Triangular
BW Type	mserd	mserd
Observations	94	209
Conventional p-value	0.399	0.825
Robust p-value	0.359	0.605
Order Loc. Poly. (p)	1	1
Order Bias (q)	2	2
BW est. (h)	149.5	933.1
BW bias (b)	220.9	1561.6

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Gang-Control Effect on Gap First-Second in 2014 (RD)

	(1)	(2)	(3)
	Before 2014	2014	After 2014
Gang Control Area - 2014 map	-0.018 (0.178)	-0.711*** (0.161)	-0.046 (0.103)
Robust 95% CI	[-.73 ; .341]	[-1.062 ; -.269]	[-.252 ; .301]
Kernel Type	Triangular	Triangular	Triangular
BW Type	mserd	mserd	mserd
Observations	41	94	170
Conventional p-value	0.922	0.000	0.653
Robust p-value	0.476	0.001	0.860
Order Loc. Poly. (p)	2	2	2
Order Bias (q)	3	3	3
BW est. (h)	98.9	90.5	97.7
BW bias (b)	132.8	138.8	151.8

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Gang-Control Effect on Gap First-Second in 2018 (RD)

	(1)	(2)	(3)
	Before 2018	2018	After 2018
Gang Control Area - 2018 map	0.008 (0.024)	-0.109** (0.050)	0.043 (0.061)
Robust 95% CI	[-.037 ; .067]	[-.21 ; .006]	[-.09 ; .176]
Kernel Type	Triangular	Triangular	Triangular
BW Type	mserd	mserd	mserd
Observations	760	222	432
Conventional p-value	0.726	0.030	0.484
Robust p-value	0.573	0.065	0.526
Order Loc. Poly. (p)	2	2	2
Order Bias (q)	3	3	3
BW est. (h)	1246.2	1484.7	1653.6
BW bias (b)	2011.6	2145.5	2255.8

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

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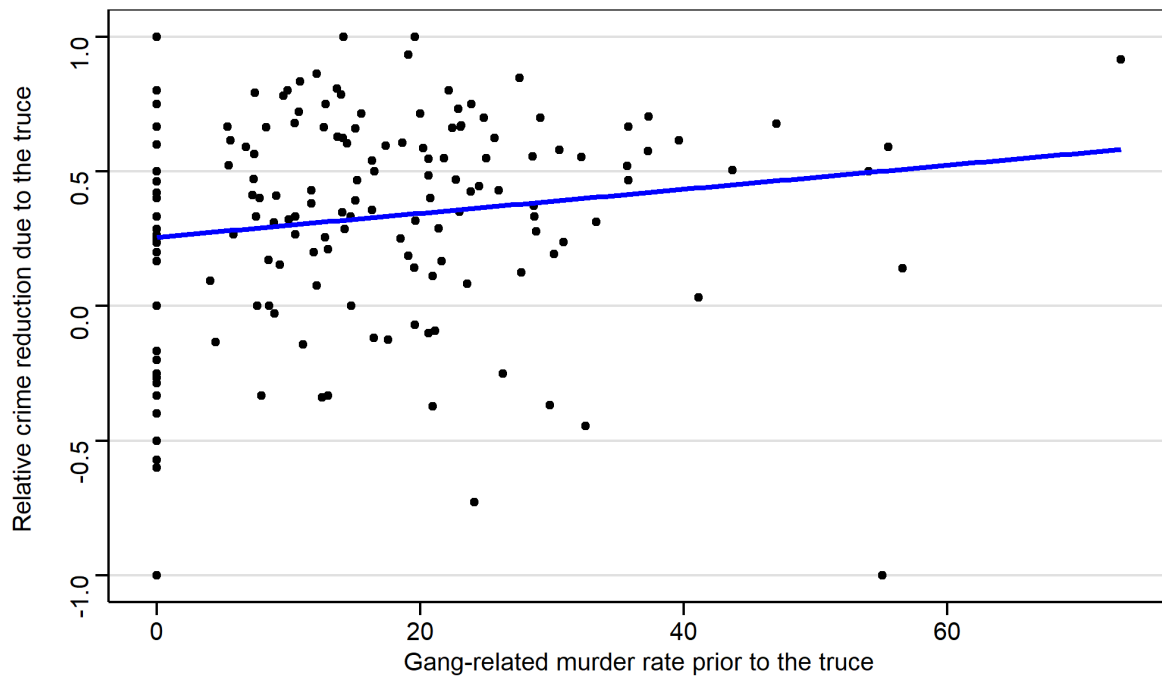
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Appendices

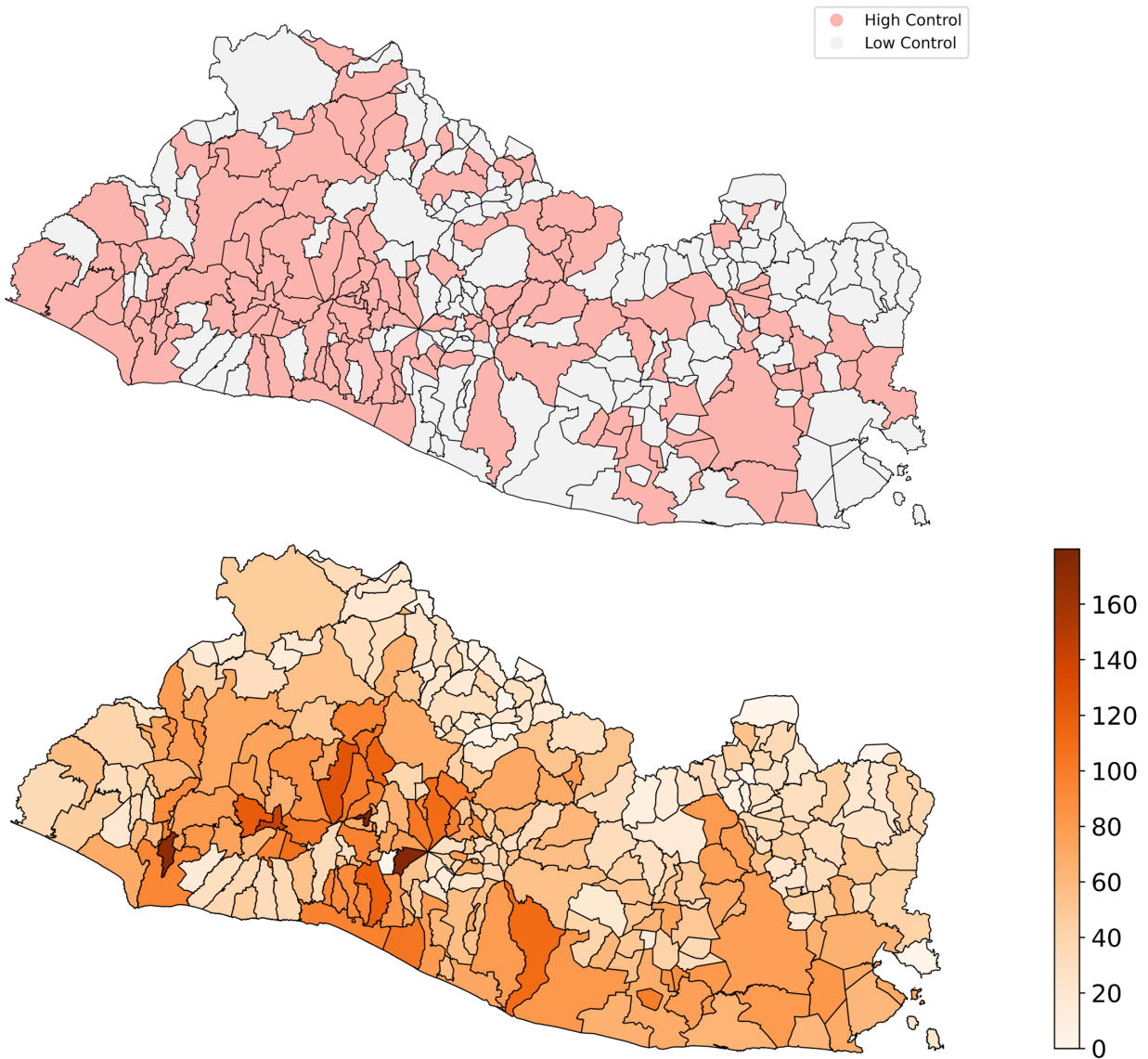
A Truce and gang-control

Murder rate variation during the truce compared to prior gang-related murder rates.



B Gang-controlled areas

Gang Controlled Areas and Murder Rates Across El Salvador



C Gang criminality during electoral seasons

**Table 10: Criminality in Gang-Controlled Areas during Electoral Seasons
(robustness to gang control)**

	Dependent variable				
	Homicide Rate (per 100,000 inhabitants)				
	(1)	(2)	(3)	(4)	(5)
Election	.382*** (.096)	.283*** (.097)	.222** (.096)	.236** (.098)	.283*** (.096)
Election × Gang-Control	-.358*** (.109)				
Election × High-Prisoners		-.597*** (.219)			
Election × Gang-Leaders			-.655* (.350)		
Election × B-18				-.211 (.211)	
Election × MS-13					-.584*** (.205)
Time and Voting Center FE	Yes	Yes	Yes	Yes	Yes
Observations Mean	1.42	1.42	1.42	1.42	1.42
Observations	415,224	415,224	415,224	415,224	415,224
R ²	.055	.055	.055	.055	.055
Adjusted R ²	.052	.052	.052	.052	.052

*p<0.1; **p<0.05; ***p<0.01

Notes: This table reports the association between criminality and electoral season, specifically in gang-controlled areas between 2012 and 2019. Electoral season is an indicator variable equal to one 12 weeks before and after an election. The homicide rate is measured weekly and annualized per 100,000 inhabitants. Gang control is defined as the neighborhoods where the decrease in homicides due to the 2012 truce was above median. High-Prisoners represents the neighborhood where the number of convicted gang members was above average. B-18 and MS-13 are constructed similarly based on B-18 and MS-13 convicts. Gang-Leaders represents the neighborhoods of origins of convicted gang leaders. The 2012 and 2015 elections were removed from the sample because of outside events affecting the depending variable (resp. truce and end of truce)

**Table 11: Criminality in Gang-Controlled Areas during Electoral Seasons
(robustness to electoral season)**

	Dependent variable			
	Homicide Rate (per 100,000 inhabitants)			
	(1)	(2)	(3)	(4)
Election (4 weeks)	.115 (.133)			
Election (4 weeks) × Gang-Control	−.378** (.149)			
Election (8 weeks)		.158 (.105)		
Election (8 weeks) × Gang-Control		−.349*** (.124)		
Election (12 weeks)			.382*** (.096)	
Election (12 weeks) × Gang-Control			−.358*** (.109)	
Election (16 weeks)				.449*** (.083)
Election (16 weeks) × Gang-Control				−.232** (.095)
Time and Voting Center FE	Yes	Yes	Yes	Yes
Observations Mean	1.42	1.42	1.42	1.42
Observations	415,224	415,224	415,224	415,224
R ²	.055	.055	.055	.055
Adjusted R ²	.052	.052	.052	.052

*p<0.1; **p<0.05; ***p<0.01

Notes: This table reports the association between criminality and electoral season, specifically in gang-controlled areas between 2012 and 2019. Electoral season is an indicator variable equal to one 12 weeks before and after an election. The homicide rate is measured weekly and annualized per 100,000 inhabitants. Gang control is defined as the neighborhoods where the decrease in homicides due to the 2012 truce was above median. The 2012 and 2015 elections were removed from the sample because of outside events affecting the depending variable (resp. truce and end of truce)

D Party votes in gang-controlled areas

Table 12: Party Preferences in Gang-Controlled Areas

	Dependent variable					
	FMLN (2014)			FMLN (2019)		
	(1)	(2)	(3)	(4)	(5)	(6)
Gang Control	1.529** (.668)			−1.369** (.604)		
High-Prisoners		1.596** (.681)			−1.730** (.757)	
High-Leaders			1.878 (1.324)			−1.634** (.769)
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations Mean	48.8	48.8	48.8	17.9	17.9	17.9
Observations	2,852	2,852	2,852	1,422	1,422	1,422
R ²	.475	.474	.473	.663	.662	.661
Adjusted R ²	.425	.424	.423	.592	.592	.591

*p<0.1; **p<0.05; ***p<0.01

Notes: This table reports the association between gang control and party specific votes in the 2014, 2018, and 2019 elections at the voting center level. Gang control is defined as the neighborhoods where the decrease in homicides due to the 2012 truce was above median. High-Prisoners represents the neighborhood where the number of convicted gang members was above average. Gang-Leaders represents the neighborhoods of origins of convicted gang leaders. We added municipality fixed effects and clustered the standard errors by municipality.

E RDD - Results

Results of the discontinuous regression in 2014 - multiple degrees

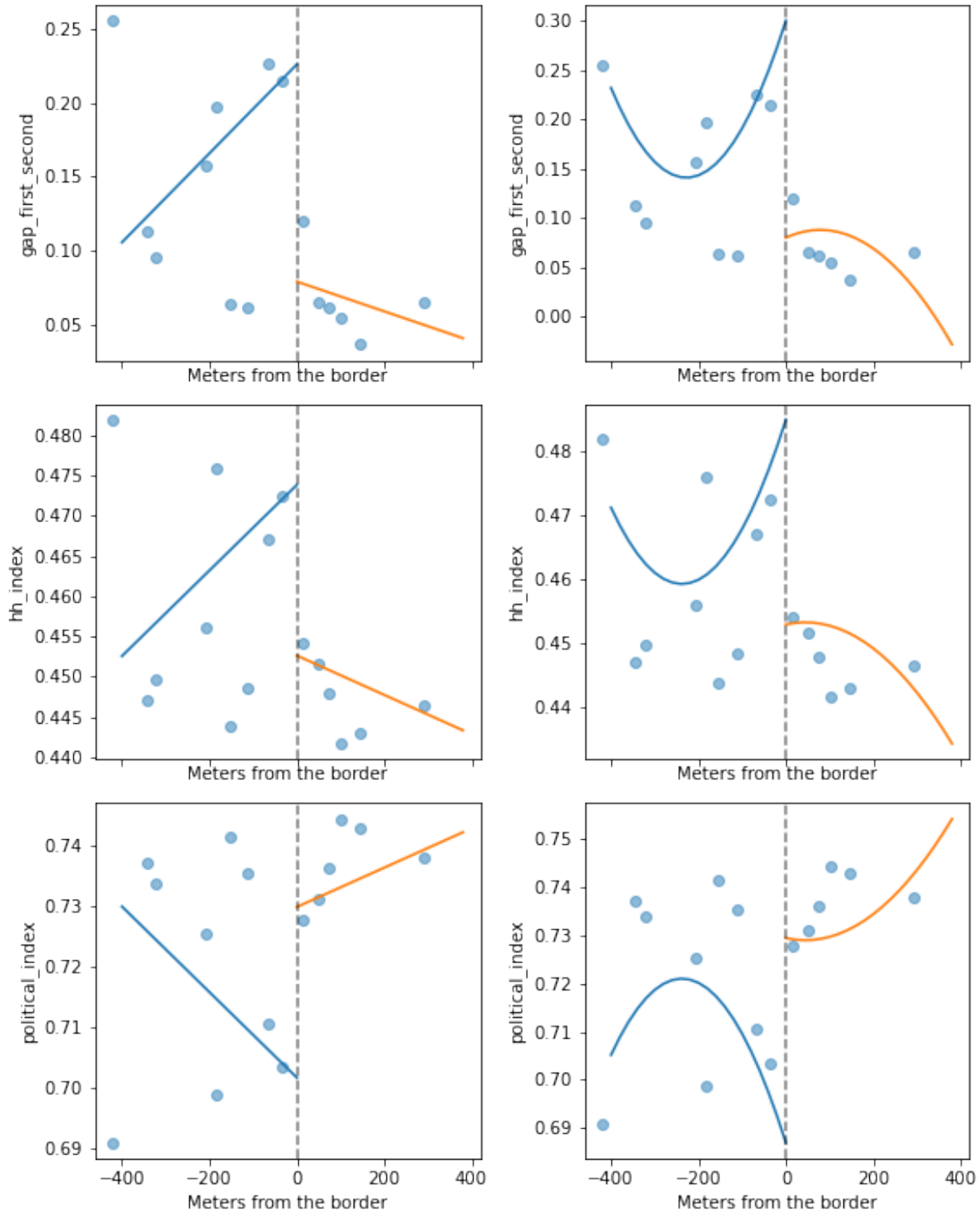


Table 13: Results of the discontinuous regression - Validation 2014

	(1)	(2)	(3)
	Gap First-Second	HH index	Political index
Gang Control Area	-0.711*** (0.161)	-0.115*** (0.028)	0.153*** (0.038)
Robust 95% CI	[-1.062 ; -.269]	[-.193 ; -.051]	[.068 ; .257]
Kernel Type	Triangular	Triangular	Triangular
BW Type	mserd	mserd	mserd
Observations	94	94	94
Conventional p-value	0.000	0.000	0.000
Robust p-value	0.001	0.001	0.001
Order Loc. Poly. (p)	2	2	2
Order Bias (q)	3	3	3
BW est. (h)	90.5	93.6	93.6
BW bias (b)	138.8	135.0	135.0

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

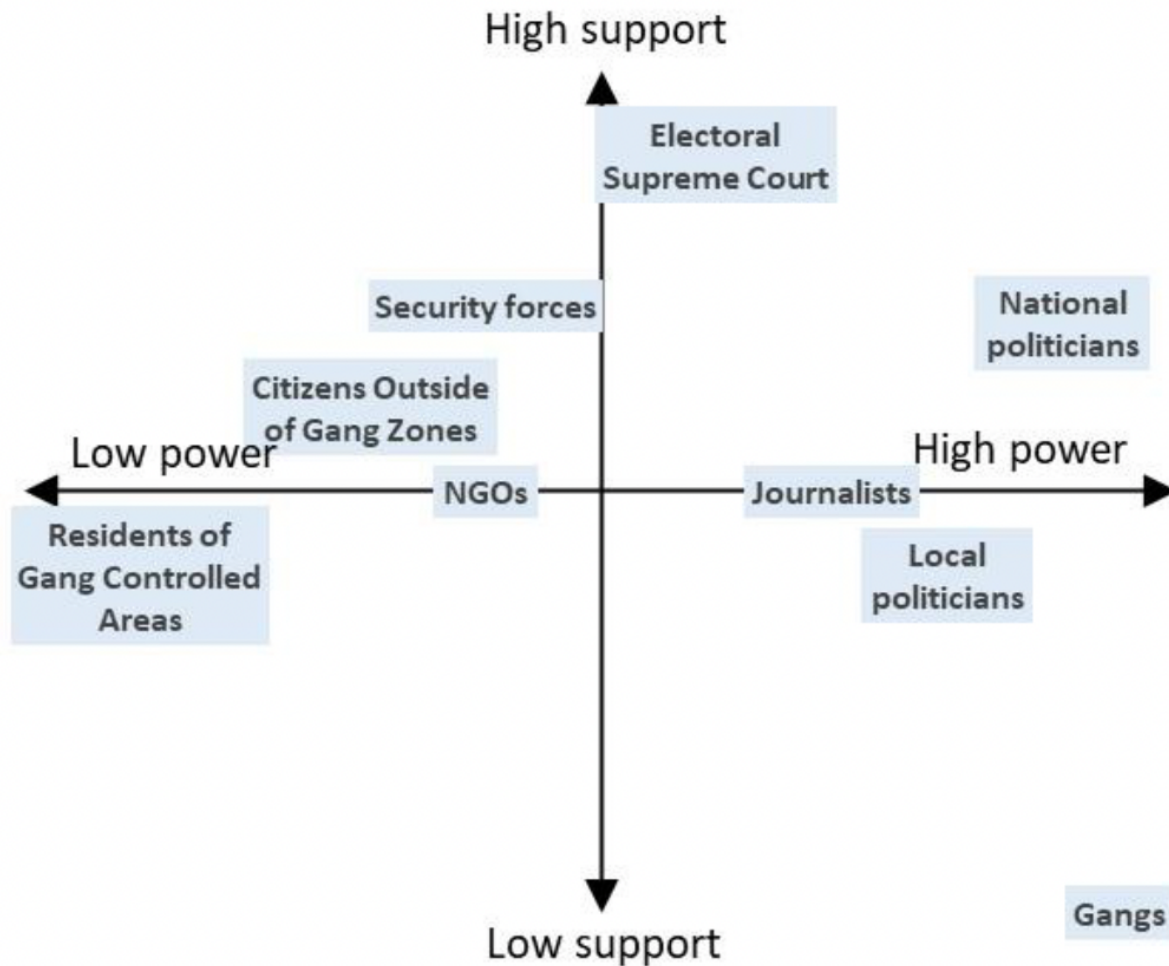
Table 14: Results of the discontinuous regression - Validation 2018

	(1)	(2)	(3)
	Gap First-Second	HH index	Political index
Gang Control Area	-0.109** (0.050)	-0.024 (0.027)	0.026 (0.029)
Robust 95% CI	[-.21 ; .006]	[-.074 ; .039]	[-.042 ; .081]
Kernel Type	Triangular	Triangular	Triangular
BW Type	mserd	mserd	mserd
Observations	222	222	222
Conventional p-value	0.030	0.376	0.376
Robust p-value	0.065	0.541	0.541
Order Loc. Poly. (p)	2	2	2
Order Bias (q)	3	3	3
BW est. (h)	1484.7	1363.7	1363.7
BW bias (b)	2145.5	1983.1	1983.1

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

F Stakeholders

Stakeholder Analysis: Power vs Support)



Stakeholder Analysis: Relations between Groups)

