

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

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# Craigslist and Prostitution Advertisements



## Chicago Craigslist > Adult Services



Source: Online Media Daily, July 17, 2009

## Minneapolis Craigslist > Erotic Services



Source: Chicago Tribune, June 18, 2008

# Community and Government Protest against Prostitution Related Posts

- ❑ In August 2010, **seventeen state attorneys general** sent an open letter to the founder and CEO of Craigslist, and **requested the immediate take down of the Adult Services section** of Craigslist.



Link - [https://www.texasattorneygeneral.gov/newspubs/releases/2010/082510craigslist\\_signon.pdf](https://www.texasattorneygeneral.gov/newspubs/releases/2010/082510craigslist_signon.pdf)

# Main Research Question



- Our research studies the **Economic Impact** of Craigslist's entry on Prostitution Incidences.

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

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

# Rational Choice Theory and Prostitution

- ❑ Based on Becker's (1974) framework on the economics of crime, the decision to engage in a criminal act is a rational process in which individuals make choices that maximizes their utility.
- ❑ Accordingly, in making a choice to participate in the prostitution market, the **providers and clients alike would weigh the relative benefits and costs when deciding whether to engage in paid sexual transactions.**

	Benefits	Costs
For Prostitutes	Financial gains	Legal punishments
For Clients	Sexual desires	Legal punishments

# How Can Online Platforms Influence Prostitution Market?



## ❑ Studies Supporting Increase In Prostitution Incidence

- Bring about **reduced search costs** (Bakos 1997, Il-Hann and Terwiesch 2003) by facilitating **communication across spatial and temporal boundaries** (Bailey and Bakos 1997, Jin and Robey 1999), and
- Provide a **broader base of product offerings** (Brynjolfsson et al. 2003, Jin and Robey 1999).

## ❑ Studies Supporting Market Failure

- Presence of **high levels of uncertainty** (Dimoka et al. 2012) can **reduce consumer trust** due to the presence of information overload and equivocality (Grover et al. 2006).
- Allows users to assume **false identities** easily (Cao et al. 2012), thus law enforcement can do sting operations.
- Craigslist **do not have reputation systems** like ads rating and review system to guarantee trust.

# Study Highlights



**Main Findings:** Craigslist **increases prostitution incidence.**

□ We also find four underlying **Market Mechanisms** of Craigslist's impact on prostitution trends.

**Mechanism 1:** Craigslist **creates a new market for prostitution** on top of the existing market operated by the traditional sector.

**Mechanism 2:** Craigslist facilitated prostitution mainly **operates in counties with no past history of prostitution.**

**Mechanism 3:** Craigslist causes **spillover of prostitution to a neighboring county without Craigslist.**

**Mechanism 4:** Craigslist **leads to a true increase in prostitution**, and not merely causes increase in **policing efficacy.**



# 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**, **Driving Under the Influence (DUI)**, 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
- Employment level
- Annual Income

## ❑ 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,

- $y$  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 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

# Craigslist Leads to Increase in Prostitution Trends

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

		OLS			Fixed Effect			
Variables		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Craigslist Entry		0.241*** (0.06)	0.070*** (0.02)	0.283*** (0.06)	0.073*** (0.02)	0.063*** (0.02)	0.161* (0.09)	0.045** (0.02)
Age Controls	Age 15-19 Proportion	-1.014 (0.93)	0.554 (0.53)	-1.259 (0.95)	0.679 (0.52)	0.542 (0.37)	2.424 (6.41)	0.507 (0.45)
	Age 20-39 Proportion	-0.353 (0.38)	-0.343 (0.26)	-0.497 (0.40)	-0.327 (0.26)	-0.258 (0.19)	1.687 (4.45)	-0.402** (0.18)
	Age 40-59 Proportion	0.149 (0.54)	-0.008 (0.22)	0.117 (0.57)	-0.194 (0.20)	-0.118 (0.16)	3.513 (5.89)	-0.281* (0.15)
Ethnicity Controls	White Proportion	-0.030 (0.10)	-1.383** (0.62)	0.003 (0.11)	-1.203** (0.58)	-0.850** (0.39)	-1.636 (20.21)	-0.758 (0.51)
	Black Proportion	0.161 (0.14)	-0.636 (0.53)	0.190 (0.15)	-0.408 (0.50)	-0.251 (0.35)	4.520 (20.17)	-0.077 (0.43)
	Asian Proportion	3.054* (1.61)	0.931 (0.93)	3.107* (1.66)	1.117 (0.98)	0.667 (0.62)	36.723 (22.65)	1.192 (1.30)
Socioeconomic Controls	Log (Population Size)	0.069 (0.05)	0.136** (0.06)	-0.029 (0.08)	0.116* (0.06)	0.116** (0.05)	0.960 (1.15)	0.086 (0.05)
	Log (Poverty)	0.103*** (0.03)	0.061** (0.03)	0.199** (0.08)	0.066** (0.03)	0.047** (0.02)	0.081 (0.31)	0.033 (0.02)
	Employed Proportion	1.595*** (0.54)	-0.309 (0.19)	1.907*** (0.59)	-0.247 (0.21)	-0.214 (0.16)	-3.024 (3.02)	-0.177 (0.15)
Police & Crime Controls	Log(Annual Income)	0.081 (0.06)	0.005 (0.03)	0.247* (0.14)	-0.015 (0.03)	-0.014 (0.01)	1.345 (0.99)	0.131* (0.07)
	Log (Police Officers)	0.057** (0.03)	-0.020** (0.01)	0.054* (0.03)	-0.021** (0.01)	-0.014** (0.01)	-0.310*** (0.10)	-0.010* (0.01)
	Log (All Other Crimes)#	-0.005 (0.01)	0.007 (0.01)	-0.008 (0.01)	0.007 (0.01)	0.005 (0.00)	0.062 (0.93)	0.009** (0.00)
County Fixed Effect			✓		✓	✓	✓	✓
Time Fixed Effect				✓	✓	✓	✓	✓
Un-Weighted Regression					✓	✓	✓	✓
Prostitution Only Counties						✓	✓	✓
Propensity Score Matching							✓	✓
Clustered Standard Errors		✓	✓	✓	✓	✓	✓	✓
Weighted Regression		✓	✓	✓	✓	✓	✓	✓
R-squared		0.215	0.020	0.218	0.021	0.017	0.126	0.017
F-Stats		5.774	2.694	3.919	1.854	1.937	3.075	1.511
Observations		16674	16674	16674	16674	16674	1326	15529

Effect size of  
**7.57%**  
increase in  
prostitution  
trends

# No Effect on Alternative Crimes



Falsification Test Using Alternative Crimes		
	DV = Log (DUI)	DV = Log (Vandalism)
Variables	Model 1	Model 2
Craigslist Entry	0.010 (0.03)	-0.033 (0.03)
	No Effect	No Effect
Note: All control variables are included.		
County Fixed Effect	✓	✓
Time Fixed Effect	✓	✓
R-squared	0.041	0.016
F-Stats	14.840	5.721
Observations	16674	16674

# Craigslist Creates a New Market for Prostitution



- The observed Craigslist-related prostitution trends constitute as a new market on top of the prevailing market operated by organized prostitution rings.

Impact of Commercialized Vice and Craigslist Entry on Prostitution		
Variables	Model 1	Model 2
Log (Commercialized Vice)	0.743*** (0.04)	0.740*** (0.04)
Craigslist Entry		0.047*** (0.02)
<i>Note: All control variables are included.</i>		
R-squared	0.398	0.400
F-Stats	24.080	23.826
Observations	16674	16674

Similar  
Coefficient  
Sizes

# Craigslist Creates a New Market for Prostitutes in Age Group 41-50



- The new market primarily consist of sex workers in age group 41-50.

**Impact of both Craigslist Entry and Commercialized Vice on Prostitution by Age Break-Down**

	Age 0-17	Age 18-30	Age 31-40	Age 41-50	Age 51-99
Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Craigslist Entry	-0.000 (0.00)	0.016 (0.02)	0.002 (0.02)	0.029** (0.01)	-0.003 (0.00)
Log (Commercialized Vice)	0.020** (0.01)	0.228*** (0.04)	0.167*** (0.05)	0.088*** (0.03)	0.006 (0.00)

Note: All control variables are included.

R-squared	0.009	0.043	0.019	0.016	0.002
F-Stats	0.876	3.588	2.048	2.024	0.497
Observations	16674	16674	16674	16674	16674

# Craigslist Introduces Prostitution in Counties with No Prior History of Prostitution



- ❑ The new market for prostitution primarily occurs at counties with no prior history of prostitution before site entry.

## 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 3	Model 4
Craigslist Entry	0.042*** (0.01)	0.070 (0.10)
<div>Effect size of 4.29% increase in prostitution trends</div>		
R-squared	0.019	0.106
F-Stats	0.931	2.313
Observations	15484	1190

Note: All control variables are included.

# Craigslist Entry Causes Prostitution to Spillover to a Neighboring County



- ❑ We identify nearest county-pairs, where at least one county has Craigslist entry.

## Spillover Effect of Craigslist Entry

Variables	County with site entry	Neighboring county without site entry
	Model 1	Model 2
Craigslist Entry	0.201*** (0.05)	0.050** (0.02)
Log (Commercialized Vice)	0.734*** (0.03)	1.003*** (0.03)
R-squared	0.521	0.711
F-Stats	28.639	67.694
Observations	756	791

Note: All control variables are included.

5.13% increase in own county prostitution due to Craigslist entry in neighboring county





# Is It True Increase in Prostitution Or Increase in Police Efforts?

- ❑ We use newspaper reports to locate counties and years in which police departments used sting operations over Craigslist to make prostitution arrests.
- ❑ For this, we amassed over 600 news articles from four disparate news databases, like **Access World News**, **LexisNexis Academic**, **ProQuest Newsstand**, and **Factiva**.
- ❑ Later, we hired online workers from Upwork website to read and label the articles from these databases.



# After Removing Counties With Police Efforts, We Yet Again Get Increase in Prostitution Trends

## Impact of Craigslist Entry on Prostitution after Removing County-Year with Police Stings As Reported in News Articles

	No County-Year Removed	Removing Exact County-Year with Police Stings	Removing Exact County-Year with Police Sting, and Any Following County-Years
Variables	Model 1	Model 2	Model 3
Craigslist Entry	0.073*** (0.02)	0.057*** (0.02)	0.058*** (0.02)
R-squared	0.021	0.016	0.017
F-Stats	1.854	1.823	1.809
Observations	16674	16619	16605

Note: All control variables are included.

Effect size of  
5.86%  
increase in  
prostitution  
trends

# Research Implications



- ❑ There was **actual increase in prostitution** due to Craigslist's entry.
- ❑ Our estimate is like a tip of an iceberg, as **true effect can be larger.**
- ❑ Our results **can add to similar classified ads websites** since they carry prostitution advertisements even to this day!
- ❑ Finally, online platform also help to facilitate **market clearing for illicit markets.**





**Thank You**  
**Questions?**