

Violence and Child Health Outcomes: Evidence from Mexican Drug War

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Motivation

- Early life shocks and later life wellbeing (Strauss and Thomas 2008)
- Recent work extends this literature to include conflict shocks
 - Adverse effects on health and education (Akresh et al. 2012)
- Covers large-scale violence (wars and genocides)
- Lack of studies for areas with organized crimes
 - birth weight (Brown 2015)
 - countries in West Africa and Latin America
 - criminal violence: Persistent but low intensity
 - motivations, goals, potential targets are different
 - effects could also be different

Research Questions

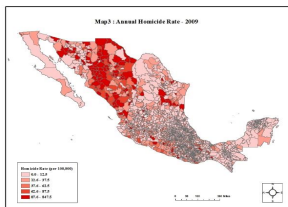
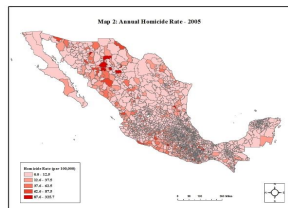
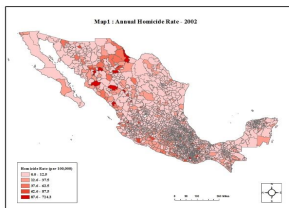
- Do high levels of criminal violence have comparable effects to large-scale violence on the following dimensions of children's human capital?
 - Stature
 - Cognitive ability
 - Socio-emotional behavior
 - Chronic illnesses
- Do the effects of criminal violence on these diverse outcomes differ by exposure timing across
 - In-utero (and trimesters)
 - Childhood

Violence in Mexico

- Stable and declining homicide rate before 2007
- President Calderon and Drug Trafficking Organizations
- Exogenous surge in criminal violence
- Annual homicides tripled during 2007-10



Spatial-Temporal Variation 2002-09



Empirical Strategy

- Using sibling fixed effect, the identification strategy rely on time varying exposure to violence to estimate the effect on child development outcomes

$$CDO_{ijtmk} = \alpha + \phi_1 hom_{trim1_{kt}} + \phi_2 hom_{trim2_{kt}} + \phi_3 hom_{trim3_{kt}} + \phi_4 hom_{childhood_{kt}} + \xi_m + FE_s + \beta X_{itm} + v_{ijtmk}$$

- Potential Concerns
 - Exogenous surge in violence: pre-escalation trends in municipality characteristics and violence (Brown 2014)
 - Violence and behavioral responses
 - 1 Fertility? No
 - 2 Migration? Yes: use intent-to-treat approach

- Mexican Family Life Survey (MxFLS): 3 Waves 2002, 2005-06, 2009-12
- Children age 1-9 years: varies based on outcome
- **Child health outcomes:**
 - Stature (stunting): height-for-age Z-score (HAZ)
 - Cognitive ability: Raven test scores (standardized for age)
 - Socio-emotional behavior: “interaction behavior” and “sleeping behavior”
 - Chronic illnesses: asthma, obesity, or hearing problem
- Monthly homicide rate (per 100,000) at municipality level (Mexican Institute for Statistics and Geography)

Table: Effect of Violence on HAZ

Homicide Rate	(1)	(2)
Trimester 1	-0.011*	-0.015*
	[-0.006]	[-0.009]
Trimester 2	-0.002	-0.002
	[-0.004]	[-0.006]
Trimester 3	0.002	-0.016**
	[-0.004]	[-0.007]
Childhood	0.0003	-0.003
	[-0.0015]	[-0.002]
Sibling FE	No	Yes
Municipality FE	Yes	Yes
Month, Year, State FE	Yes	Yes
Observations	2147	893
Effect (SD)	-0.03	-0.08

Note: Significance: **p < 0.05, *p < 0.1 The homicide rates are per 100,000. S. Errors clustered at municipality level.

Results

- Smaller effects in comparison to large scale conflicts
 - Health infrastructure in place
 - Ability to cope with shocks *ex post*
 - Feel less threatened compared to wars
- No effect in first years of childhood
- Effect heterogeneity
 - 0.13 SD for families with lower socio-economic status
 - No heterogeneity: mother's education and rural/urban region

Table: Effect of Violence on Cognitive Development

Homicide Rate	(1)	(2)
Trimester 1	-0.01 [-0.007]	-0.020** [-0.010]
Trimester 2	-0.011 [-0.007]	-0.037** [-0.015]
Trimester 3	-0.009 [-0.005]	0.027* [-0.014]
Childhood	0.0005 [-0.002]	0.001 [-0.010]
Sibling FE	No	Yes
Municipality FE	Yes	Yes
Month, Year, State FE	Yes	Yes
Observations	1175	270
Effect (SD)		-0.08

Note: Significance: **p < 0.05, *p < 0.1 The homicide rates are per 100,000. S. Errors clustered at municipality

Results

- Cognitive Ability: Positive effect in third trimester
 - Consistent with medical evidence (Matthews *et al.* 2004)
 - High cortisol at latter half of pregnancy
- Robustness Checks
 - Results not driven by sibling sample
 - Cognitive effect independent of HAZ
- No effect **on chronic illness and socio-emotional behavior**
- Falsification Tests
 - Results not driven by pre-existing trends in violence

Channels

- Adverse effect from prenatal exposure
- No effect from exposure during childhood
- Potential channels
 - Prenatal health care
 - Provision of health services
 - Maternal depression during pregnancy
 - Parental quality
 - Nutritional deprivation
 - Mother's own health behavior

Table: Impact of Violence on Prenatal Care Use

Homicide Rate	All		Low SES Families	
	No. of Visits (1)	Initiation (2)	No. of Visits (3)	Initiation (4)
Trimester 1	-0.003 [-0.028]	-0.001 [-0.003]	-0.058 [-0.039]	-0.007 [-0.005]
Trimester 2	-0.052** [-0.024]	-0.008*** [-0.002]	-0.135*** [-0.025]	-0.015*** [-0.004]
Trimester 3	-0.038 [-0.032]	-0.004 [-0.004]	-0.019 [-0.059]	-0.003 [-0.007]
Sibling FE	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes
Month, Year, State FE	Yes	Yes	Yes	Yes
Observations	861	861	466	466
Mean of dependent variable	3.65	47.00%	3.62	48.00%
Effect (SD)	-0.13	-2.00%	-0.34	-3.75%

Note: Significance: ***p < 0.01, **p < 0.05 The homicide rates are per 100,000 people. Standard errors clustered at municipality level.

Table: Impact on Supply of Health Service in Community

Homicide Rate	Presence of Health Centers (Yes/No)	Number of Health Centers	Number of Service Days (per week)
	(1)	(2)	(3)
01-12 Months	0.0001	-0.025	0.0005
Before Interview	[-0.002]	[-0.026]	[-0.020]
Community FE	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes
Observations	285	285	285
Mean of Dep Variable	72.60%	2.00	3.90

Note: The homicide rates are per 100,000 people. Standard errors clustered at municipality level.

Table: Maternal Depression and Parental Quality

	Mothers' Mental Stree (Yes/No)	Time Spent with Children (hours per week)
Homicide Rate	(1)	(2)
01-12 Months Before Interview	0.0032** [-0.0016]	0.245* [0.134]
Individual FE	Yes	Yes
Municipality FE	Yes	Yes
MOI and YOI FE	Yes	Yes
Observations	800	450
Mean of Dep Variable	12.80%	38.7
Effect	3.20%	2.45

Note: Significance: **p < 0.05, *p < 0.1 The homicide rates are per 100,000 people. Standard errors clustered at municipality level.

Channels

- Parental quality may compensate for adverse effects
- No effect on mothers' health behavior (smoking and exercise)
- Household consumption and mothers' employment: negative but insignificant
- Household consumption: data based on recall

Concluding Remarks

- Literature focuses on large scale conflicts
- Effects of criminal violence
 - Qualitatively similar but smaller in magnitude
 - Vary across domains of human capital
 - Timing of exposure is crucial
- Channels: prenatal care use and maternal depression
- Likely reduction of 2.2% (HAZ) and 1.6% (cognitive ability) in wages
- Long-term wellbeing of much wider population is at risk

Thank you!
Questions/comments/suggestions