

# The Digital Sin City: An Empirical Study of Craigslist's Impact on Prostitution Trends

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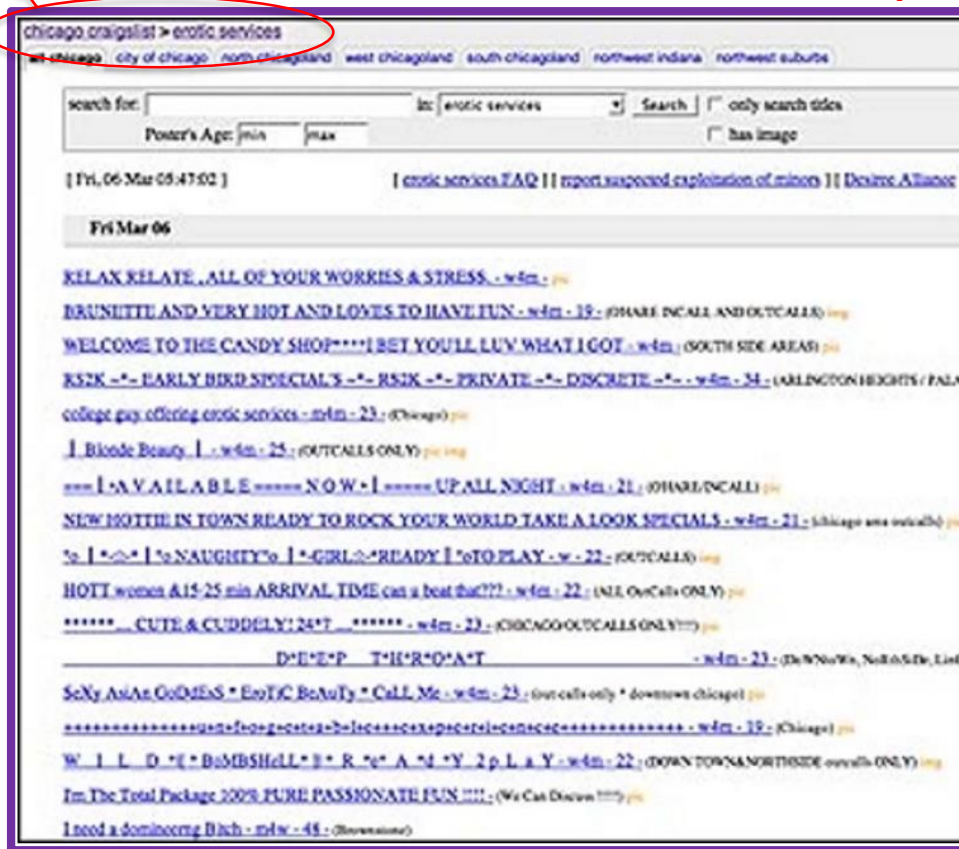
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# Craigslist and Prostitution Advertisement



chicago craigslist > erotic services

minneapolis craigslist > erotic services



Source: theguardian.com, August 8, 2010



Source: Chicago Tribune, June 18, 2008

# Community and Government Protest of Prostitution Related Posts



## ❑ Examples

1. In 2009, Cooke county **Sheriff Thomas Dart** sued **Craigslist** for hosting prostitution related ads.

665 F.Supp.2d 961 (2009)

Thomas DART, Sheriff of Cook county, Plaintiff,  
v.  
CRAIGSLIST, INC., Defendant.

[No. 09 C 1385.](#)

United States District Court, N.D. Illinois, Eastern Division.

October 20, 2009.

Daniel Francis Gallagher, Christopher Paul Keleher, Paul A. Ogrady, Querrey & Harrow, Ltd., Chicago, IL, for Plaintiff.

Eric D. Brandfonbrener, Perkins Coie LLC, Chicago, IL, for Defendant.

Link - [https://scholar.google.com/scholar\\_case?case=5947039940466716121&hl=en&as\\_sdt=6,24](https://scholar.google.com/scholar_case?case=5947039940466716121&hl=en&as_sdt=6,24)

2. Following this, **seventeen state attorneys general sent a letter** to the founder and CEO of Craigslist, in August 2010, and requested the immediate removal of the “adult” services section of Craigslist.

## Craigslist asked to stop advertising prostitution Adult services section contains numerous ads

Updated: Tuesday, 24 Aug 2010, 1:44 PM EDT

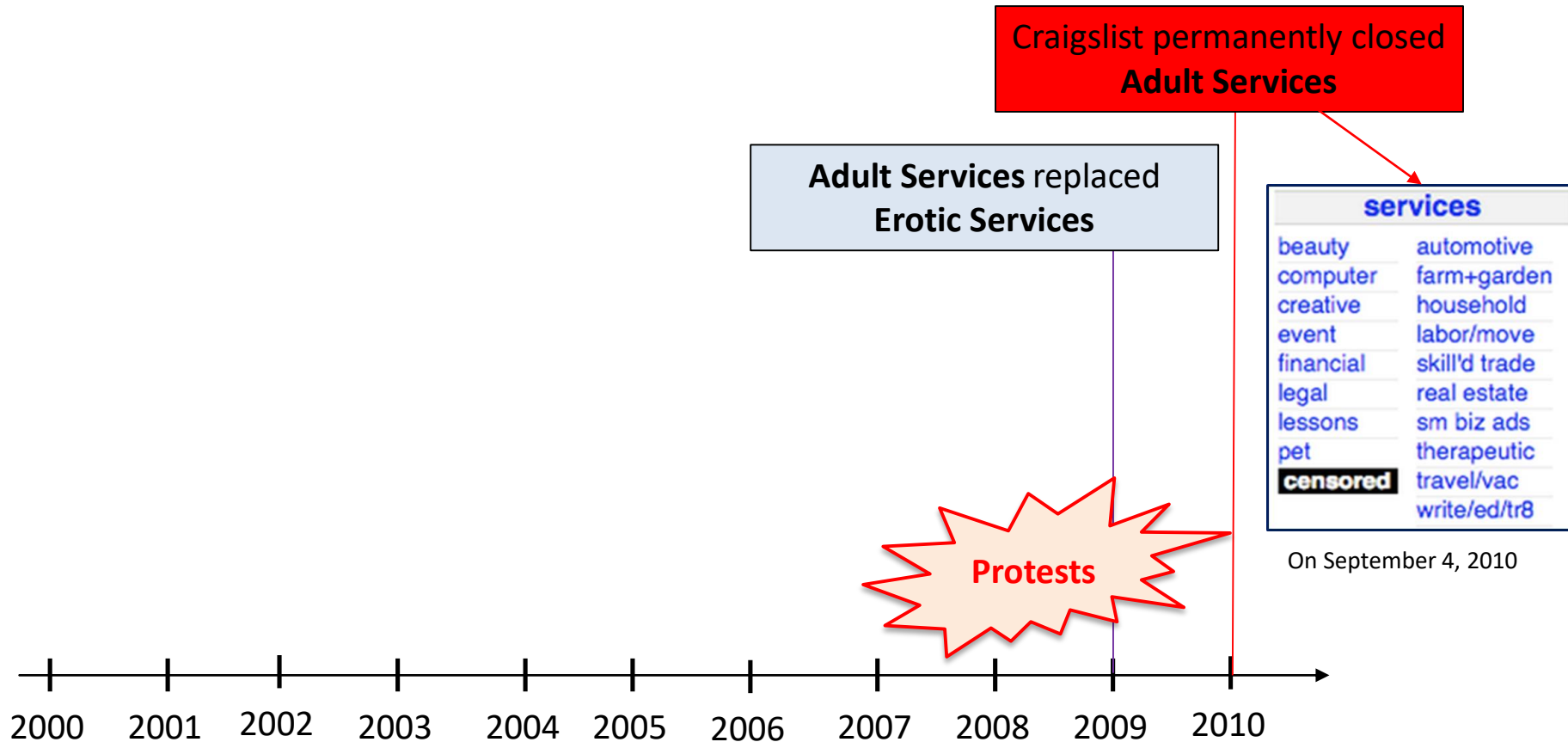
Published : Tuesday, 24 Aug 2010, 1:31 PM EDT

COLUMBUS, Ohio (WANE) - Ohio Attorney General Richard Cordray, joined by 16 other state attorneys general, is calling on the craigslist online classified advertising service to immediately take down the Adult Services portion of the site. The request is due to continued prostitution advertisements and concern about reported sex trafficking of children through the Adult Services section of the craigslist website.

The multi-state letter, sent to craigslist CEO Jim Buckmaster and founder Craig Newmark, contends that craigslist cannot, or will not, adequately screen these illicit ads, so it must stop accepting them altogether and shut down the Adult Services section.

Link - <http://comedying.org/wp-content/uploads/articles/SouthCarolina3.pdf>

# Timeline of Events



# Our Study



## ❑ Primary Research Question → Economic Impact

**Question 1a:** Does Craigslist leads to more prostitution incidences?

**Question 1b:** If yes, how big is the impact size?

## ❑ Secondary Research Question → Market Mechanisms

**Question 1:** Does Craigslist **substitutes** the existing market for prostitution, or **create** a new market on top of the existing market?

**Question 2:** Is the effect stronger for counties with **no prior history** of prostitution, or for counties with **existing history** of prostitution.

**Question 3:** Does Craigslist causes **migration** of prostitution to a neighboring county?

**Question 4:** Does Craigslist lead to an increase in **actual prostitution**, or induces an improvement in **policing opportunities**?

# Data Sources



## ☐ FBI's Uniform Crime Reports (UCR)

- **Prostitution<sub>iy</sub>**, which is the number of prostitution arrests. It is constructed by summing the number of prostitution arrests across all the reporting ZIP codes in a county for a given year.
- Other crime trends, like **commercialized vice**, **drinking under influence**, and **vandalism**.

## ☐ Craigslist's Website

- **Craigslist Entry<sub>iy</sub>**, which is a dummy variable indicating the entry of Craigslist in county  $i$  in year  $y$ .

## ☐ U.S. Census Bureau

- Population size,
- Age-group proportions,
- Racial proportions, and
- Individuals below the poverty level.

## ☐ FBI's Law Enforcement Officers Killed and Assaulted Dataset

- Number of police employees

# Empirical Model: Difference in Difference Estimator

- We rely on Craigslist's expansion in the United States in a **natural experiment setup**, and apply **difference-in-difference estimation** with county and time fixed effects.

$$\ln(Prostitution_{iy}) = \alpha_i + \beta_y + g \cdot \gamma_{iy} + p \cdot Craigslist_{iy} + e_{iy}$$

Where,

- $i$  indicates **1763** counties
- $y$  refer to year,  $y = 1999, \dots, 2008$
- $Prostitution_{iy}$  is the number of prostitution arrests for county  $i$  in year  $y$
- $\alpha_i$  is a vector of 1,763 county fixed effects
- $\beta_y$  is a vector of year fixed effects
- $\gamma_{iy}$  is a vector of county-year demographics features, socioeconomic indicators, and crime-related factors
- $Craigslist_{iy}$  is the binary indicator for Craigslist entry
- $e_{iy}$  is error term



# Main Result: Craigslist Leads to Increase in Prostitution Trends



Fixed Effect Regressions Showing Impact of Craigslist Entry on Prostitution, with Robustness Checks

Variables		Model 5	Model 6	Model 7	Model 8	Model 9
Craigslist Entry		0.066*** (0.02)	0.066*** (0.02)	0.056*** (0.02)	0.198* (0.10)	2.710** (1.33)
Age Controls	Age 15-19 Proportion	0.096 (0.41)	0.096 (0.41)	0.123 (0.28)	-10.851 (11.90)	22.665 (19.29)
	Age 20-39 Proportion	-0.730** (0.33)	-0.730** (0.33)	-0.537** (0.24)	-2.961 (7.86)	-22.977** (11.32)
	Age 40-59 Proportion	-0.825*** (0.30)	-0.825*** (0.30)	-0.609*** (0.22)	-2.790 (7.52)	-34.646** (15.11)
	Age 60-79 Proportion	-0.978** (0.42)	-0.978** (0.42)	-0.737** (0.30)	-11.288 (8.59)	-43.203** (19.96)
Ethnicity Controls	White Proportion	-6.961** (3.31)	-6.961** (3.31)	-4.842** (2.27)	-119.999 (75.37)	-426.096** (205.54)
	Black Proportion	-6.419** (3.11)	-6.419** (3.11)	-4.436** (2.12)	-115.186 (73.69)	-383.129** (189.98)
	Asian Proportion	-3.499* (1.81)	-3.499* (1.81)	-2.430** (1.22)	-91.678 (76.45)	-228.180* (121.09)
	American Indian Proportion	-6.565** (3.34)	-6.565** (3.34)	-4.468** (2.27)	-175.154 (106.95)	-401.575** (202.89)
Economic Controls	Log (Population Size)	-0.023 (0.05)	-0.023 (0.05)	0.001 (0.04)	2.076 (1.40)	-5.113 (3.36)
	Log (Poverty)	0.060*** (0.02)	0.060*** (0.02)	0.044*** (0.02)	-0.015 (0.33)	3.765** (1.70)
	Employed Proportion	-0.319* (0.18)	-0.319* (0.18)	-0.253* (0.13)	-2.213 (3.88)	-13.270 (10.63)
	Log(Annual Income)	-0.039* (0.02)	-0.039* (0.02)	-0.023* (0.01)	-0.284 (1.14)	-2.942 (1.91)
Police & Crime Controls	Log (Police Officers)	-0.009 (0.01)	-0.009 (0.01)	-0.007 (0.00)	-0.257*** (0.09)	-0.599* (0.32)
	Log (All Other Crimes)#	0.003* (0.00)	0.003* (0.00)	0.003* (0.00)	-0.658 (1.13)	0.095 (0.09)
Robust Standard Errors			✓	✓		
Un-Weighted Regression				✓		
Prostitution Only Counties					✓	
DV = Prostitution Arrests						✓
R-squared		0.026	0.026	0.021	0.180	0.015
F-Stats		2.048	2.048	2.028	3.860	0.870
Observations		16377	16377	16377	884	16377

Effect size of  
6.6% increase in  
prostitution  
trends



# Falsification Result: No Effect on Alternative Crimes



## Falsification Test Using Alternative Crimes

	DV = Log (Driving Under Influence)	DV = Log (Vandalism)
Variables	Model 1	Model 2
Craigslist Entry	0.021 (0.03)	-0.038 (0.03)
	No Effect	No Effect
County Fixed Effect	✓	✓
Time Fixed Effect	✓	✓
R-squared	0.046	0.016
F-Stats	13.656	5.193
Observations	16377	16377

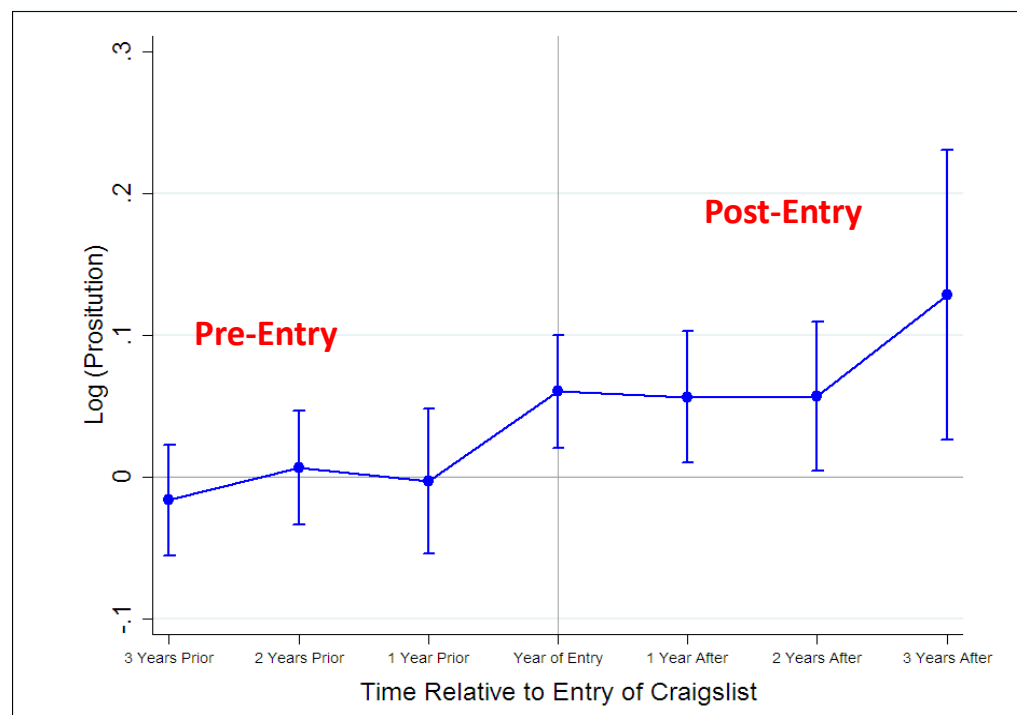
Note: All control variables are included.

# Falsification Result: No Pre-Entry Effect



**Falsification Test Using Pre- and Post- Entry  
Craigslist Indicators**

	Variables	Weighted Regressions	
		Model 3	Model 4
Pre-Entry Indicators	Craigslist Entry <sub>-3</sub>	-0.014 (0.02)	-0.016 (0.02)
	Craigslist Entry <sub>-2</sub>	0.017 (0.02)	0.007 (0.02)
	Craigslist Entry <sub>-1</sub>	0.004 (0.02)	-0.003 (0.03)
Post-Entry Indicators	Craigslist Entry <sub>1</sub>	0.062*** (0.02)	0.056** (0.02)
	Craigslist Entry <sub>2</sub>	0.060** (0.03)	0.057** (0.03)
	Craigslist Entry <sub>3</sub>	0.131** (0.05)	0.128** (0.05)
Note: All control variables are included.			
County Fixed Effect		✓	✓
Time Fixed Effect			✓
R-squared		0.024	0.027
F-Stats		1.636	1.733
Observations		16377	16377



# Mechanism 1: Craigslist Creates a Separate Market for Prostitution



## Impact of Commercialized Vice and Craigslist Entry on Prostitution

Variables	Model 1	Model 2
Log (Commercialized Vice Arrests)	0.715*** (0.06)	0.712*** (0.06)
Craigslist Entry		0.051*** (0.02)
<a href="#">Note: All control variables are included.</a>		
R-squared	0.372	0.377
F-Stats	11.536	11.389
Observations	16377	16377

Similar  
Coefficient  
Sizes

# Mechanism 2: Craigslist Introduces Prostitution in Counties with No Prior History of Prostitution



Impact of Craigslist Entry over Sample Split based on Presence of Past Prostitution

Variables	No Cases of Prostitution before Craigslist Entry	Had Cases of Prostitution before Craigslist Entry
	Model 1	Model 2
Craigslist Entry	0.037*** (0.01)	0.095 (0.11)
<p><b>Effect size of 3.7% increase in prostitution trends</b></p>		
R-squared	0.018	0.139
F-Stats	0.680	3.307
Observations	15590	787

Note: All control variables are included.

# Mechanism 3: Craigslist Entry in Neighboring County Causes Sex Worker Migration From Own County

- ❑ We identify nearest county-pairs, where at least one county had Craigslist entry.
  - For this, we used the **‘haversine’ formula** to calculate the shortest distance between 2 points on earth, where each point is the midpoint of a county.
- ❑ We alternate the county pair, based on cases where focal county with Craigslist is either the own county or the neighboring county.

**Migration of Prostitution Due to Neighboring County Craigslist Entry**

Variables	DV = Log (Own County Prostitution)	
	Own County Has Craigslist	Own County Does Not Have Craigslist
	Model 1	Model 2
Own County Craigslist Entry	0.182*** (0.04)	
Neighboring County Craigslist Entry		-0.035** (0.02)
Log (Commercialized Vice Arrests)	0.779*** (0.02)	2.133*** (0.07)
<i>Note: All control variables are included.</i>		
R-squared	0.688	0.622
F-Stats	49.765	39.346
Observations	709	752

**3.5% decrease in own county prostitution due to Craigslist entry in neighboring county**



# Mechanism 4: True Increase in Prostitution Or Increase in Police Effort?

- ❑ We retrieve news articles from 4 databases that talk about police conducting sting operations over Craigslist to make prostitution arrests.
- ❑ We omit US states-years where reported police stings were mentioned, and re-run our models.

**News Articles on Police Stings**

News Article Database	No. of News Articles
Access World News	885
Factiva	193
LexisNexis Academic	120
Proquest Newsstand	463

**States Involved in Police Stings**

Years	States Where Police Conduct Stings Using Craigslist
2005	CA, MA, NY, RI
2006	CA, CT, FL, GA, IL, MA, NH, NJ, NY, OK, PA, RI, WA
2007	AL, AR, CA, CO, CT, FL, GA, ID, IL, IN, LA, MA, MD, MN, NC, NH, NJ, NY, OH, OK, OR, PA, RI, WA
2008	AL, AR, CA, CO, CT, FL, GA, ID, IL, IN, KS, KY, LA, MA, MD, MI, MN, MO, NC, NH, NJ, NY, OH, OK, OR, PA, RI, SC, TN, TX, UT, VA, WA, WI, WV



# True Increase in Prostitution Trends



## OLS and Fixed Effect Regressions Showing Impact of Craigslist Entry on Prostitution, with Robustness Checks on sample without Police Stings

Variables	OLS				Fixed Effect		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Craigslist Entry	0.446*** (0.08)	0.366*** (0.08)	0.076*** (0.03)	0.464*** (0.08)	0.078*** (0.03)	0.078*** (0.03)	0.064*** (0.02)
County Fixed Effect			✓		✓	✓	✓
Time Fixed Effect				✓	✓	✓	✓
Control * Time Trend		✓					
Robust Standard Errors						✓	
Un-Weighted Regression							✓
Clustered Standard Errors	✓	✓	✓	✓	✓		✓
Weighted Regression	✓	✓	✓	✓	✓	✓	
R-squared	0.235	0.250	0.022	0.236	0.025	0.025	0.019
F-Stats	4.282	2.746	1.497	2.833	1.642	1.642	1.606
Observations	14107	14107	14107	14107	14107	14107	14107

Note: All control variables are included.



# Future Work and Implications



## □ Future Work

1. **We want to further tease out whether there was true increase in prostitution, or increase in Police efforts.**
  - For this we will use **multinomial logit**, to model police decision making in order to identify crimes where they can put effort to make arrests, among a set of alternative crimes against society.

## □ Implications

1. Our results suggests that Craigslist's shutdown of 'Adult Services' is legitimate.
2. Our results suggests that there was actual increase in prostitution due to Craigslist's entry.
3. Our results can generalize, since other similar websites like Backpage, etc. carry prostitution advertisement even to this day.



# Thank You Questions?