Visualization and Analysis of the Mexican Drug War

Valeria Espinosa and Joseph Kelly

ABSTRACT
In Mexico, the presidency of Felipe Calderón (2006-2012) has been characterized for the war against organized crime, raising many questions regarding security and violence. We attempt to visualize and analyze homicide rates at the municipality level, and link this to information obtained about the association of drug cartels to municipalities. The main question of interest is if homicide rates increase significantly after a military intervention. The data were obtained from many sources (INEGI, CIDAC, Stratfor, Nexos). Due to the observational nature of the study we explore the feasibility of causal inference. Some of the challenges are the violation of SUTVA (stable unit treatment value assumption), making ignorability feasible and the partial missingness of key variables. In particular, population information is only observed every 5 years and thus the yearly population of municipalities needs to be imputed.

CURRENT VISUALIZATION
As this is ongoing research snapshots of the current version of the interactive visualization are shown below. The map displays the distribution of cartels (according to Stratfor) encoded by color, and the intensity encodes homicide rates in a categorical scale. The yearly homicide rates are visually compared by the respective time series at four levels of aggregation: national, state, cartel association and municipality. In the first two images the plot on the top right shows the homicide rate time series of all municipalities associated to a cartel. In the last two images, when hovering over a municipality, the plot changes to display the information of the aggregations relevant to that municipality. The goal of the visualization is to encourage data exploration and to provide an engaging way for users to explore the results of the analysis.