The Local Educational and Regional Economic Foundations of Violence: A Spatial Analysis of Homicide across Mexico's Municipalities

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Wilson Center

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What are the origins of violence?

Why does violence occur in Latin America?

What are the spatial dimensions of homicide across Mexico's 2455 municipalities?

"local schools/regional economy" approach to violence reduction

Motivation: Why Study Violence?

- Direct harm to health/wellbeing
  - Leading cause of death in U.S. and around the world
  - Major public health concern (CDC 2013; WHO 2002)
- Costs to Democracy
  - Fear and insecurity erode public trust/confidence
  - Low public trust undermines legitimacy of democratic institutions
  - Persistent insecurity → support for authoritarianism (e.g., Central America)
- Costs to Development
  - Constrains business hours, movement of goods and people
  - Increases costs of doing business (Prillaman 2003)
  - 10.5% of GDP in Brazil, 12.3% in Mexico, and >20% of GDP in El Salvador and Colombia (IDB 1999)
  - Direct impact on wellbeing and restrictions on movement affect broader notions of development (health, inequality, education)

Preventable!

Yet … Policies Headed in "Wrong" Direction or Neglect Empirical Research

- Persistent or increasing emphasis on punitive, coercive public security models, even militarization
  - Brazil: state police still military model
  - Chile: main police force still military model (Dammert 2006)
  - Colombia: demilitarization recently turned to increasing militarization; little investment in everyday public safety/citizen security
  - El Salvador: shackled demilitarization followed by increasing militarization
  - Mexico: major militarization 2007-2012
    - 2008: prominent crimpro reform all but ignored prevention
    - 2013: major investment in prevention, but no empirical criteria

New Emphasis in Merida Initiative on "Resilient Communities"

- Implications:
  - What exactly does "resilient" mean?
  - Implicitly acknowledges strengthening reactive security institutions not enough
  - Need proactive, public health model of violence prevention
  - Implicit call for more research on root causes of violence
  - Lack of studies in Mexico
  - At a minimum, need to examine socio-economic sources – income, poverty, inequality, economic activity, education – that presumably build this resilience

Research Questions

1. What does variation in violence look like in Mexico?
2. Do socio-economic factors explain variation in violence?
3. What are spatial processes underlying variation?

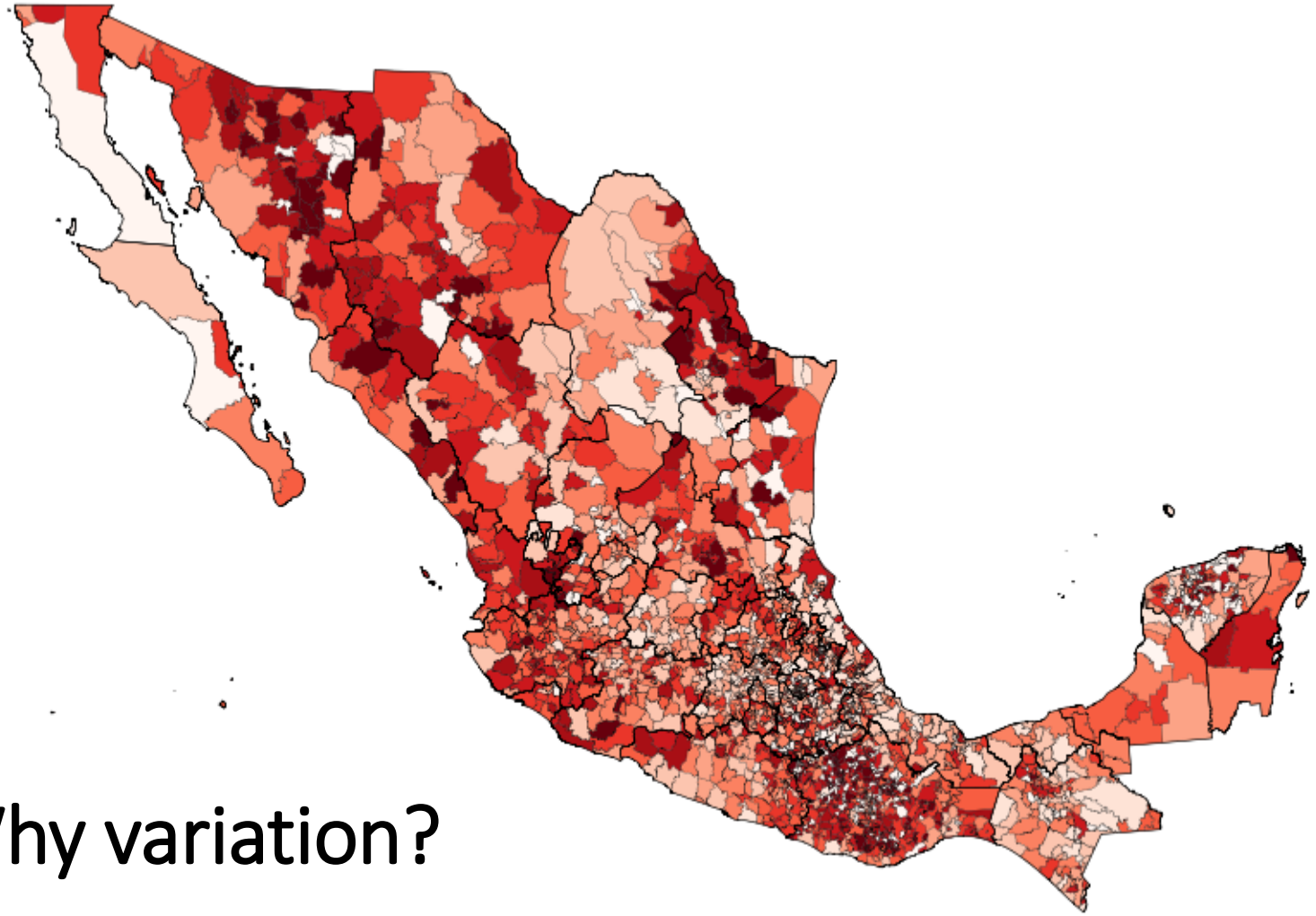
Comparative Measure of Violence

Homicide Rate (usually per 100,000 people; here, per 1,000 at municipal level in Mexico)

Not perfect, but several strengths:

- Available for almost all countries
- Available at subnational level for many countries
- Available longitudinally (over time)
- Other types of crime and violence track trend in homicide rates (Bailey and Dammert 2006; Mainwaring and Scully 2010)
- Also tends to track drug violence in Mexico (Molzahn, Rios and Shirk 2012, 12-13)

Mexico
2455 municipalities (2010, deciles)



Why variation?

Potential Answers

Drawing on various literatures:

Sociology/Criminology

Political Science

Conflict Studies

Spatial processes

Emphasize socio-economic factors while controlling for others

Emphasize spatial dimensions of violence:

* identification of spatial regimes
* model spatial processes

That is, controlling for other predictors of violence – locally and globally – what is causal role of space?

Conventional Arguments

Sociology/Criminology

Three core arguments (Land; Deane; Messner; Baller):

(1) Population pressures (total population; population density)

(2) Resource deprivation (income; inequality)

(3) Family disruption (divorce rates)

Also:

(4) Education (mean years)

(5) Unemployment (economic inactivity)

(6) Age structure (median age)

Political Science

(1) Competitiveness/alternation in power disrupts criminal networks

(2) Social capital: participation dampens criminal activity

Conflict Studies

(1) Relative deprivation (captured by spatial dynamics)

(2) Greed/opportunity vs. grievance (income; inequality)

(3) Uneven terrain (altitude s.d.)

Theory 2: What is Causal Role of Space?

Focus on spatial processes influencing violence

Methodological Reasons

- Dependent structure of data

Theoretical Reasons

- Many of our theories – implicitly or explicitly – contain spatial processes (e.g., diffusion or demonstration effects)

Methodological Reasons: Spatial Dependence of Observations

Units of analysis are connected to each other

Connectedness = Interdependence

Phenomena of interest exhibit this interdependence (implicitly or explicitly)

Need to theorize this interdependence (many of our theories already do, often implicitly)

Need methods to study this interdependence

Theoretical Reasons

Spatial Regimes

Null hypothesis is that homicide is spatially random

If not random, what are spatial processes shaping homicide?

Three main processes underlie spatial analysis (Manski 1993)

(1) Correlated relationship
- Unmeasured variable can affect DV across a group of units
- "common exposure" (Franzese 2008)

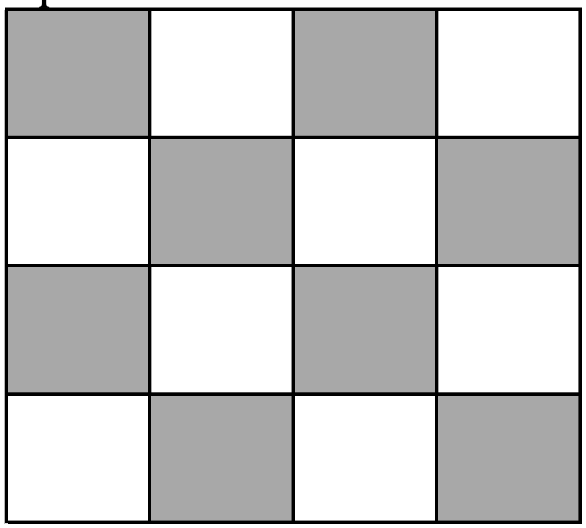
(2) Endogenous interaction relationship
- DV in unit 1 can be affected by DV in other units
- Spillover, diffusion, contagion, transfer effects

(3) Exogenous interaction relationship
(1) Common to geographers, but almost entirely unexplored in social sciences
(2) DV in unit 1 can be affected by IVs in other units

Spatial Relationships

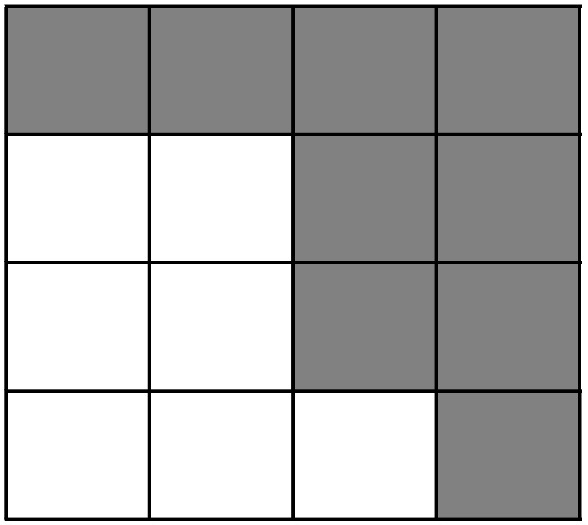
Random

spatial randomness

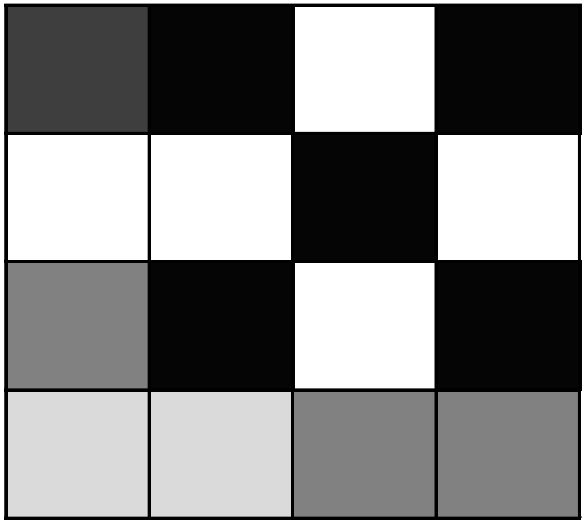


Non-Random

similar values cluster

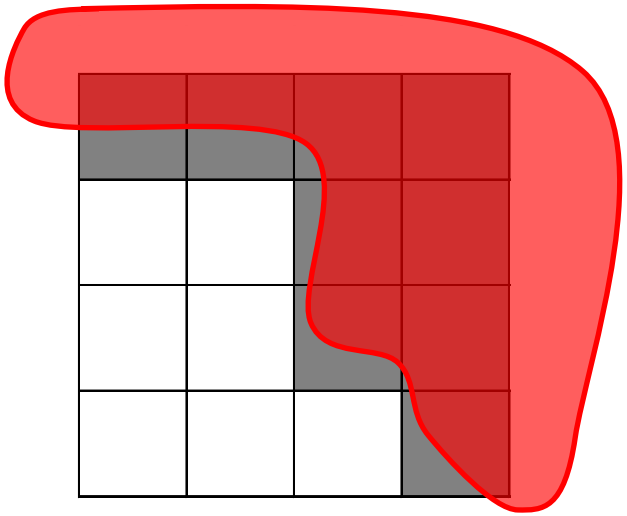


dissimilar values cluster

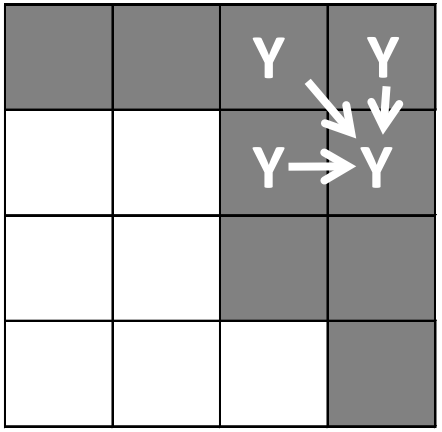


3 Spatial Processes

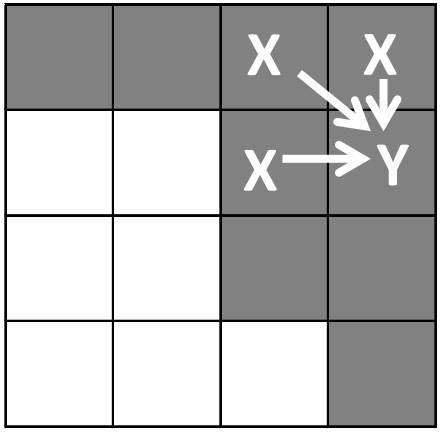
Correlated Relationship
(unmeasured common factor)



Endogenous Interaction
(Y of neighbors affect Y at home)

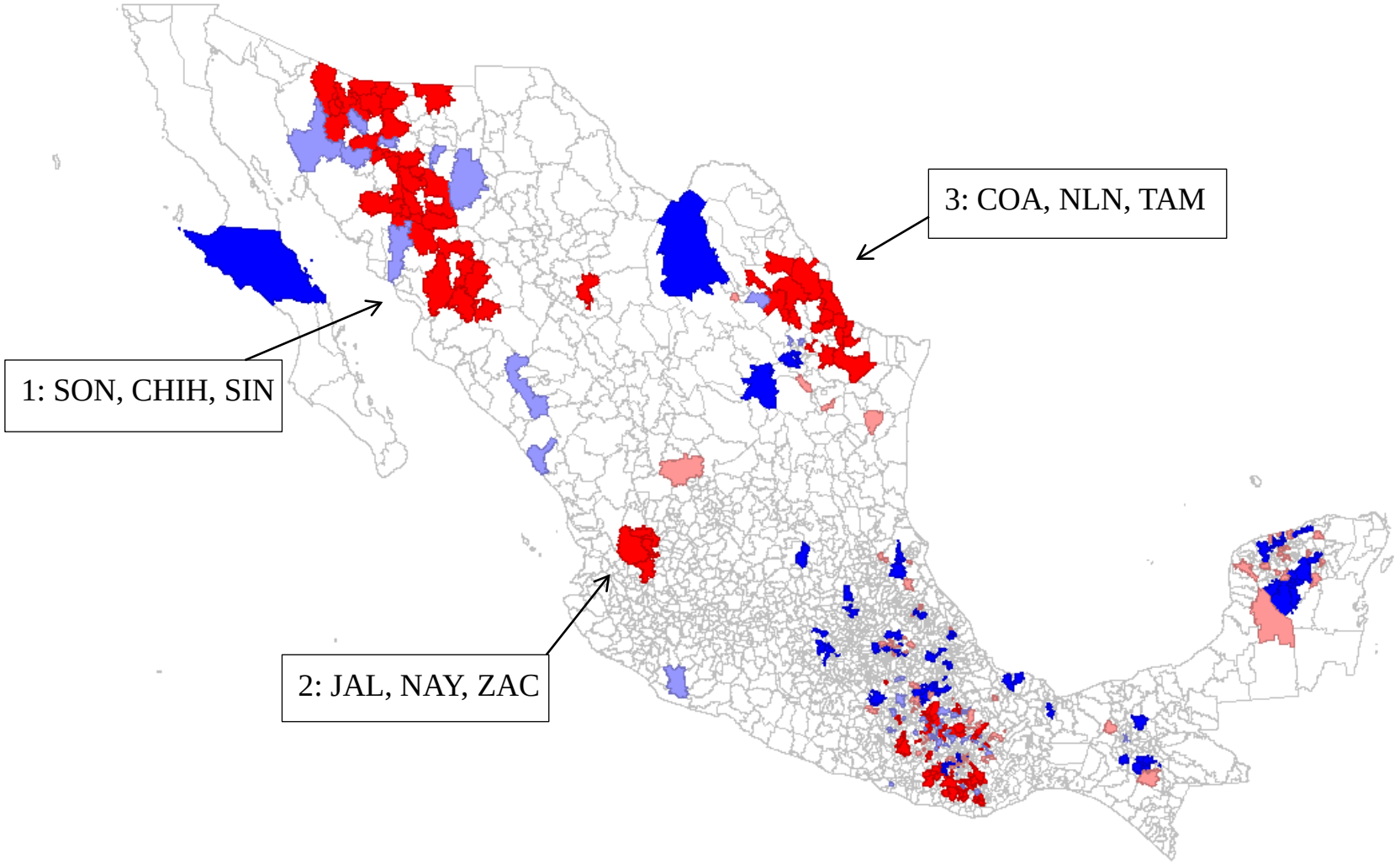


Exogenous Interaction
(Xs of neighbor affect Y at home)



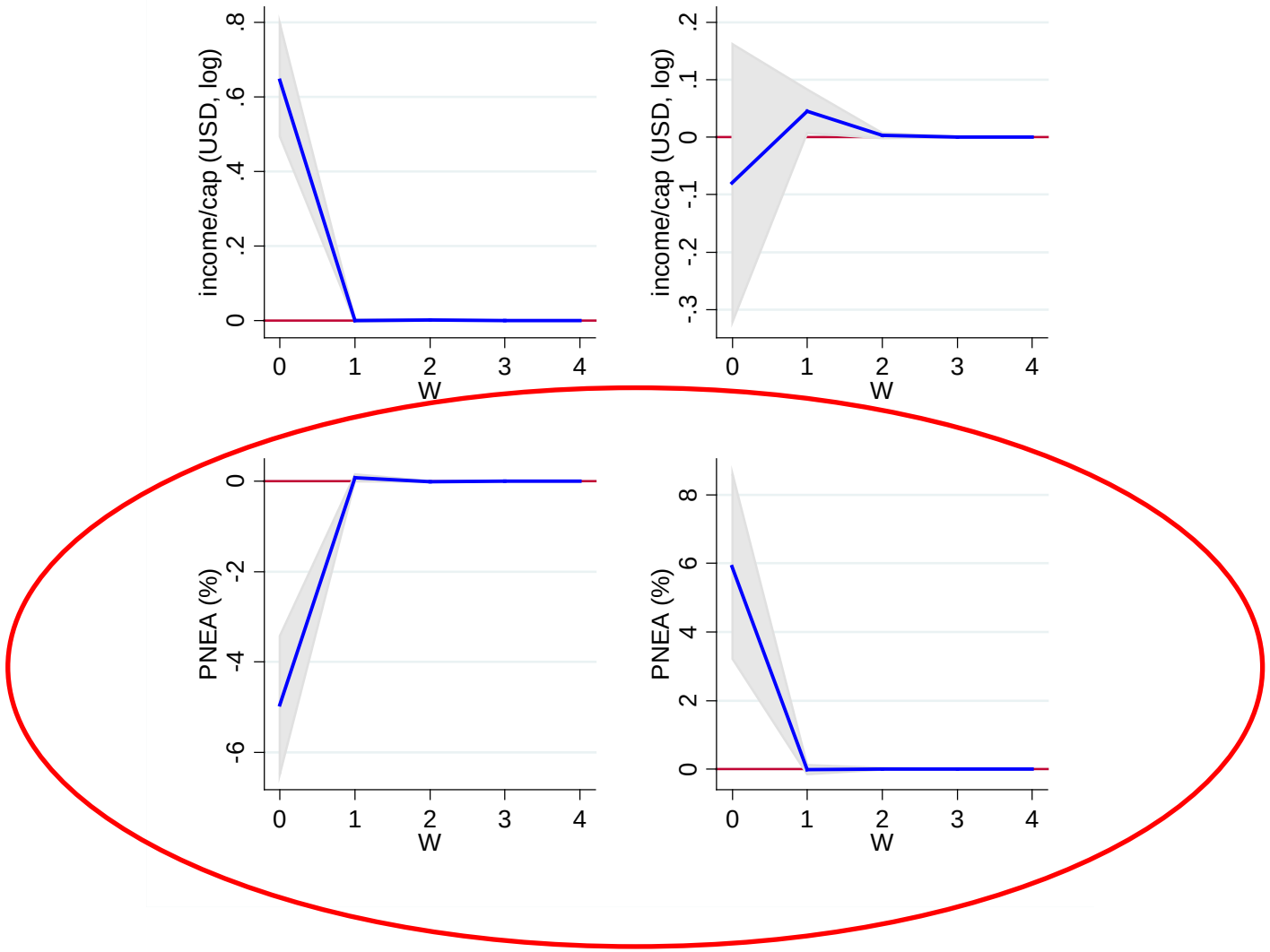
Results 1:
Exploratory Spatial Analysis

Homicide clusters
(3 straddle borders of 3 states)

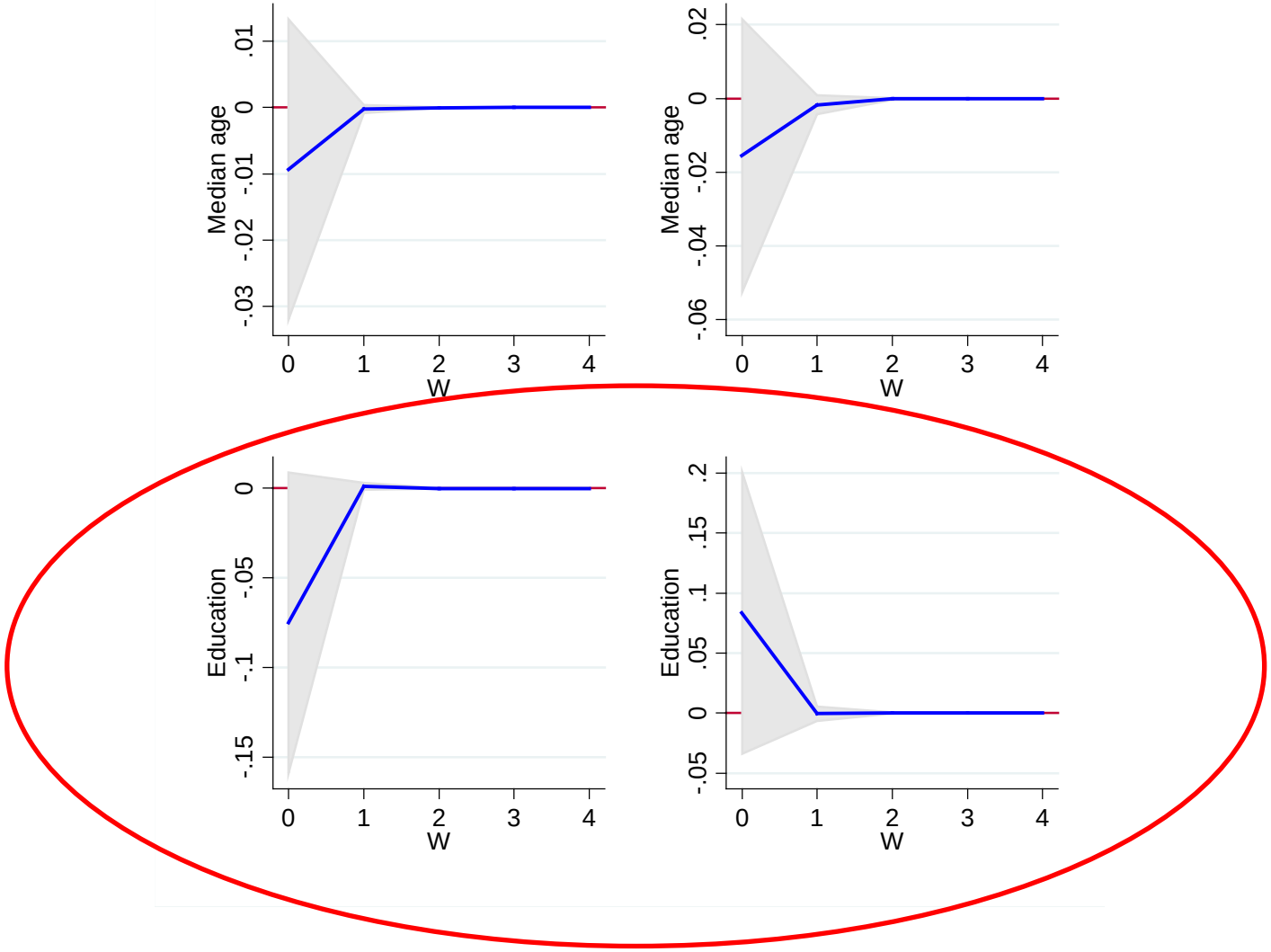


Results 2:
Spatial Regressions

Partitioned Effects: Income and Economic Inactivity (PNEA)



Partitioned Effects: Age and Education



Conclusions

Spatial regimes: homicide is not spatially random across Mexico

Lag effect: homicide rates in one unit affects homicide in other units

* econometrics do not identify mechanism

Local effect of education: educational attainment reduces homicide, but only locally

Social relativity process of PNEA: economic inactivity in neighboring units increases risk of homicide in focal unit

Uneven terrain raises risk of homicide, as both direct effect and second-order indirect effect

Policy Implications

Taken together, education and PNEA findings suggest a **"local schools/regional economy"** approach to violence prevention, i.e., to building "resilient communities"

In any case, a regional approach is also in order given:

- cross-jurisdictional spatial regimes
- lag effect of homicide itself

Governments and aid agencies should emphasize policies that:

(1) identify regions of municipalities that are connected in relevant ways, even if straddling state boundaries

(2) emphasize economic activity within these regions

(3) emphasize education, which can be targeted locally