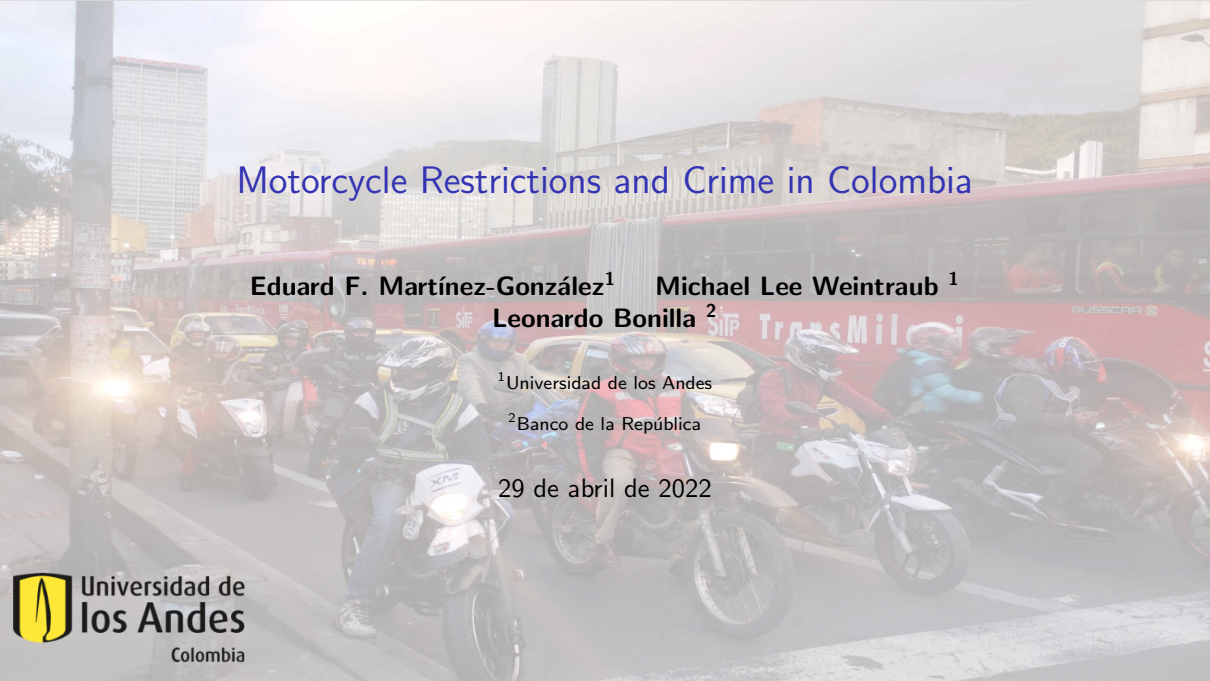

Motorcycle Restrictions and Crime in Colombia

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29 de abril de 2022

Universidad de los Andes
Colombia

Motivation

EL TIEMPO

JUEVES, 28 ABR. 2022

Archivo

Ocho capitales ya prohíben el parrillero en moto para combatir delitos

Sicariato, fleteo y hurto a personas, las modalidades delictivas con más casos.

Por: JUSTICIA
22 de septiembre 2016 , 08:39 p. m.

Los temidos fleteros –que en menos de una semana asesinaron a dos personas en Bogotá por robarles 18 millones de pesos que habían retirado en efectivo de sucursales bancarias– son la expresión más siniestra del crimen que se mueve en motocicleta por las calles del país.

Pero no son la única. En el robo de celulares y

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NEWS

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Ethiopian capital bans motorbikes to curb crime

9 July 2019

GETTY IMAGES

Food delivery firms have been affected by the ban

A ban on motorbikes has come into force in the Ethiopian capital, Addis Ababa, aimed at curbing crime.

The city's mayor said criminals riding motorbikes often robbed people.

Takele Uma said businesses would be exempt, but delivery companies say they have been affected - with their bikes seized by the authorities.

Motorbikes have become increasingly popular in Addis Ababa as a way of avoiding traffic jams, but are not as common as in many other African cities.

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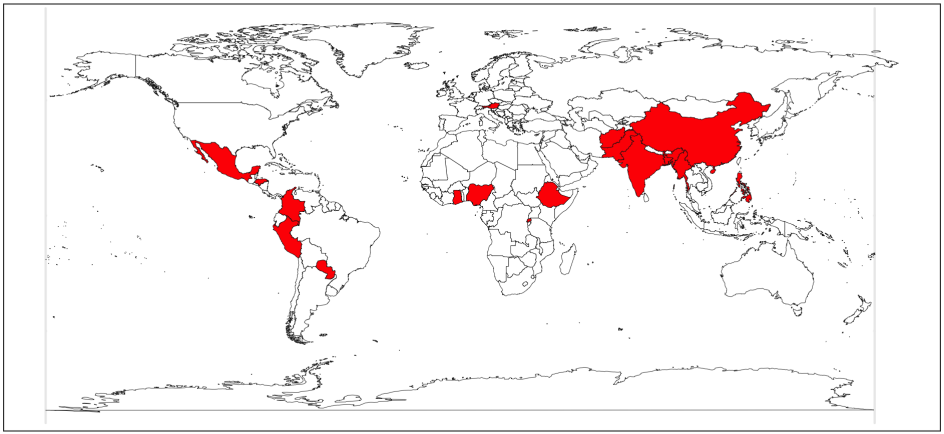
Motivation

Figura 1: Countries with motorcycle bans



Motivation

In many low and middle-income countries:

- Motorcycles are the most commonly used means of transportation, accounting for up to 85 % of the total motorized vehicle fleet (Holgate et al. 2017).
- Motorcycles represent the fastest growing means of transport (Programme 2022): between 1993 and 2014, the number of motorcycles in these countries increased six-fold (PAHO and WHO 2018).
- Many times motorcycles can to supply a deficiency of public formal transport (Estupiñan et al. 2018).

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Little is known...

- Despite the popularity of motorcycle bans and the high costs that they generate for motorcycle users, there exists no evidence regarding these policies' effectiveness in reducing crime.

In this paper

What is the causal effect of motorcycle restrictions on crime?

- We evaluate the potential crime-reduction effects of six separate motorcycle bans, implemented over a number of years in different cities in Colombia.
- We use a differences-in-differences identification strategy, leveraging temporal and/or spatial variation as to where and when motorcycle restrictions have been implemented.

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What do we find?:

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How much we know?:

- To the best of our knowledge, this is the first study that estimate causal effect of motorcycle restrictions on crime.
- This paper contributes to the literature on the effectiveness of public policies to reduce crime (Carr and Doleac 2018; Carpenter 2007; Marvell 2001).

Roadmap

Motorcycle restrictions in Colombia: Background

Data and empirical strategy

Results

Robustness checks

Discussion

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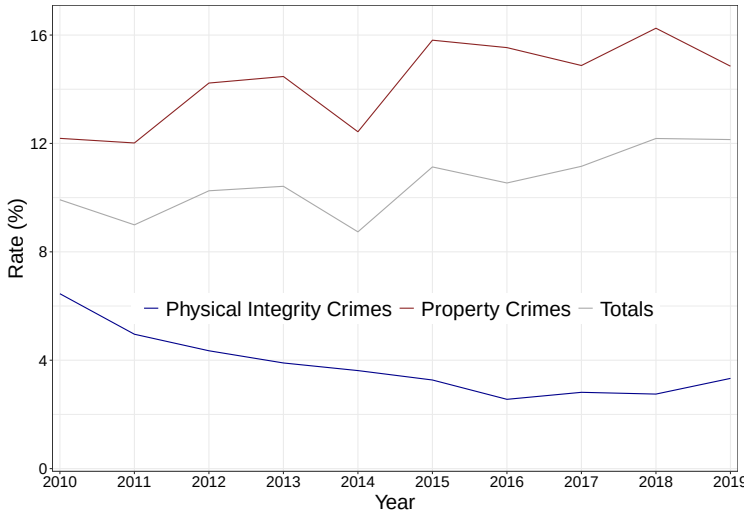
Background

Figura 2: Crimes committed using a motorcycle in Colombia, 2010-2019



Universidad de los Andes Colombia

Motorcycle restrictions in Colombia

Ban on male passengers:

- At least 19 Colombian cities have implemented at some point in time.
- We examine two cities, Barranquilla and Bogotá.

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Ban on passengers of either sex:

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Total ban on motorcycles:

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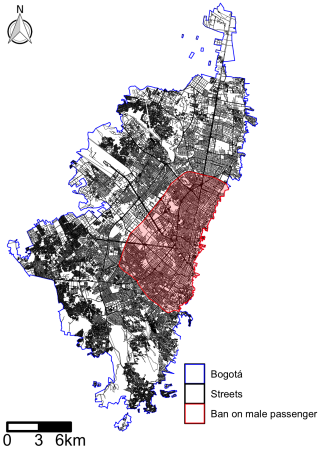
All cities in this study implemented their restrictions by zones or hours of the day.

Motorcycle restrictions in Colombia

Figura 3: Ban on male passenger in Bogotá



Notes: Constructed by authors based on Decree 068 of 2018, Bogotá.

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Data

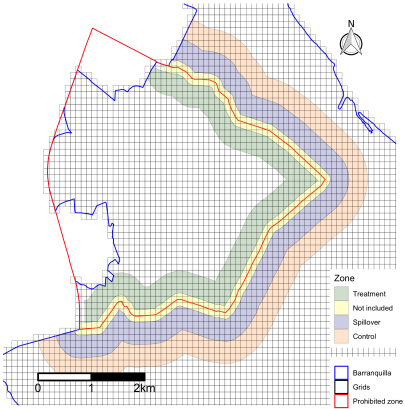
System on Statistics, Crime, Contraventions, and Operational Information:

- Property crimes include theft from individuals, car theft, and theft from homes and businesses.
- Crimes against bodily integrity include homicide, assault, and personal injury.
- The data providing the precise coordinates of the crime (latitude and longitude).
- Additionally, the police register the date and time, the weapon used (if any) and some basic information about the victim.

In order to standardize this information, we create a grid composed of cells of 50 meters by 50 meters and calculate the number of crimes that occur in each cell, by month, disaggregated by type of crime.

Identification strategy

Figura 4: Treatment, spillover, and control cells (Barranquilla)



Notes: Constructed by authors based on Decree 0176 of 2017, Barranquilla.

Main specification

$$y_{it} = \psi_1 Treat_i \times Post_t + \psi_2 Spillover_i \times Post_t + \lambda_i + \tau_t + \varepsilon_{it}$$

Where:

- y_{it} is the number of crimes committed in cell i during month t.
- $Treat_i$ takes a value of 1 if the cell is in the restriction zone and a value of 0 otherwise.
- $Spillover_i$ takes a value of 1 if the cell is in the Spillover zone and 0 otherwise.
- $Post_t$ is equal to 1 for months after the implementation of the restriction and 0 for months prior.
- All regressions include fixed effects by cell (λ_i) and month (τ_t) and standard errors are clustered at the cell level.

Our principal specification uses a window of six months around the date on which the policy entered into force, with data disaggregated by month.

Roadmap

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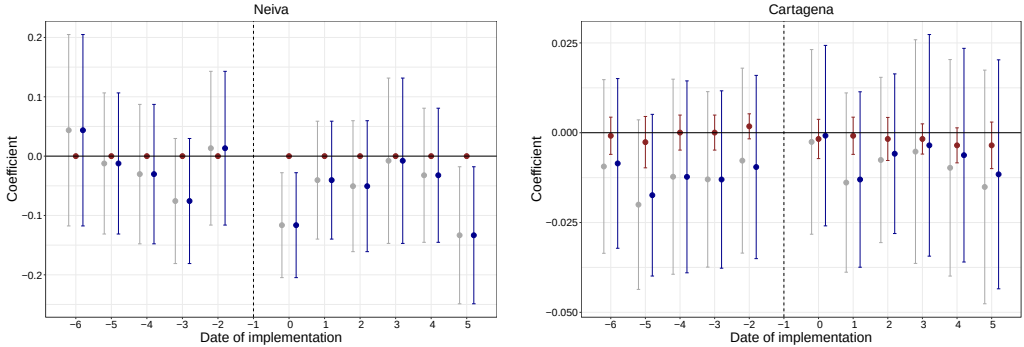
Cuadro 1: Effect of motorcycle restrictions on crime

	Ban male passengers		**Ban passenger either sex**		**Total ban motorcycles**	
	Barranquilla (1)	Bogotá (2)	Cartagena (3)	Neiva (4)	Soledad (5)	Barranquilla (6)
			A. Property crime			
Treated*Post	-0.0076**	-0.0006	0.0036	-0.0348***	-0.0016	0.1067
	(0.0032)	(0.0011)	(0.0053)	(0.0117)	(0.0030)	(0.0993)
Spillover*Post	0.0062**	-0.0004	-0.1208	0.0019	0.0004	0.0007
	(0.0029)	(0.0012)	(0.1183)	(0.0062)	(0.0030)	(0.0030)
			B. Physical integrity crimes			
Treated*Post	-0.0003	0.0001	-0.0019*	0.0000	-0.0024*	0.0325
	(0.0014)	(0.0003)	(0.0010)	(.)	(0.0015)	(0.0305)
Spillover*Post	-0.0009	-0.0001	-0.0009	0.0002	-0.0009	-0.0013
	(0.0014)	(0.0004)	(0.0013)	(0.0002)	(0.0014)	(0.0013)
N	44,388	106,458	30,408	24,288	72,000	32,496
Month window	6	6	6	6	6	6
Fixed effects pixel	✓	✓	✓	✓	✓	✓
Fixed effects month	✓	✓	✓	✓	✓	✓

Notes: $***$ Significant at 1 % , $**$ Significant at 5 % , and $*$ significant at 10 % . Each pixel is 50 meters by 50 meters. a bandwidth of 100 meters on each side of the border between the area in which the measure was in force and the area was not. The treatment, spillover, and control bands are each 300 meters wide.

Dynamic effect

Figura 5: **All passengers**



Notes: Point estimates and 95 % confidence intervals for total crimes are shown in grey. Estimations for property crimes against persons are shown in blue and red, respectively. Estimates for pixels of 50 meters by 50 meters, fixed effects by pixel. A band of 100 meters around the limit of the area where the policy was implemented is excluded.

Cuadro 2: **Time-based motorcycle restrictions**

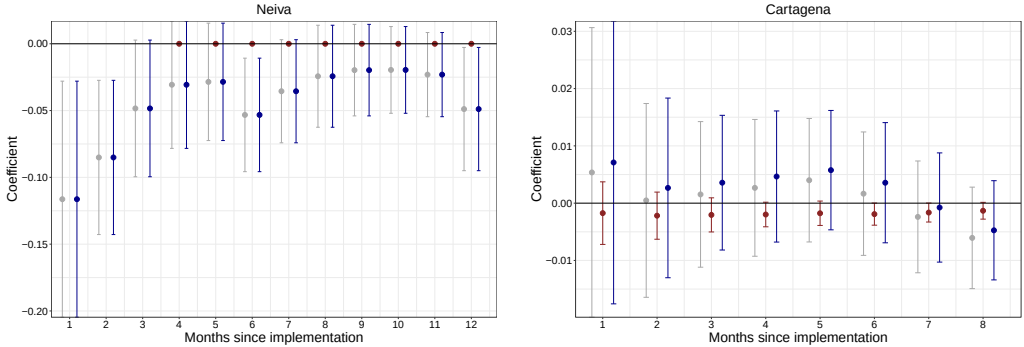
	Neiva			Soledad		
	Totales (1)	Propiedad (2)	C. la vida (3)	Totales (4)	Propiedad (5)	C. la vida (6)
Treated*Post	-0.0164	-0.0164	-0.0000	-0.0057	-0.0034	-0.0023
	(0.0101)	(0.0101)	(0.0000)	(0.0068)	(0.0055)	(0.0025)
Spillover*Post	-0.0093	-0.0093	-0.0000	-0.0026	-0.0002	-0.0024
	(0.0077)	(0.0077)	(0.0000)	(0.0068)	(0.0054)	(0.0025)
Treated*Post*Hour	-0.0368	-0.0368	0.0000	0.0032	0.0034	-0.0002
	(0.0243)	(0.0243)	(0.0000)	(0.0064)	(0.0051)	(0.0030)
Spillover*Post*Hour	0.0229*	0.0224*	0.0004	0.0041	0.0010	0.0031
	(0.0129)	(0.0129)	(0.0000)	(0.0061)	(0.0049)	(0.0024)
Observaciones	24,288	24,288	24,288	72,000	72,000	72,000
Meses	6	6	6	6	6	6
E.F. Pixel	✓	✓	✓	✓	✓	✓
E.F. Mes	✓	✓	✓	✓	✓	✓
Treated*Post + Hour	0.0140	0.0140	.	0.2353	0.9234	0.1249
Spillover*Post + Hour	0.1768	0.1912	.	0.2333	0.2755	0.2852

Notes: $***$ Significant at 1 % , $**$ Significant at 5 % , and $*$ significant at 10 % . Each pixel is 50 meters by 50 meters. a bandwidth of 100 meters on each side of the border between the area in which the measure was in force and the area was not. The treatment, spillover, and control bands are each 300 meters wide. The last two lines of the table show p-va sum of the coefficients of Treated*Post + Treated*Post*Hour, and Spillover*Post + Spillover*Post*Hour, respectively.

Roadmap

Sensitivity to different temporal windows

Figura 6: **All passengers**



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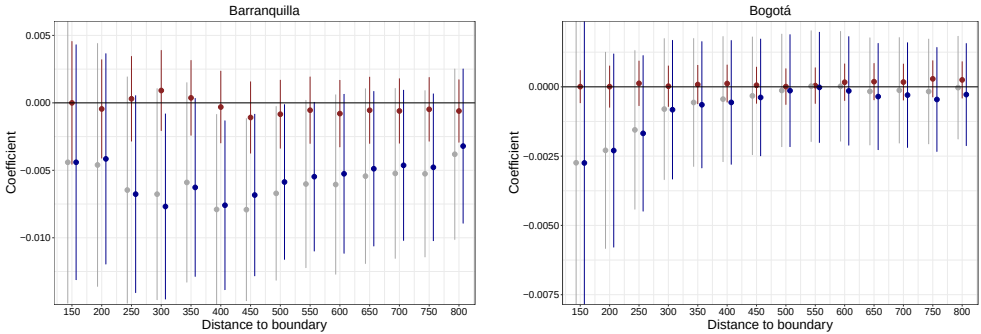
Sensitivity to Different Bandwidths

Figura 7: **Male passenger**



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Roadmap

Discussion

- In general, motorcycle restrictions do not substantially reduce crime in Colombia.
- Of the 6 restrictions that we examine, only three have negative and significant effects. Even in these cases, the estimated effects do not persist over time or are not robust to different specifications.
- We also observe signs of spatial displacement in some cases where we find statistically significant crime reduction effects, suggesting that that these restrictions did not reduce aggregate crime.
- Motorcycle restrictions doing that citizens to seek alternate forms of transportation (which may include more lengthy commute times).
- Also imposing on the police unnecessary responsibilities for monitoring compliance, time that could be better spent on other crime prevention activities (Carrillo et al. 2018).

Thank You!