

Disappeared Persons and Homicide in El Salvador

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Abstract

During 2012-2013, the homicide rate in El Salvador came down from 69.9 to 42.2 per 100,000 population following a truce between the leaders of the two major gangs, “Mara Salvatrucha” and “Barrio 18”, and government. But despite the apparent successes of the truce, it was speculated that the drop in murders could have been due to the killers simply hid the bodies of their victims. This paper aims at determining whether gangs effectively disappeared their victims to cut down the official counts of murders, or they committed these crimes for other reasons. The results from this study suggest that Salvadoran gangs had been using disappearance as a resource to gain sustained social control among residents of already gang-dominated areas, that together with homicide, disappearance is part of a process of territorial spread and strategic strengthening by which these groups are enhancing their capabilities to interfere in the alliances of Mexican drug trafficking organizations with Central American criminal organizations specializing in the trans-shipment of drugs and in providing access to local markets to distribute and sell drugs. Our findings show that the risk for disappearance has been large even before the truce was in place and that actually, it continues as such and going through a process of geographic expansion.

Keywords

El Salvador, gangs, Bayesian mapping, trends in disappearance, homicide trends, and Bayesian shared component model.

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Background

El Salvador has a total population of about 6.5 million distributed over 20,000 square kilometers; it is organized in 262 municipalities varying widely in terms of size and number of residents. The country extends on the Pacific coast sharing borders with Guatemala on the West, and Honduras on the North and the East. Roughly, its territory divides into 3 well differentiated regions: A coastal region running along the Pacific Ocean; the most densely populated central plateau, covering 85 percent of the territory; and the northerly mountain ranges. These regions define climatic and environmental zones characterized by varying land uses, economic activities and potentials. Together with Honduras and Guatemala, El Salvador is part of the so called Northern Triangle Region of Central America, arguably the most violent region in the world, with strong gang presence, and a key link to the drug corridor connecting South America to the United States.

Homicide and missing persons in El Salvador

Figure 1 shows homicide rates computed over 4 consecutive government periods. The first running from June 1999 to May 2004, recorded 39.7 homicides per 100,000 population and was scenery to the so called “Strong Hand” policy ^a. The rate increased to 58.8 over June 2004-May 2009 in which the government implemented what they named as “Ultra Strong Hand” policy ^b. It went up to 61.7 during the first half of the third government period, June 2009-February 2012. From March 2012 to May 2013, the two major gangs, the Mara Salvatrucha (MS-13) and Barrio 18, negotiated a 15-month truce, allegedly facilitated by the government ^c, in which the homicide rate felt down to 41.8. During the following 18 months, from June 2013 to December 2014, following the sitting of the government of current president Salvador Sánchez Cerén, that backed off from the truce and adopted the strategy of an apparent frontal combat to gangs ^d, the homicide rate more than doubled to reach 86.8 per 100,000 residents.

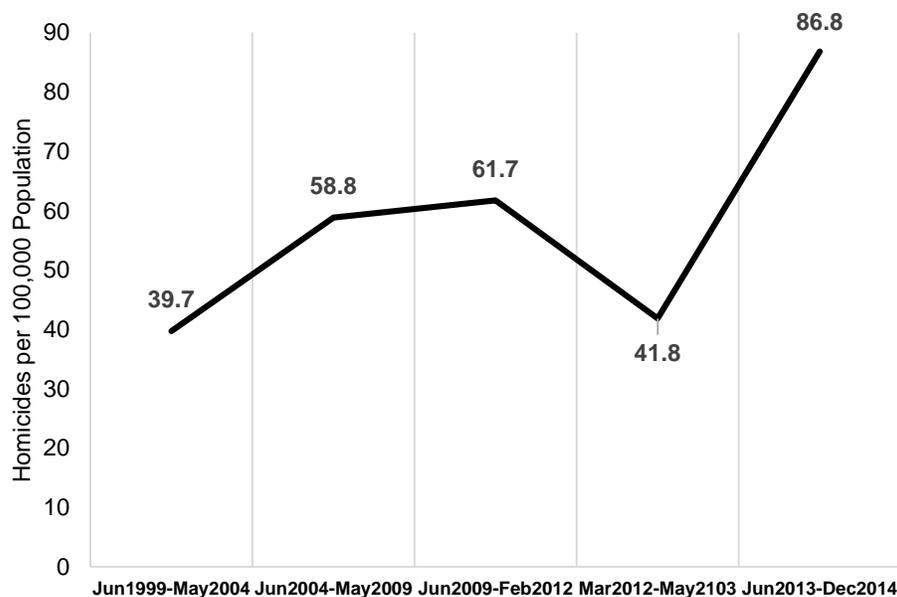


Figure 1: El Salvador, homicide rates per 100,000 over different periods

The possibility that the decline in recorded homicide during the period the gang truce was in place might have been accompanied by increases in the numbers of disappearances has been sustained by both the media and local crime and safety experts (Savenije & van der Borgh, 2014). There is a strong belief that gangs used disappearances to bring homicide counts artificially down. Figure 2 shows recorded cases of missing or disappeared persons per 100,000 population during each of the 5 years from 2010 to 2014, derived from official police data. This rate went up from 6.0 in 2010 to 37.4 in 2014. In particular, it increased from 15.8 in 2011 to 26.1 in 2012 and to 30.7 in 2013 (i.e. the years when the gang truce was in place).

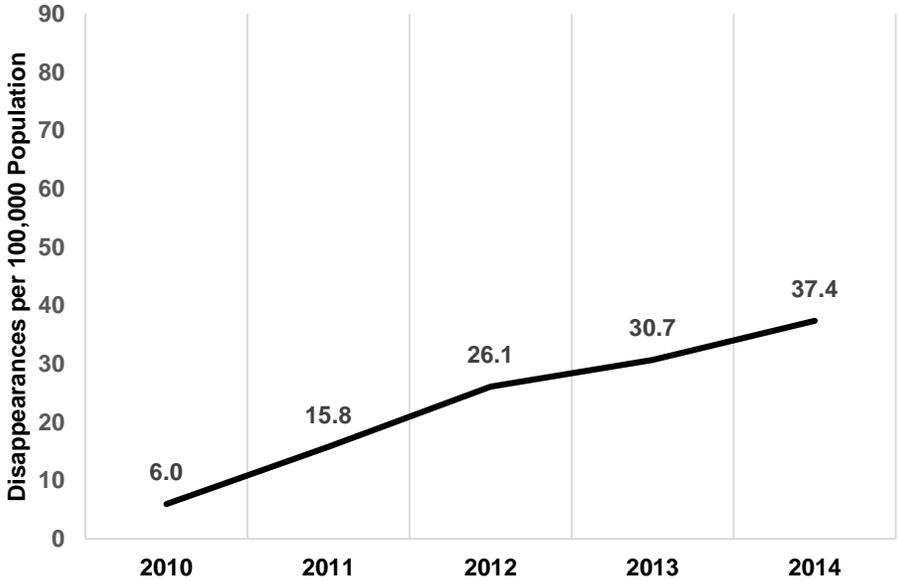


Figure 2: El Salvador, 2010-2014, disappeared persons per 100,000

Figure 3 shows relative risks or standardized rates for both homicides and disappearances across municipalities and over time periods.

In 2010-2011, there were 81 municipalities with homicide risks exceeding one (first row and first column). During the truce (i.e. 2012-2013), in 57 out of these municipalities, the risk dropped down to values that were smaller than one (second row and first column). On the other hand, in 2010-2011 there were 237 municipalities where the risk of disappearance took on values below one (first row and second column), 66 of which increased the risk to values greater than one during 2012-2013 (second row and second column). The maps in the third row of Figure 3 show that following the end of the truce (2014), relative risks for both homicide and disappearance did not only increase but also seemed to have modified their geographical patterns.

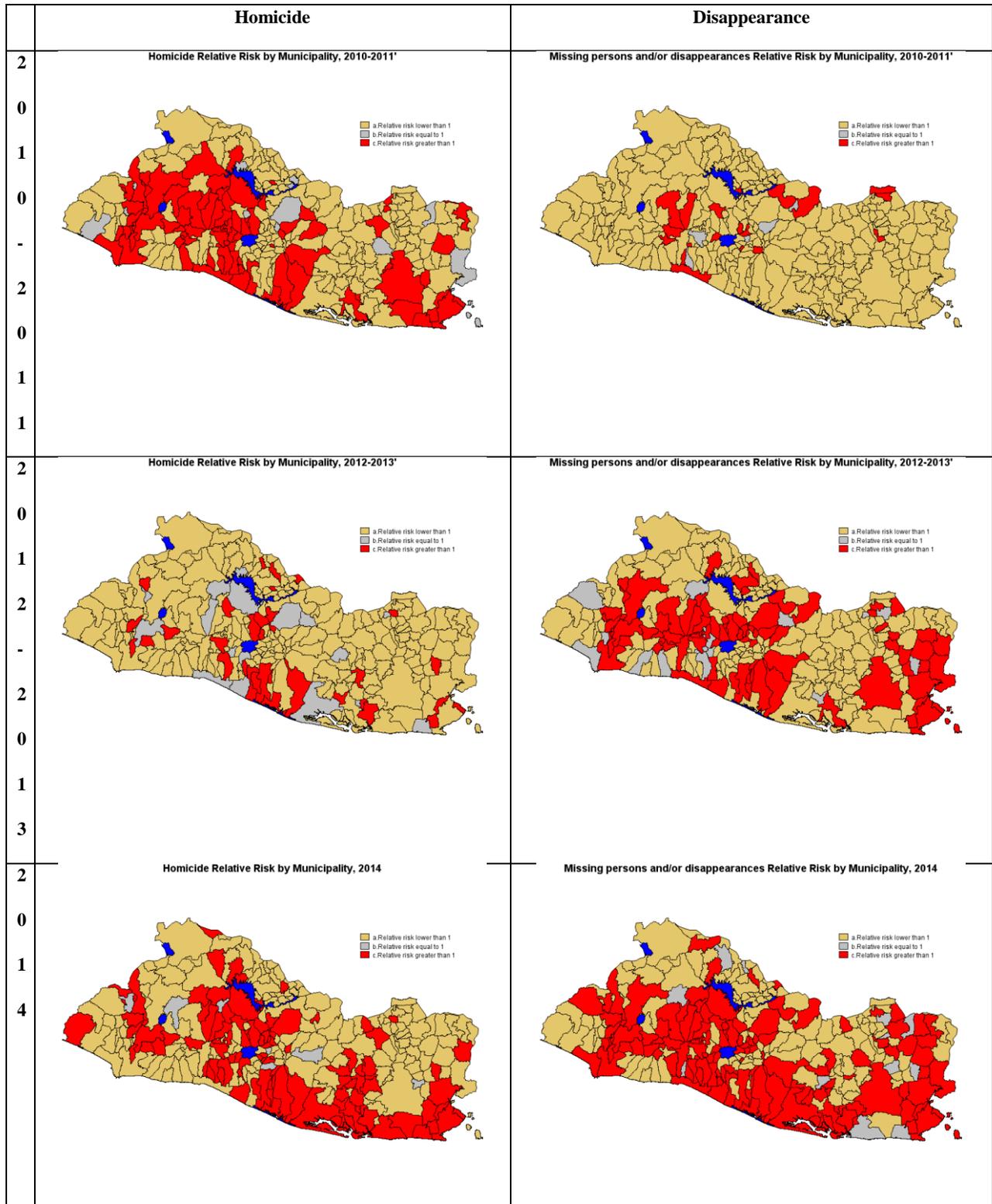


Figure 3: Relative Risk for Homicide and Disappearance

Disappearances and gangs

A missing person is a person who has disappeared and whose status as alive or dead cannot be confirmed. A person may go missing due to accident, crime, and death in a location where they cannot be found, or many other reasons, including voluntary disappearance and enforced disappearance. This research addresses disappearances related to murder after which the victim might have been buried in secret. These are common crimes committed by common criminals.

In the case of El Salvador and during the last 10 years or so, these crimes have taken place within the context of intense gang activity, mainly by the Mara Salvatrucha and Barrio 18. The nature of gang-related disappearances is not clear cut. While it is true that the disappearance of a person implies her kidnapping, the most likely set up of most of the Salvadorian disappearances involves the murder and further clandestine burial by a gang, within the limits of a gang dominated territory, and as the result of its war against a rival gang. Whether Salvadorian gangs can be considered common criminal groups or not is an issue that is open to debate. Their apparent gain of political power as evidenced by an enhanced capacity to negotiate with government in recent years, together with an undisputed control over significant parts of the country's territory and penitentiary facilities, may lead one to think of Salvadorian gangs as organizations that have evolved into a mix of mafia-like organizations and some form of politically motivated groups with characteristics that may be similar to those observed in paramilitary groups of Colombia and Mexico.

The data in Figures 2 and 3 provide support to the claim in Rivera Virúes (2014) that Salvadoran gangs are extending the use of the killing and secret burial of their victims. Initially and as a response to a government approach to crime control characterized by increased presence of police and army in the streets, gangs reduced the numbers of homicides committed in public places and replaced them with the clandestine burial of their victims. Also, gangs may have been using disappearances to gain social control through either the intimidation of the residents of dominated territories, or ensuring their cooperation in protecting themselves against rival gangs or police. Demanding concessions from government to imprisoned gang members may be another factor underlying disappearances. The country is suffering a new wave of disappearances, mostly young people and teenagers, who go missing without explanation in a phenomenon linked to the gang violence hitting the country (Stone, 2011, 2013). Young Salvadoran men being under pressure from gangs who resist their influence don't survive (Sánchez-Aizcorbe, 2014). In El Salvador, most accounts on this type of violence come from the media.

Outside the context of political violence and drug wars, in Latin America, the disappearance of persons has been related to paramilitary groups as in the case of Colombia (Rozema, 2008; Hristov, 2010), and the so called self-defense forces, as in Mexico (Santamaría, 2014). Literature on disappearances related to gang activity is almost inexistent. Rivera Virués (2014) is the only academic work on the topic that also refers to the specific case of El Salvador.

According to the Salvadorian police, nearly 90% of disappeared persons are murdered by gangs. Clandestine graves are the final destination of most persons going disappeared.

During 2007-2013, the Fiscalía General de la República (FGR) conducted 145 inhumations in 30 clandestine cemeteries. Around 2007-2008, cemeteries were located in semi-rural deprived and gang-controlled communities of municipalities of the San Salvador metropolitan area. During 2009-2010, clandestine graves were discovered in the rural areas of the municipalities of Santa Ana and Usulután, located in the Western and Eastern sides of the country, respectively. Between 2011 and 2013, clandestine cemeteries were found in most of the territory indicating an expansion of the phenomena (Rivera Virúes, 2014, p. 61-62).

A number of explanations to the phenomenon of disappeared persons in El Salvador emerge from the findings in Rivera Virúes (2014) and media accounts, all of them pointing towards gangs. First, the disappearance of persons as the response of gangs to government crime control actions. Second, disappearances as means to gain sustained social control among residents of gang controlled areas. Third, disappearance as retaliation to youth resisting to become members of gangs. Fourth, disappearance as a gang strategy aimed at sustaining territorial control. Fifth, the observed geographic spread of the phenomenon (Figure 3) might concur with the strengthening of gangs in their capabilities to advantageously interfere in the alliances of Mexican drug trafficking organizations with Central American criminal organizations specializing in the trans-shipment of drugs and in providing access to local markets to distribute and sell drugs (Santamaría, 2014). Sixth, Salvadoran gangs may be in a process of mutation into forms of highly efficacious and effective criminal organizations sharing traits of both the traditional street gangs, mafia-like groups and paramilitary or self-defense forces.

This research

This paper uses data on official records of disappearances and homicides to explore joint spatial behavior across municipalities in El Salvador over the period 2010-2014. It aims at determining whether gangs effectively disappeared their victims to cut the official counts of murders down during the period the government sponsored truce was in place, or they committed this crime for other reasons. Within this context, we approach homicide and disappearances as competing outcomes linked through unobserved variables, most of them believed to be related to gang activity.

Methods

A Bayesian model with shared components (Knorr-Held & Best, 2001) was implemented to jointly account for the effect of unobserved common influences on the risk of both the disappearance of persons and homicide. This approach was deemed convenient as it was believed that most variation in relative risk was due to differences in gang activity across municipalities. Details on the methodology and discussion of technical issues are shown in the Appendix.

Results and discussion

The Deviance Information Criterion (DIC) (Spiegelhalter et al., 2002) was used to assess the fit and identification of the model in (1) – (2) relative to a simpler model without a shared component. Models with smaller DIC are considered better. For each of the 3 periods, the shared component model had smaller DIC scores compared to separate models for disappearance and homicide (Table 1).

Table 1: Summary of deviance information criteria for competing models

	2010-2011		2012-2013		2014	
	pD	DIC	pD	DIC	pD	DIC
Shared Component Model						
Disappearances	118.51	811.00	142.44	1190.72	141.19	1091.74
Homicide	187.69	1495.18	145.82	1391.65	162.92	1313.77
Total	306.19	2306.18	288.26	2582.38	304.11	2405.51
Individual Models						
Disappearances	120.85	815.95	144.41	1203.09	144.39	1104.28
Homicide	189.46	1496.30	151.28	1398.65	166.30	1318.35

Table 2 details the model parameters from the shared component model. For disappearances, the ratio of relative risk associated with the shared component was found to be 1.85 (95% CI: 1.04-4.00) in 2010-2011, 1.40 (95% CI: 0.99-2.23) in 2012-2013, and 1.97 (95% CI: 1.32-3.63) in 2014, indicating that unobserved gang activity common to both outcomes has a stronger association with the disappearance of persons. The model also shows that 79%, 46% and 66% of the between-municipality variation in relative risk of disappearance is explained by the shared component during 2010-2011, 2012-2013 and 2014, respectively.

Table 2: Summary of model parameters

	2010-2011			2012-2013			2014		
	Estimate	Lower Bound 95% CI	Upper Bound 95% CI	Estimate	Lower Bound 95% CI	Upper Bound 95% CI	Estimate	Lower Bound 95% CI	Upper Bound 95% CI
a0	-1.94	-2.16	-1.75	-0.38	-0.48	-0.29	-0.12	-0.24	-0.01
a1	-0.39	-0.46	-0.33	-0.62	-0.68	-0.56	-0.23	-0.30	-0.16
Ratio - Relative Risk associated with shared component	1.85	1.04	4.00	1.40	0.99	2.23	1.97	1.32	3.64
Fraction of variation in RR of disappearance explained by shared component	0.79	0.66	0.83	0.46	0.42	0.48	0.66	0.63	0.67

For disappearance, municipal-level relative risks have varied around average values of 0.143 ($= \exp(-1.944)$), 0.681 ($= \exp(-0.384)$) and 0.886 ($= \exp(-0.121)$) during 2010-2011, 2012-2013 and 2014, respectively. In the case of homicide, municipal-level relative risks have varied around average values of 0.676 ($= \exp(-0.392)$), 0.540 ($= \exp(-0.616)$) and 0.797 ($= \exp(-0.227)$) over the same periods. These estimates suggest a convergence in national average relative risks of disappearance and homicide over time.

Figure 4 displays the overall posterior mean relative risk from the shared component model for both homicide and disappearance. The data suggest that prior to the gang truce (i.e. 2010-2011), the relative risk for disappearance was larger in municipalities that also had large relative risks for homicide, most of them located in the central part of the country. During the truce (i.e. 2012-2013), the relative risk for homicide concentrated in a few municipalities located along the Pacific coast and one municipality located in the North-Eastern region. On the other hand and always during the time the gang truce was in place, the relative risk for disappearance not only continued being large for many of the municipalities where it also was large in the previous period (i.e. 2010-2011), but spread over municipalities located in the Eastern side of El Salvador. Finally, the maps in the last row of Figure 4 indicate that after the truce was over, homicide risk recovered the spatial distribution it had during 2010-2011 whereas the risk of disappearance continued spreading over the territory.

These results suggest that in gang-dominated areas, the risk for disappearance has been large even before the truce was in place and that actually, it continues as such and going through a process of geographic expansion. These findings are consistent with an explanation of the phenomenon as a component of a strategy aimed at gaining sustained social control among residents of already gang controlled areas.

Figure 5 displays relative risk associated with the shared component. The maps might be taken as estimates of the evolution of the spatial distribution of gangs in El Salvador during the five years running from 2010 and 2014. The data provide support to an explanation of gang related violence as part of a process of territorial expansion and strengthening by which these groups are enhancing their capabilities to interfere in the likely alliances of Mexican drug trafficking organizations with Central American criminal organizations specializing in the trans-shipment of drugs and in providing access to local markets to distribute and sell drugs.

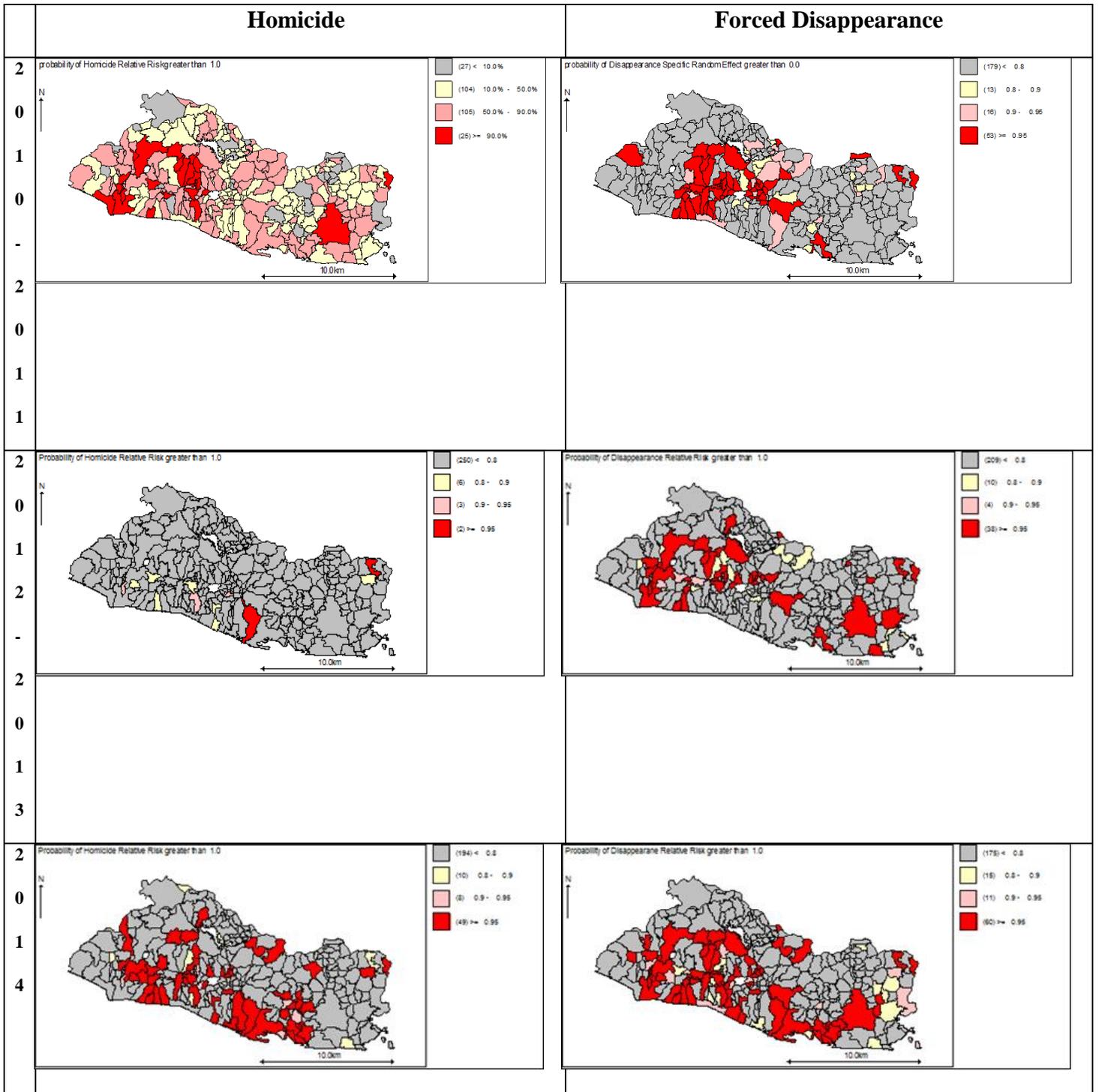


Figure 4: Posterior median relative risks for forced disappearance and homicide in El Salvador from the shared component model

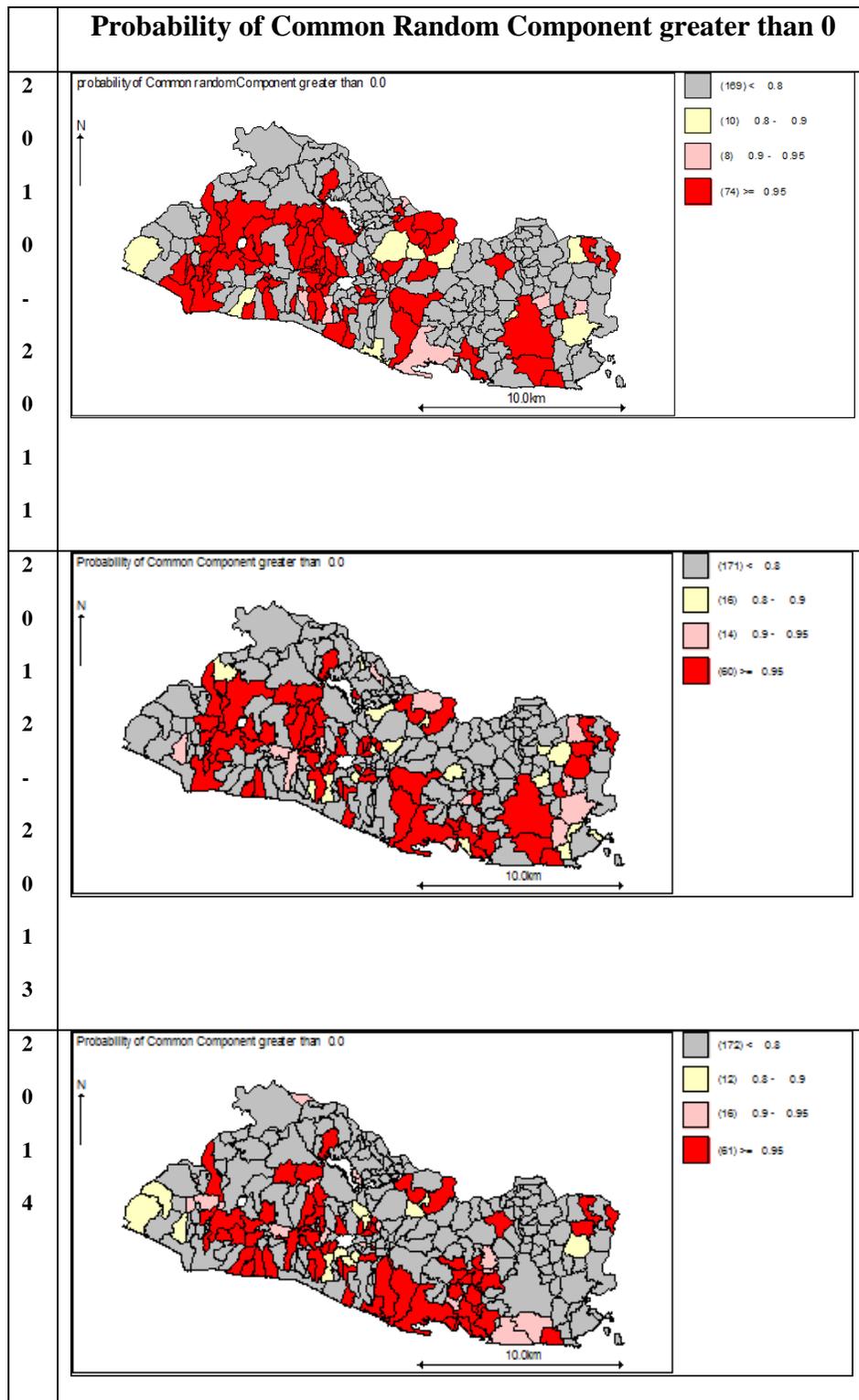


Figure 5: Shared relative risk

Conclusion

This research was to implement a Bayesian shared component model to jointly analyze disappearance and homicide trends across municipalities of El Salvador, one of the countries with the highest homicide rates worldwide. The results from this study suggest that Salvadoran gangs had been using disappearance as a resource to gain sustained social control among residents of already gang-dominated areas, that together with homicide, disappearance is part of a process of territorial expansion and strengthening by which these groups are enhancing their capabilities to interfere in the alliances of Mexican drug trafficking organizations with Central American criminal organizations specializing in the trans-shipment of drugs and in providing access to local markets to distribute and sell drugs. Moreover, the risk for disappearance has been large even before the truce was in place and that actually, it continues as such and going through a process of geographic expansion.

The main policy implication deriving from this research has to do with the need for the Salvadoran government to regain the territorial and social control of expanding portions of the country. Either the MS13 or the Barrio 18 or both Salvadoran gangs seem to be in the middle of a conflict around the control of drug transport and distribution routes that are managed by other criminal organizations allegedly linked to the Mexican drug trafficking groups and that most probably hold strong connections with locals.

Appendix: Methodological and technical issues

The data for this study consisted of the numbers of disappeared persons and homicides occurring at each of the 262 municipalities across the country over the five year period spanning from 2010 to 2014. Data on homicides were obtained from the Instituto de Medicina Legal (IML), and data on disappeared persons came from the Policía Nacional Civil (PNC). Official population projections obtained from the Dirección General de Estadística y Censos (DIGESTYC) were used in the computation of rates.

Let the i index designate a municipality, ($i = 1, 2, \dots, 262$), and the k index, a specific outcome, ($k = 1$ for *disappearance* and 2 for *homicide*). The number of incidents in municipality i for outcome k , Y_{ik} , follows a Poisson distribution with mean $E_{ik}\theta_{ik}$. In this expression, θ_{ik} is the unknown relative risk of person disappearance or homicide and E_{ik} is the expected number of disappeared persons or homicides in municipality i . Risks are estimated by (indirectly) standardized rates (SRs). In order to implement the Bayesian approach to the modeling of disappearance and homicide risk, a same Poisson distribution was assumed at the first level of hierarchy, given by

$$Y_{ik} | \theta_{ik} \sim \text{Poisson}(E_{ik}\theta_{ik}) \quad (1)$$

The use of SRs as estimates of relative risk assumes a constant rate over each local area and outcome. For rare events such as disappearances or homicides, the variation in the numbers of incidents exceeds that predicted by a Poisson process. Extra variation may arise either from common unobserved heterogeneity that may be dominated by gang activity, or from the spatial clustering of incidences, or both. Allowing area-specific risks to depend on a latent variable (a random effect), the variance of which reflects the degree of extra-Poisson

variation, is a standard approach to accommodate over-dispersion in counts in the epidemiological literature (Mollié, 2000; Lawson, 2013 and references therein).

At the second level of the hierarchy, the logarithms of the relative risks were defined as

$$\begin{aligned} \log(\theta_{i1}) &= \alpha_1 + \delta W_i + U_{i1}, & \text{for disappearance,} & \quad (2a) \\ & & & \text{and} \\ \log(\theta_{i2}) &= \alpha_2 + \frac{W_i}{\delta}, & \text{for homicide.} & \quad (2b) \end{aligned}$$

In these expressions, U_{1i} is a separate random component for disappearance, W_i represents the shared component, and α_1 and α_2 are specific intercepts for disappearance and homicide, respectively. Finally, δ is a scaling component for the contribution of the shared component to the overall relative risk that allows for differential risk gradients (on the log-scale) for each crime.

Prior distributions needed to be assigned to the parameters. The α parameters were assigned improper uniform priors on the whole real line. The choice of these priors expressed the absence of genuine prior expectations on the parameter values. A normal prior with zero mean and variance σ^2_δ was given to the logarithm of the scaling parameter (δ).

Conditionally autoregressive (CAR) priors (Besag, York & Mollié, 1991) were used for the spatially structured random effects (U_{1i}) and the common component random effect (W_i). Under the CAR specification and for a given municipality, the mean of U_{1i} and W_i depends upon the U_{1i} 's and W_i 's of its neighboring municipalities. More formally,

$$U_{1i}|U_{1j}, j \neq i, \tau_u \sim \text{Normal}(\bar{U}_{1i}, \sigma^2_{ui}), \quad (3)$$

and

$$W_i|W_j, j \neq i, \tau_W \sim \text{Normal}(\bar{W}_i, \sigma^2_{Wi}), \quad (4)$$

where, $\bar{U}_{1i} = \frac{1}{m_i} \sum_{j \neq i} \omega_{i,j} U_{1j}$, $\bar{W}_i = \frac{1}{m_i} \sum_{j \neq i} \omega_{i,j} W_j$, $\sigma^2_{ui} = \frac{\sigma_u^2}{m_i}$, and $\sigma^2_{Wi} = \frac{\sigma_W^2}{m_i}$, with $\omega_{i,j} = 1$ if the i -th and j -th municipalities were neighbors and m_i was the number of municipalities that were neighbors to the i -th municipality.

Variance parameters σ^2_u and σ^2_W control the variability of the random effects U_i and W_i conditional upon the random effects in the neighboring municipalities, respectively. At the next level of hierarchy, uniform hyper-priors (i.e. $U(0,10)$) were assigned to the variance parameters (σ^2_W, σ^2_u).

We fitted the model in (1) and (2) to data on disappearances and homicide for 3 separate time periods. The first of these periods, 2010-2011, preceded the gang truce; the second, 2012-2013, corresponded to the time when the truce was in place; and 2014, when the truce was over.

The model was fitted using WinBUGS (Lunn et al, 2000), a programming language based software implementing MCMC algorithms to generate random samples from posterior distributions. The WinBUGS code for the model in (1) and (2) is available on request from the first author. Two chains were run and convergence was achieved by 20,000 iterations. A further 20,000 samples were run for each chain to obtain the desired posteriors with Monte Carlo errors lower than 5% of the posterior standard deviation.

The general structure of the shared component model in (1) and (2) is discussed in Lawson (2013, p. 209). Earnest et al (2010), MacNab (2010) and Chamanpara et al (2015) are examples of recent applications in epidemiology. To the best of our knowledge and at the time of writing, the literature does not report on uses of this type of models in criminology.

From a criminological perspective, the shared common spatial component helps in understanding likely shifts in gang related violence to an increased use of the disappearance and further murder of individuals to either respond to police operations, or to adapt to new developments in drug markets or organized crime activities, or securing the control of territories, or all of the above.

Endnotes

^a The “Strong Hand” plan was implemented from 2003 during the government of right-wing president Francisco Flores and had as its main objective the breaking up of gangs. The plan contemplated joint actions by the national police (PNC) and the army.

^b The “Ultra Strong Hand” plan was launched in August 2004 by the newly elected right-wing government of Elías Antonio Saca. This plan was aimed at fighting the gangs, drug trafficking and money laundering.

^c In March 2012, the left-wing government of president Mauricio Funes both facilitated and sponsored a truce between the two major gangs (MS 13 and Barrio 18) aimed at reducing the numbers of murders in exchange for granting concessions to incarcerated gang leaders.

^d The left-wing government of Salvador Sánchez Cerén came to power in June 2014 and almost immediately distanced itself from the truce. From May 2015, the government has implemented an approach based on a frontal combat to gangs.

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