

# The Effect of Indoor Prostitution on Sex Crime

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# Research Question

- ▶ Indoor prostitution constitutes roughly the 85% of all US sex work activity (Urban Justice Center (2005) )
- ▶ Does the availability of indoor prostitution companies affect the number of rapes?
- ▶ This question has strong social policy implications to motivate whether prostitution should be legalized or not.

# Potential effects of Paid Sex on Rapes

- ▶ Note that there are **two possible effects** and several explanations to justify each of them:
  1. **Positive:** E.g. possibly opening strip clubs reinforce a sexist view in the neighborhood, women are seen as objects and there are more rapes. (Complementary)
  2. **Negative:** E.g. since the price of paid sex is lower than the *price of rape*, the availability of paid sex might decrease the number of rapes in a certain neighborhood. (Substitutive)

## Contribution to the literature

- ▶ This paper provides one of the first empirical evidences of the causal effect of indoor prostitution on rape. Further it also provides the first empirical evidence to support the mechanism behind this effect.
- ▶ In Economics:
  - ▶ high-speed internet increases sex crimes. (Bhuller et al. (2013)).
  - ▶ In the same years of this paper: Cunningham and Shah (2014) and Biscchop et al. (2015)

- ▶ We construct a daily panel database for NYC from January 2004 to June 2012 . Dividing the city in 77 precincts and analyzing their evolution.
- ▶ For this paper we need:
  1. Data about the # of rapes.
  2. Data about openings of indoor prostitution businesses = strip clubs and escort services.

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- ▶ For this paper we need:
  1. Data about the # of rapes.
    - ▶ *Stop and Frisk data-set* of NYPD: provides information about each *stop and frisk* encounter in the city: classification of the crime, exact hour and geographical position.
  2. Data about openings of indoor prostitution businesses = strip clubs and escort services.

# Data-set

- ▶ We construct a daily panel database for NYC from January 2004 to June 2012 . Dividing the city in 77 precincts and analyzing their evolution.
- ▶ For this paper we need:
  1. Data about the # of rapes.
  2. Data about openings of indoor prostitution businesses = strip clubs and escort services.
    - ▶ *Reference USA* provide data about all the businesses in the US.
    - ▶ We have data about all these establishments in NYC.
    - ▶ We matched every establishment with its opening (and sometimes, closing) date reported on web-pages like yellowpages, superpages, or the Department of the State of NY businesses' database.

▶ Descriptive Statistics

# Identification Strategy

- ▶ Day-Precinct level specification:

$$\log \text{Sex Crime}_{pt} = \beta \text{Indoor Prost.}_{pt} + \Gamma X_{pt} + \varepsilon_{pt}$$

- ▶ We exploit the quasi natural experiment generated by timing in openings of indoor prostitution businesses. Opening dates are exogenous in a model for daily crime. ▶ Day of Openings
- ▶ Of course there could be precincts more prone to have these businesses but for us it is important that the timing of their opening do not correlate with any unignorable characteristic affecting *Sex Crime*



# Identification Strategy

- ▶ Day-Precinct level specification:

$$\log Sex\ Crime_{pt} = \beta Indoor\ Prost._{pt} + \Gamma X_{pt} + \varepsilon_{pt}$$

- ▶ Two great features:
- ▶ **Flexible specification:** Besides the classical year and month fixed effects, our daily specification allows us to include **day-of-the-week, day-of-the-year and holidays fixed effects to capture deeper variation due to timing factors**
- ▶ **Easy comparability of groups:** Note that comparability of our treatment and control groups boils down to **comparability of police precincts inside NYC.**

# Results

VARIABLES	(1) log(Sex Crime+1)	(2) log(Sex Crime+1)	(3) log(Sex Crime+1)	(4) log(Sex Crime+1)
Indoor Prost.	-0.00215** (0.000947)	-0.00215** (0.000948)	-0.00215** (0.000948)	-0.00401* (0.00218)
Constant	0.0125*** (0.00316)	0.00721* (0.00391)	0.00734* (0.00391)	-5.514 (5.099)
Observations	238,931	238,931	238,931	238,931
Precinct FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Month FE	YES	YES	YES	YES
Day of the week FE	YES	YES	YES	YES
Day of the year FE	NO	YES	YES	YES
Holiday FE	NO	NO	YES	YES
Precinct Trends	NO	NO	NO	YES

Clustered variance at precinct level. Robust standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

# Results

## Size of the coefficient

- ▶ Negative coefficient of .4%
- ▶ Bhuller et al. (2013) : 2.5% of the total sex crimes between 2000 and 2008 would have been avoided w/o broadband internet.
- ▶ In 2012 on average 4 indoor prostitution establishments per precinct. Then  $4 * 0.4\% = 1.6\%$  decrease in rapes.
- ▶ Further results are robust to different specification

# Robustness Check

VARIABLES	(1)	(2)	(3)	(4)
	(IHS) Sex Crime	(Probit) Sex Crime	(Linear Prob) Sex Crime	(Levels) Sex Crime
Number of Indoor Prost.	-0.00800* (0.00436)	-0.0171 (0.0104)	-0.00456* (0.00231)	-0.00762* (0.00432)
Constant	-11.46 (27.59)	81.77*** (0.00231)	-6.165 (10.025)	-10.176
Observations	238,931	235,828	238,931	238,931
Clustered variance at Precinct level	YES	YES	YES	YES
Precinct FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Month FE	YES	YES	YES	YES
Day of the week FE	YES	YES	YES	YES
Day of the year FE	YES	YES	YES	YES
Holiday FE	YES	YES	YES	YES
Precinct Trends	YES	YES	YES	YES

Robust standard errors in parentheses

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▶ Extra

## Possible mechanisms

- ▶ In the paper we explore three possible mechanisms that might explain the negative coefficient:

1. Police mechanism: it could be that decline in rape is due to increase of number of policemen that happens when an establishment opens.
2. Potential victims mechanism: women might be avoiding precincts where these establishments open.
3. Potential criminals mechanism: potential criminals might use indoor prostitution instead of committing crimes.

We find evidence to refuse **Police mechanism** and **Potential victims mechanisms** but we cannot refuse **Potential criminals mechanism**.

# Possible mechanisms

1. **Police mechanism:** it could be that decline in rape is due to increase of number of policemen that happens when an establishment opens

VARIABLES	(1) Log(Drugs)	(2) Log(Burglarys)
Number of Indoor Prost.	-0.00118 (0.00456)	0.00539 (0.00796)
Constant	0.161*** (0.0310)	8.891 (20.48)
Observations	238,931	238,931
Clustered variance at Precinct level	YES	YES
Precinct FE	YES	YES
Year FE	YES	YES
Month FE	YES	YES
Day of the week FE	YES	YES
Day of the year FE	YES	YES
Holiday FE	YES	YES
Precinct Trends	YES	YES

Robust standard errors in parentheses

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# Possible mechanisms

2. **Potential victims mechanism:** i) women might be avoiding precincts where these establishments open (column 1) & street-prostitutes might be working in indoor prost. establishments (column 2)

VARIABLES	(1) Log(Sex Crime+1)	(2) Log(Street Prostitutes+1)
Number of Indoor Prost.	-0.000618 (0.0109)	-0.0006164 (0.0011319)
Constant	-31.69*** (11.17)	2.6867 (2.1494)
Observations	238,931	238,931
Clustered variance at Precinct level	YES	YES
Precinct FE	YES	YES
Year FE	YES	YES
Month FE	YES	YES
Day of the week	YES	YES
Day of the year	YES	YES
Holiday	YES	YES
Precinct Trends	YES	YES

Robust standard errors in parentheses

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# Possible mechanisms

## 3. Potential criminals mechanism: potential criminals might use indoor prostitution instead of committing crimes (column 1)

VARIABLES	(1) Log(Sex Crime+1)	(2) Log(Sex Crime+1)
Number of Indoor Prost.	-0.00169* (0.000927)	-0.000345 (0.000287)
Dummy Afternoon		0.000579 (0.000383)
Dummy Evening		0.00135 (0.000975)
Dummy Night	0.00283*** (0.000914)	0.000322 (0.00102)
Interaction Afternoon		-0.000324 (0.000252)
Interaction Evening		-0.00145 (0.000889)
Interaction Night	-0.00108 (0.000673)	-0.00150 (0.000968)
Constant	-3.317 (2.872)	-1.526 (1.420)
Observations	477,862	955,724
Clustered variance at Precinct level	YES	YES
Precinct FE	YES	YES
Year FE	YES	YES
Month FE	YES	YES
Day of the week FE	YES	YES
Day of the year FE	YES	YES
Holiday FE	YES	YES
Precinct Trends	YES	YES

Robust standard errors in parentheses



# Discussion

- ▶ We estimate to our knowledge the first causal evidence that indoor prostitution establishments decrease rape even at daily level.
- ▶ Our results are robust.
- ▶ Data seems to support that Potential criminals are indoor prostitutes' customers
- ▶ Strong social policy implications: criminalize *johns* vs legalization of prostitution to decrease rape.

# Appendix

# Descriptive statistics

	Sex crimes by borough	Openings by borough
The Bronx	474	10
Brooklyn	1,625	20
Manhattan	3,930	150
Queens	1,684	24
Staten Island	162	2
Total	7,875	206

	Sex crimes by male offenders (per day)	Percentage over total
Weekend (Friday-Sunday)	2,431	90.34%
-Friday	1,013	91.43%
-Saturday	712	89.79%
-Sunday	706	89.37%
Weekdays (Monday-Thursday)	4,776	92.13%

	Openings (per day)
Weekend (Friday-Sunday)	90
-Friday	30
-Saturday	20
-Sunday	40
Weekdays (Monday-Thursday)	116

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## Other tables: Robustness

VARIABLES	(1)	(2)	(3)
	Log(Sex Crimes+1)	Log(Sex Crimes+1)	Log(Sex Crimes+1)
Number of Indoor Prost.	-0.00414*	-0.00214**	-0.00442*
	(0.00220)	(0.000943)	(0.00245)
Constant	-13.52*	0.00768**	0.000198
	(6.971)	(0.00361)	(0.00602)
Observations	238,931	238,931	238,931
Clustered variance at Precinct level	YES	YES	YES
Precinct FE	YES	YES	YES
Year FE	YES	YES	YES
Month FE	YES	YES	YES
Day of the week FE	YES	YES	YES
Day of the year FE	NO	YES	YES
Holiday FE	NO	YES	YES
Precinct Trends	YES	NO	NO
Exact Day FE	YES	NO	NO
Precinct M Trends	NO	YES	NO
Precinct Y-M Trends	NO	NO	YES

Robust standard errors in parentheses

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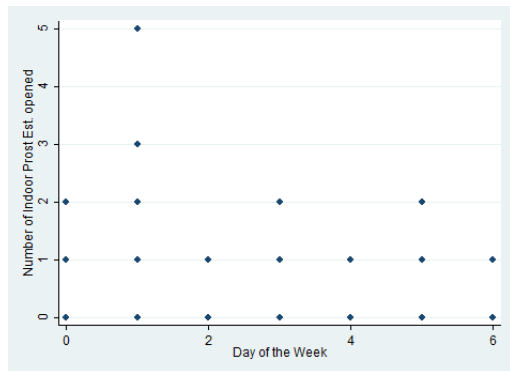
## Other tables: Additional specifications

VARIABLES	(1) Threshold Effects Log(Sex Crime+1)	(2) Committed by M Log(Sex Crime+1)	(3) Large Precincts Log(Sex Crime+1)
1 est. opened	-0.00385 (0.00304)		
2-4 est. opened	-0.00652 (0.00467)		
5 est. opened	-0.0155** (0.00727)		
6 or more est. opened	-0.00414 (0.00934)		
Number of Indoor Prost.		-0.00412* (0.00226)	-0.00688*** (0.00222)
Constant	3.373 (2.745)	-6.454 (5.329)	-33.94** (12.27)
Observations	238,931	238,931	68,266
Clustered variance at Precinct level	YES	YES	YES
Precinct FE	YES	YES	YES
Year FE	YES	YES	YES
Month FE	YES	YES	YES
Day of the week FE	YES	YES	YES
Day of the year FE	YES	YES	YES
Holiday FE	YES	YES	YES
Precinct Trends	YES	YES	YES

Robust standard errors in parentheses

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## Identification issues



Opening on indoor prost. establishment over days of the week. 0 is Sunday, 1 Monday, etc. [▶ Back](#)