Gentrification and Crime: Evidence from Rent Deregulation*

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Abstract

Many urban areas experienced a renaissance in the 1990s with rising house prices and falling crime rates. Cambridge real property values nearly doubled over this time period, which was twice the rate of increase that occurred simultaneously in the Boston Metropolitan Area. Autor, Palmer, and Pathak (2014) find that approximately 25 percent of this increase was caused by the sudden end of rent control in 1995. This paper examines whether, and how much, changes in local crime rates due to rent decontrol increased Cambridge's desirability as a residential or business location. We exploit within-Cambridge variation in reported crime across neighborhoods that differed in levels of rent control, abstracting from the prevailing city-wide trend of declining criminal activity. Using detailed, incident-level data on criminal activity assembled from Cambridge Police Department archives for the years 1992 through 2005, we find robust evidence that rent decontrol caused overall crime to fall by 18 percent—approximately 1,200 reported crimes annually—with the majority of the effect accruing through reduced property crime. Applying external estimates of the economic costs of criminal victimization, we calculate that the annual direct benefit to potential victims from the reduction in crime between 1995 and 2005 was approximately $8.7 million in 2008 dollars. Capitalizing this flow into property values, this reduction accounts for 15 percent of the contemporaneous growth in the value of Cambridge residential properties that is attributable to rent decontrol.

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Gentrification and Crime: Evidence from Rent Deregulation

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Introduction

- Urban renaissance in 1990s: rising house prices and falling crime
- Little known about mechanics of gentrification
  - Improved public safety $\Leftrightarrow$ rising prices $\Leftrightarrow$ more affluent neighbors $\Leftrightarrow$ better schools $\Leftrightarrow$ cleaner streets $\Leftrightarrow$ ...
  - Sharp changes in housing market policies provide leverage
- Autor, Palmer, and Pathak (2014): approximately 25 percent ($2.0 of $7.8 bil) of the increase in the value of Cambridge's residential housing stock between 1995 and 2005 due to rent decontrol
  - Increased residential investments (building permit data) explains no more than 12% of increase
  - Leaves 88% of the appreciation accounted for by other effects of decontrol
- Question: Did decontrol reduce local crime in Cambridge, contribute to price appreciation?

Why Would Gentrification Affect Crime?

Gentrification could reduce crime

1. New residents wealthier, spend more on target-hardening
2. Low income residents who commit crimes are priced out
3. "Monetary and non-monetary returns to criminal activity are greater in communities where crime and economic disadvantage are more prevalent" (quoted from Katz, Kling, Ludwig)
4. Fewer 'broken windows,' as properties are upgraded
5. Like-beget-like models (Sah '91, Glaeser-Sacerdote-Scheinkman '96)
6. Income effects on criminal activity among incumbents
7. More policing resources due to increased property tax base; greater political influence of wealthy on municipal priorities

Why Would Gentrification Affect Crime?

Gentrification could increase crime

1. Targets more lucrative
2. Neighborhoods become disorganized as new residents come in → Decreased community cohesion, end of natural order
   - "Collective socialization" view of neighborhoods, e.g., Wilson ('87) and Sampson, Raudenbusch, and Earls ('97) → Gentrification increases social distance
3. Wider income gap between existing residents, economic inequality made salient → more crime
4. Crime as a response to slow down gentrification (e.g., scare away the hipsters)

Substantial Lit on Gentrification↔Crime

- McDonald '86: Boston-NY-Seattle, 1970-84. Fourteen high crime neighborhoods. Gentrification reduces personal crime rates, but no reduction in property crime
- Covington and Taylor '88, '89: "As neighborhood experiences more substantial redefinition of its role in the larger urban mosaic, violence increases"
- Wilsem et. Al. '06: 500 municipalities in Netherlands: Victimization (controlling for neighborhood characteristics) is greater in neighborhoods experiencing change

Substantial Lit on Gentrification↔Crime

- Lee '10: 1994
  - Northridge earthquake in LA + short-term government sponsored home financing: middle and upper middle income HH's purchased homes in earthquake affected low and moderate income neighborhoods
  - In short term, gentrification increases assaults, robberies, auto thefts, and thefts from automobiles
- Papchristos, et al (2011): Chicago 1991-2005, FE Poisson
  - Coffee shops as a better measure of gentrification than median HH income
  - More coffee shops in neighborhood associated with declining homicide rates for White, Hispanic, and Black neighborhoods
  - But an increase in street robberies in Black gentrifying neighborhoods

Added Value of this Paper

1. Clear exogenous source of gentrification (though still a complex treatment)
2. Strong measure of exposure to gentrification using rent control density prior to decontrol
3. Unique incident-level crime data geocoded to locations
4. Monetized value of averted crimes (using external estimates)
5. Comparison to total capitalized value of rent decontrol as benchmark for economic magnitude and plausibility – Effects are substantial but plausible (IOHO)

Outline

1. Introduction
2. **Background**
   - Rent Control in Cambridge
   - Crime in Cambridge
3. Data
4. Estimation
5. Counterfactual Estimation
6. Conclusion

Rent Control in Cambridge

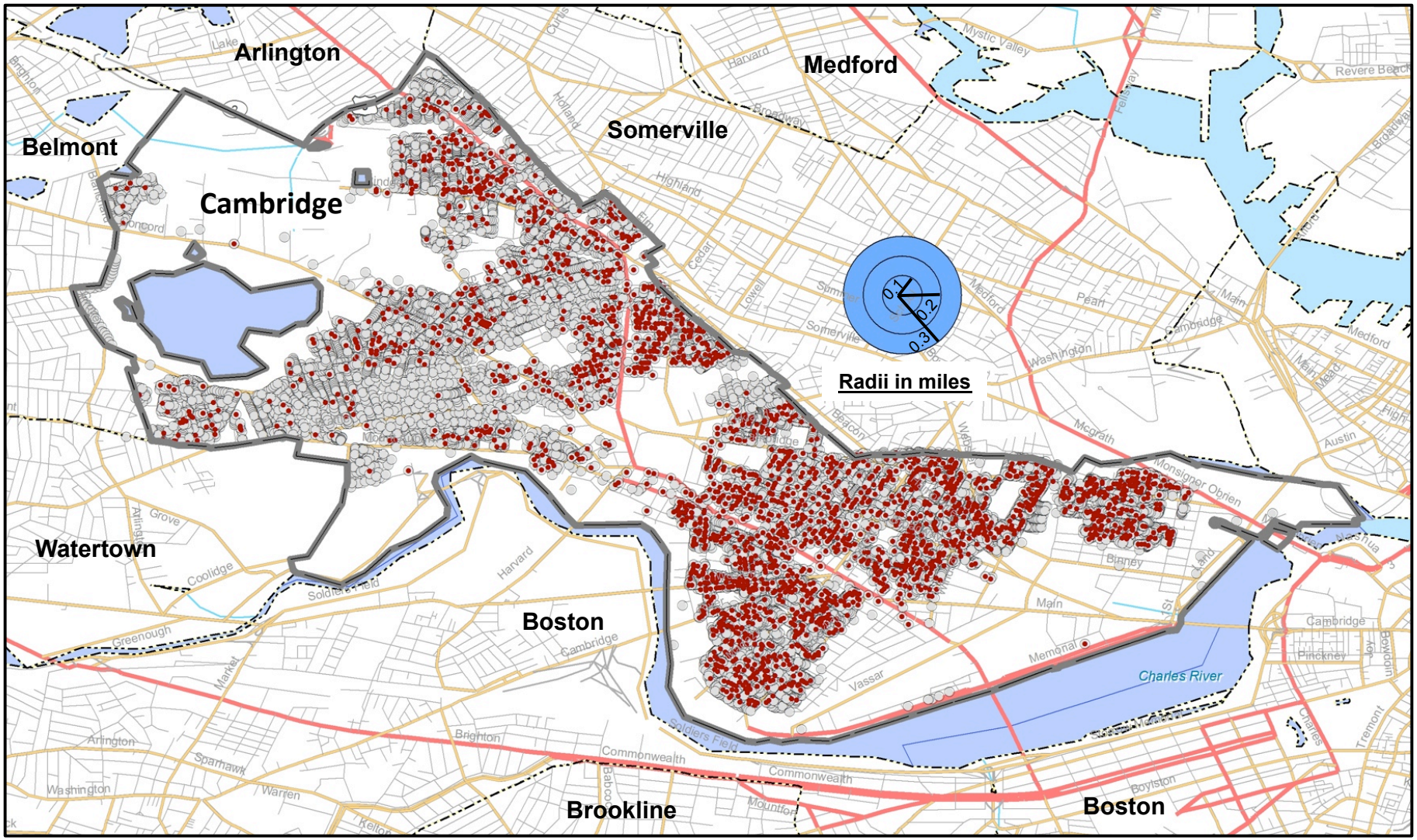
- Rent control adopted in Cambridge in 1971
  - Applied to all non-owner-occupied rental housing built before 1969
  - About one third of residential units were controlled circa 1994

- Quantity controls
  - Vacancy control: Extremely difficult to take controlled units out of circulation–either for sale or owner occupancy

Rent Control in Cambridge

- **How prices set**
  - Rents set in 1971 with goal of holding landlord profits to 1967 levels
  - Occasional across the board rent increases:
    - About 1/2 rate of inflation 1967 to 1981
    - About rate of inflation 1981 to 1994
  - V. difficult for landlord to obtain individual permission to raise rent

- **Net effect on rents**
  - 1988 Abt study: RC discount 40%+ relative to comparable market rate units in same neighborhoods
  - 1998 Atlantic Marketing Research: Decontrolled rents jump 40% to 80% between 1994 and 1997 $\rightarrow$ RC very binding


Arlington
Medford
Somerville
Belmont
Cambridge
Watertown
Boston
Brookline
Boston
Charles River
0.1
0.2
0.3
Radii in miles

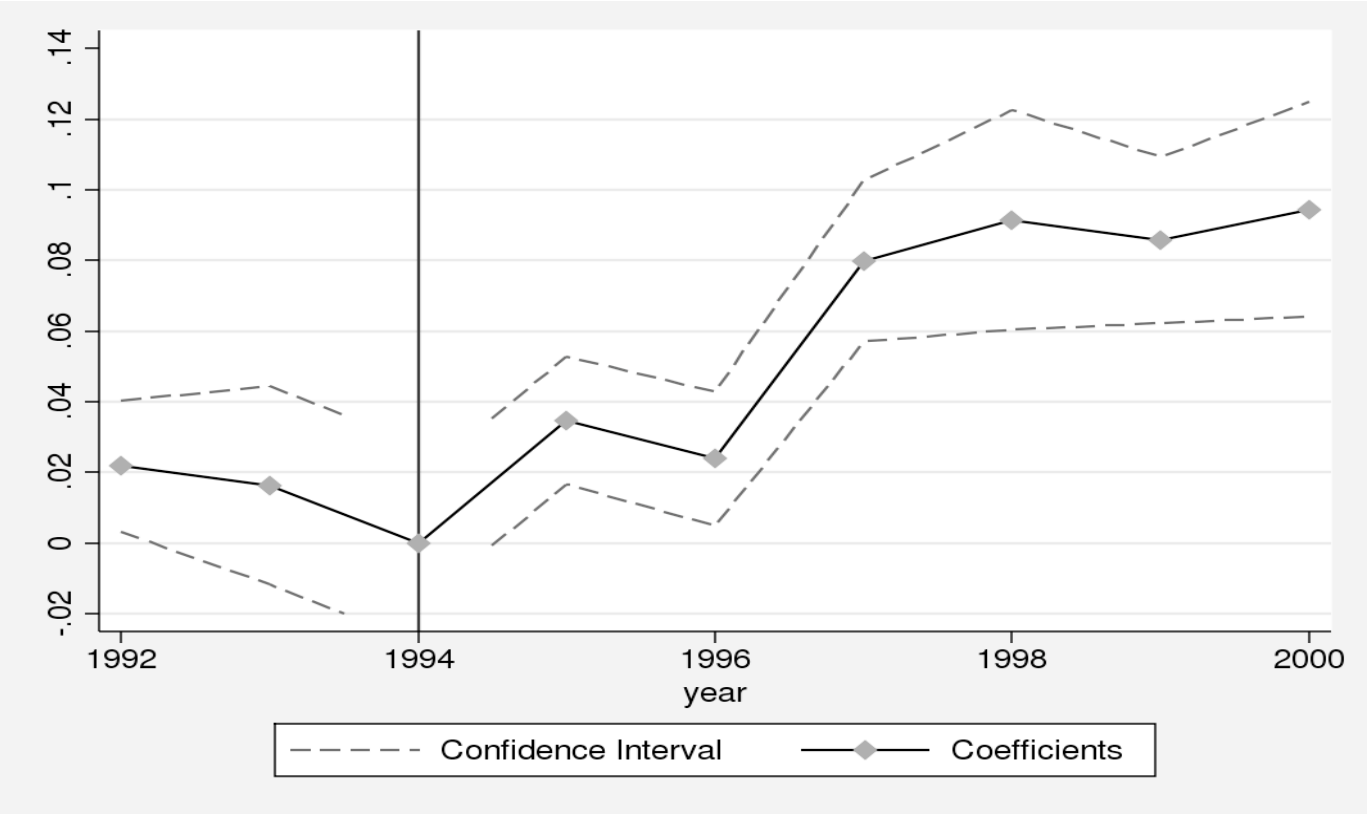

RUSSIANS CAN
NOW OWN AND
OCCUPY THEIR
APARTMENTS.
IN CAMBRIDGE
WE CANNOT!
COST
RENT
of a
FEW
Rent Control
YOU VOTE
WE PAY

The End of Rent Control

- Eliminated by state-wide referendum in 1994
  - Years of unsuccessful efforts by SPOA ('Small Property Owners' Association') to eliminate in Cambridge, Boston, Brookline
- Brilliant idea: Bring RC to state-wide ballot
  - Highly controversial referendum; outcome quite uncertain
  - MA state residents voted 51 percent to 49 to end rent regulation
  - Residents from Boston, Brookline, Cambridge overwhelmingly voted to keep it (60%+)
- Immediate price decontrols in January 1995 with very few exceptions

Event Study: Residential Turnover [APP '14]

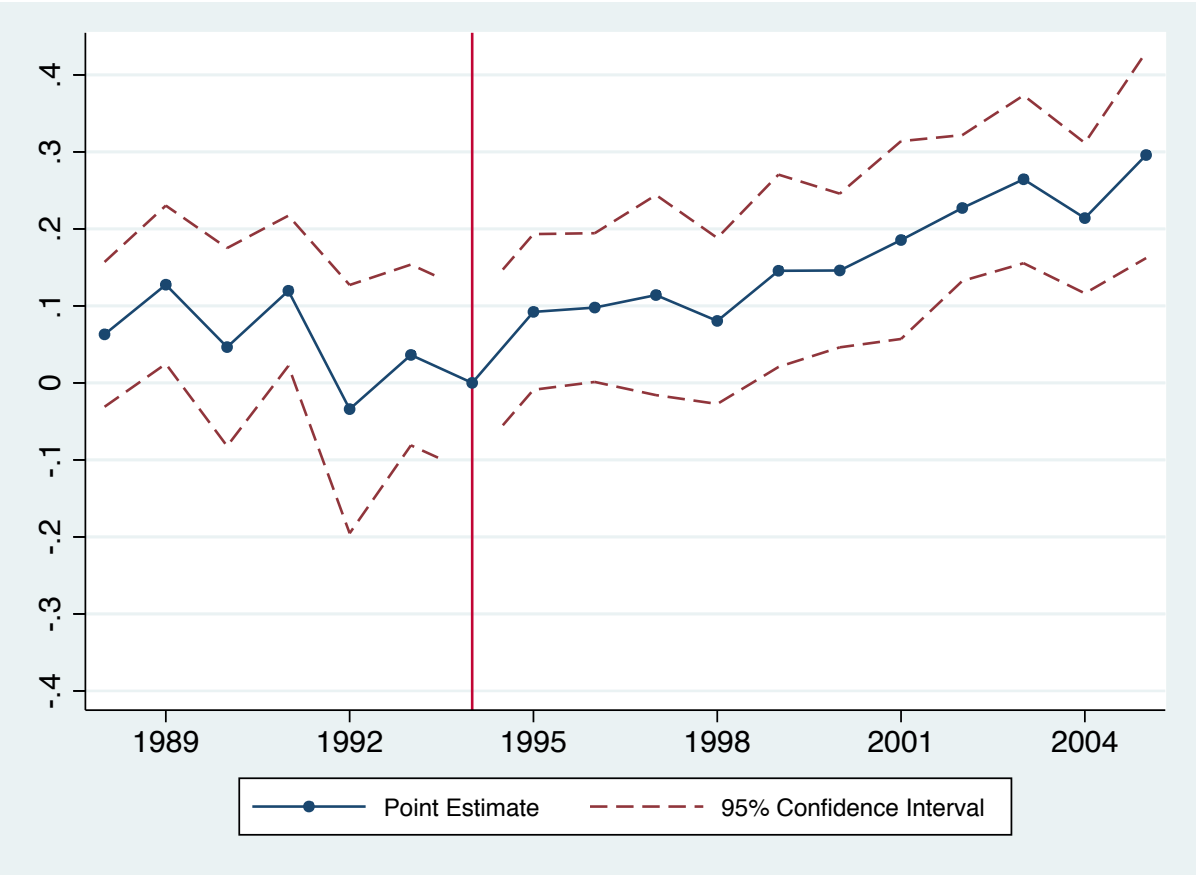
Figure 2. Residential Turnover in Cambridge Controlled relative to Never-Controlled Units



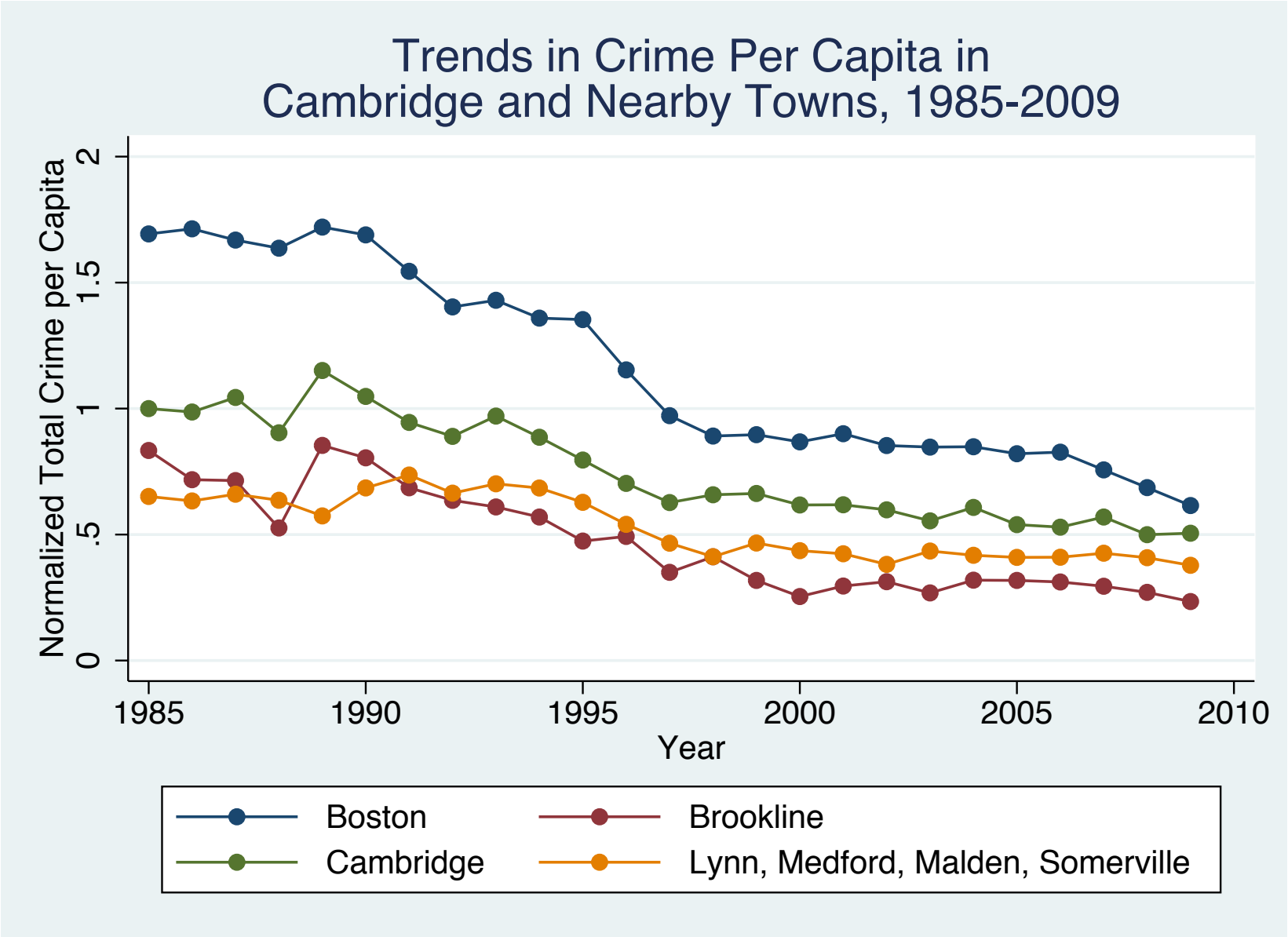
Notes. Figure plots coefficients on Rent Control (RC) x Year from regression where dependent variable is an indicator for whether a Cambridge resident changes residences in a given year. RC x 1994 is the omitted category. All specifications include a RC main effect, year controls, structure type dummies, and geographic fixed effects for 88 block groups in the 1990 Census. 95% confidence intervals are constructed from robust standard errors clustered by block group. The vertical line in 1994 indicates year prior to rent control removal.

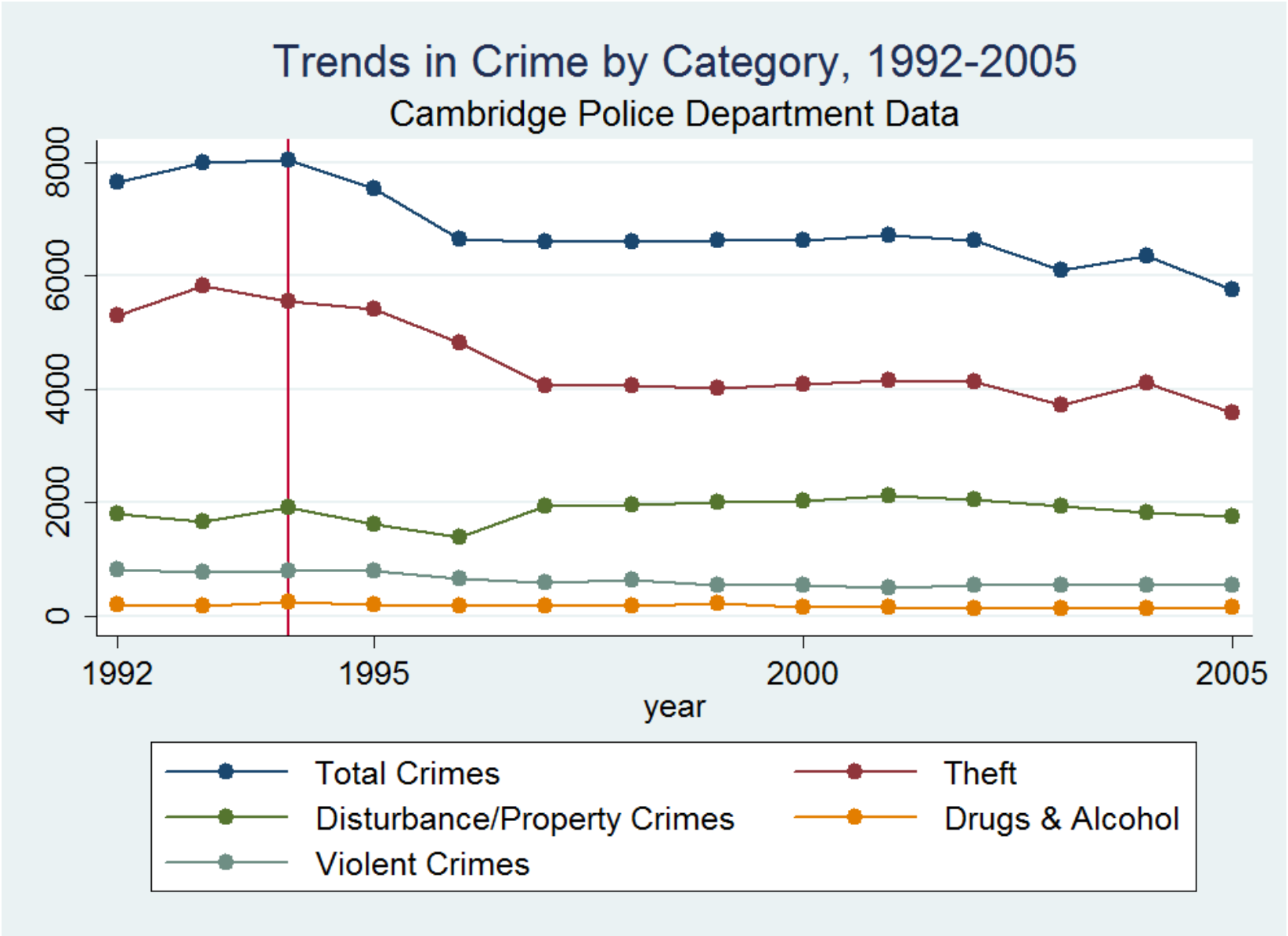
Event Study: Sale Prices of Decontrolled Units [APP '14]

Figure 3. Event Study for Direct Effect of Rent Decontrol on Transaction Prices of Decontrolled Units, 1988 - 2005



Figures plot RC x Year coefficients from event study regressions where dependent variable is log sale price, winsorized to the first percentile separately for houses and condominiums. RC is an indicator for a location that was rent controlled in 1994. Regression also includes year dummies, block group fixed effects, structure type main effects and quadratic time trends, and controls for property characteristics.


Trends in Crime Per Capita in
Cambridge and Nearby Towns, 1985-2009
Normalized Total Crime per Capita
0
.5
1
1.5
2
1985
1990
1995
2000
2005
2010
Year
Boston
Brookline
Cambridge
Lynn, Medford, Malden, Somerville


Trends in Crime by Category, 1992-2005
Cambridge Police Department Data
0
2000
4000
6000
8000
1992
1995
2000
2005
year
Total Crimes
Theft
Disturbance/Property Crimes
Drugs & Alcohol
Violent Crimes

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1. Introduction
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Crime Data

- Source: Cambridge Police archives 1992-2005
- All "Calls for Service" including reported crimes and their date and location
- Hand entered 1992-1996 data, electronic data 1997-2005
  - Electronic data only records most serious crime reported
  - Focus on crime categories that exist in paper logs
- Crime classified into categories based on CPD's classification system (similar to FBI Uniform Crime Reporting category)

Excerpt from CPD Data

Page 92-228

CAMBRIDGE POLICE DEPARTMENT

February 24, 1992

Hit & Run 92-1561	[redacted], reported that on 2-24-92 her Ma. Reg 716-VGY, 1982 Mazda was parked at Cardinal Medeiros Dr. at which time an unknown M/V struck her M/V causing damage to same without making self known. Off. E. Burke
Armed Robbery 92-1562	[redacted] reported that on 2-24-92 at 9:45pm he was approached by 2 suspects described in report. one suspect placed a butcher's knife to victim's neck and forced him in the driveway of #20 Trowbridge. Victim was forced to lie on groun at which time they took $8.cash, one Franck watch and removed victim's glasees. Off. Townes
Stolen M/V 92-1562	[redacted] reported that on 2-24-92 his M/V Ma. Reg 349-TZM, 1987 Toyota was stoben from the 99 Restaurant parking lot Concord Ave. TT# 209 Off. Clarke
Mal. Dest. P.P. 92-1565	[redacted], reported that on 2-24-92 her M/V Ma. reg 615-YTG was parked at 472 Franklin Stat at which time unknowe persons smashed the rear window. Nothing missing at this time. Off. Carter
Arrest Made 92-1564	At 11:pm one Wayne M. Copper, DOB 10-7-76, 99 Menotomy St., Arlingtob was arrested at Mass. Ave and Alewife and charged with Disturbing the Peace and False Fire Alarm. Off. Savioli/Valk*"K-9"

Crime categories, examples

- **Theft**: Larceny, Burglary, Unarmed Robbery, Fraud, Shoplifting
- **Public Disturbances**: Public Disturbance, Destruction of Property, Property Damage, Vandalism, Trespassing, Arson
- **Drugs and Alcohol**: Possession of hypodermic needle, Possession of Class A/B/C/D/E drugs, Trafficking, Alcohol in minor's possession, Unlawful sale of alcohol, Possession heroin or marijuana
- **Violent Crime**: Abduction, Murder and Attempted Murder, Assault, Rape, Armed Robbery, Aggravated Assault

  Note: Drugs-Alcohol Crime and Violent Crime relatively infrequent in Cambridge
  - Drugs frequent, but apparently not criminally so...

Crime categories summary statistics

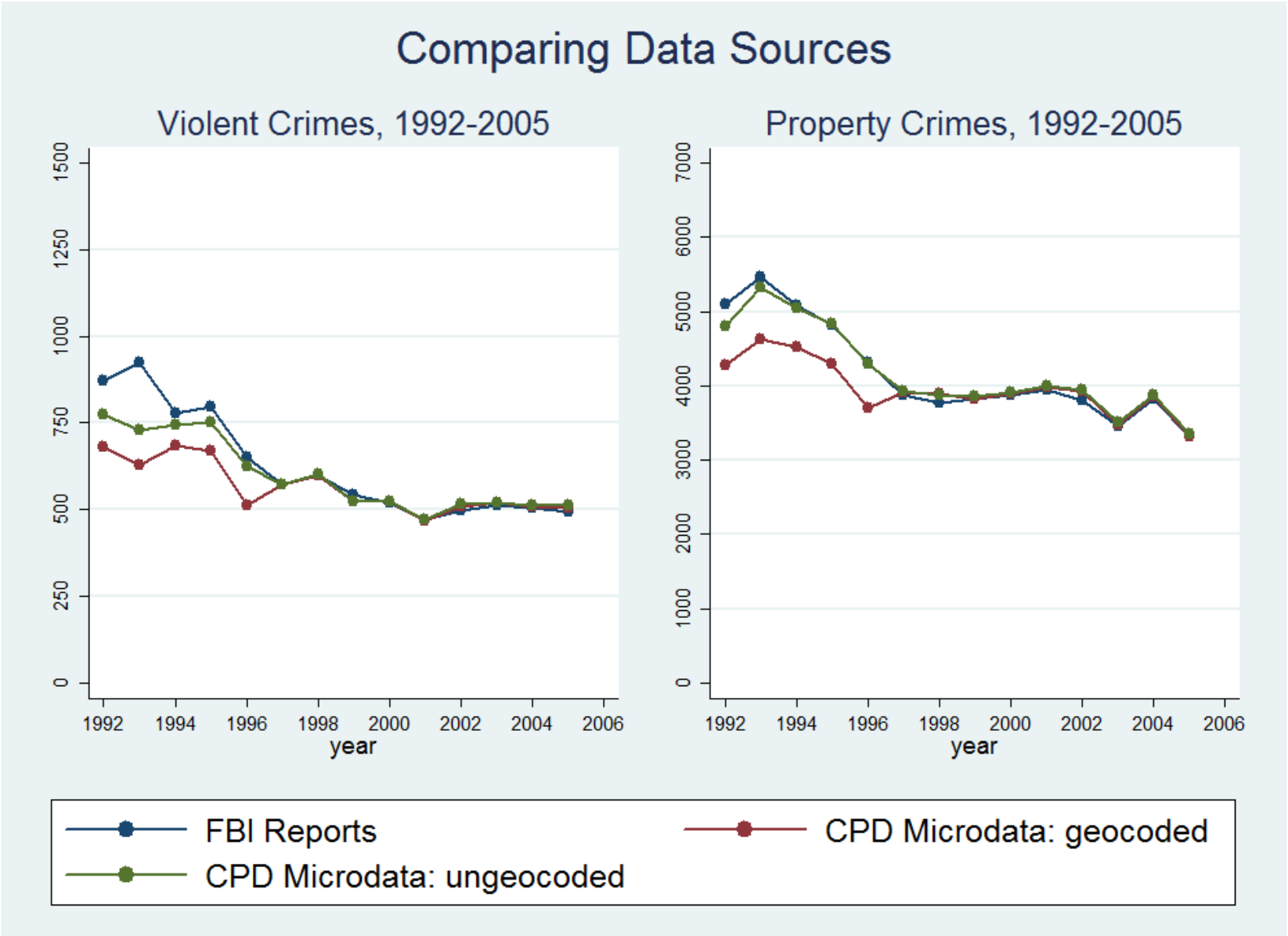
Crime density: Annual crimes per area (1,000m^2)

Table: Descriptive Statistics: Crime by Categories per Area

	Mean	Median	Std. Dev.	Minimum	Maximum
Theft	0.352	0.178	0.747	0.000	22.523
Public Disturbance	0.157	0.064	0.296	0.000	4.397
Drug & Alcohol	0.015	0.000	0.063	0.000	1.241
Violent Crime	0.053	0.000	0.132	0.000	2.389
Total Crime	0.553	0.287	1.048	0.000	27.135

Notes: N = 11,410. Table Reports summary statistics for crime per area by different categories.

CPD Microdata vs. FBI



Unit of Analysis: Adjusted Census Blocks

- Problems with Census blocks:
  - Census blocks often align with street center lines.
  - As a result, blocks do not closely correspond to geographies as neighborhood residents perceive them.
- Adjusted block:
  - a geographical unit of Census blocks moved away from the street center lines, so that crime incidents on either side of the street fall into the same unit.
  - an adjusted block can also be seen as block faces, street segment bounded by the two closest cross-streets as in Ellen et al. (2012), merged to mimic the size of Census blocks.

Unit of Analysis: Adjusted Census Blocks

Purple dots = recorded crimes

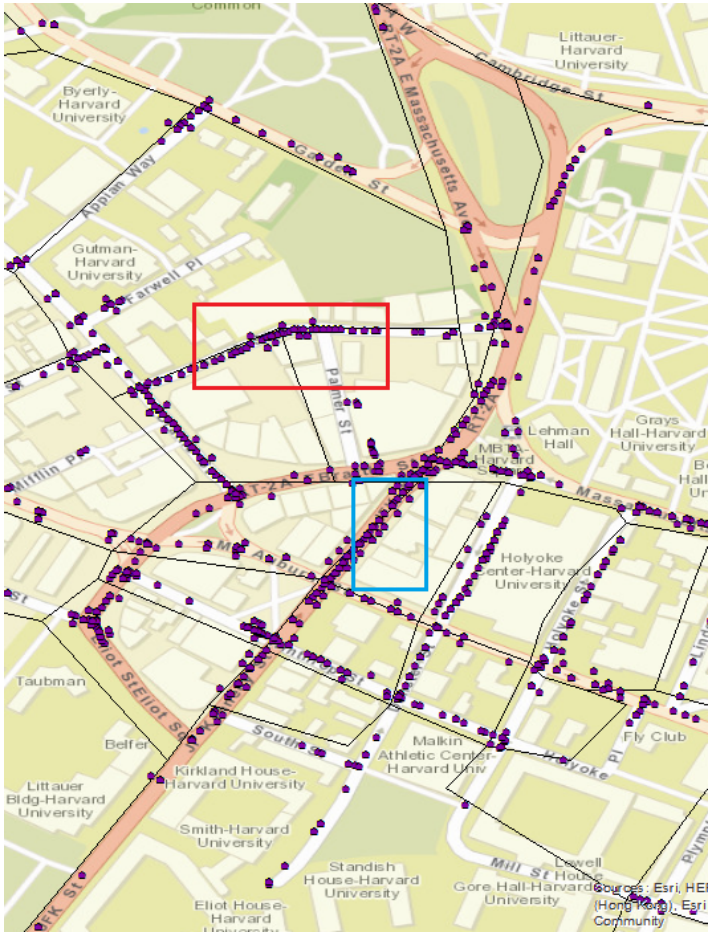


Figure: 1990 Census Blocks

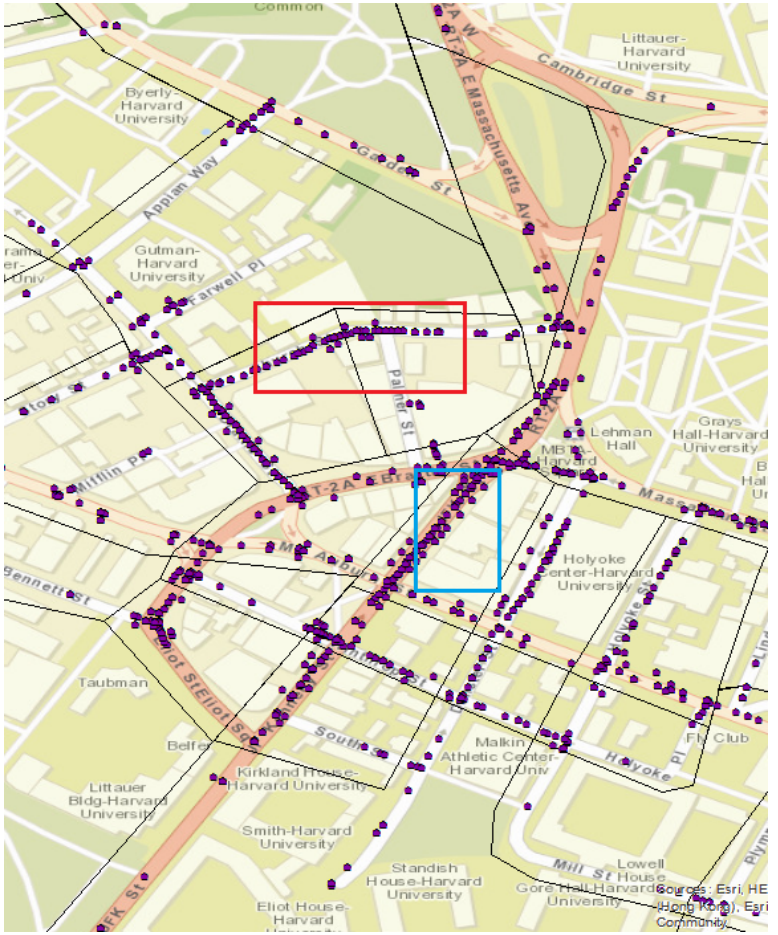


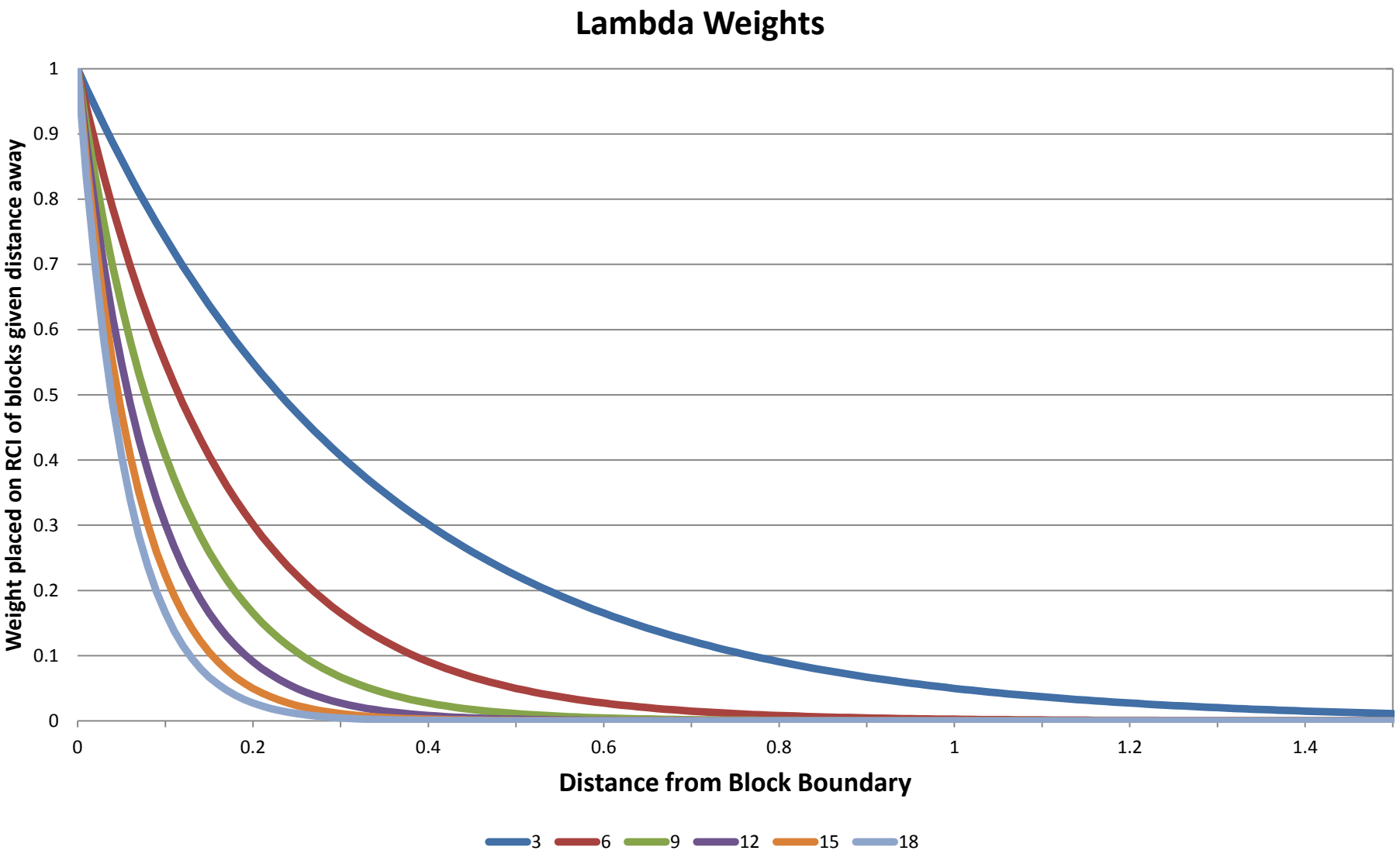
Figure: 1990 Adjusted Blocks

Measuring Neighborhood Rent Control Exposure

- RC data enumerate rent controlled units
  - Cambridge RC file (FOIA request + David Sims)
  - Enumeration of non-rent controlled units
- Measure of neighborhood rent control exposure

$$RCI_i^{\lambda} = \frac{\sum_j RC_j \times e^{-\lambda d_{ij}}}{\sum_j e^{-\lambda d_{ij}}}$$

  - d_{ij}: distance between a residential unit at location i and the nearest boundary of an Adjusted block j, measured in miles; equals 0 if the residential unit is in the block j.
  - Places greater weight on nearby units and less on more distant units in continuous way, compared to radial measure
  - Higher λ means lower weight on distant units, $\lambda \to \infty$: all weight on own block


Lambda Weights
Weight placed on RCI of blocks given distance away
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
0.2
0.4
0.6
0.8
1
1.2
1.4
Distance from Block Boundary
3
6
9
12
15
18

RCI summary statistics

Table: Descriptive Statistics: Rent Control Intensity (RCI) Measures

	Mean	Median	Std. Dev.	Minimum	Maximum
λ=3	0.439	0.466	0.101	0.134	0.587
λ=6	0.422	0.441	0.135	0.055	0.681
λ=9	0.416	0.431	0.148	0.050	0.737
λ=12	0.411	0.425	0.159	0.043	0.783
λ=15	0.407	0.422	0.172	0.034	0.852
λ=18	0.405	0.413	0.184	0.007	0.902

Notes: N = 815. Table Reports summary statistics for Rent Control Intensity measures for different lambda weights. The unit of observation is 815 adjusted Census blocks.

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Estimating equation

- Dependent variable y_{gt}
  - Ideally: log crime to capture proportional moves in crime rates, but many zeros
  - Bowes and Ihlanfeldt (2001), Ihlanfeldt and Mayock (2010), NYPD (2014) advocate crimes per unit of area.
  - Our approach: report crimes per 1,000 m^2; also investigate counts using Poisson reg
- Estimating equation:

Estimating equation

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  - Our approach: report crimes per 1,000 m^2; also investigate counts using Poisson reg
- Estimating equation:

$$y_{gt} = \alpha_g + \delta_t + \beta_0 \cdot \text{RCI}_g^{\lambda} + \beta_1 \cdot \text{RCI}_g^{\lambda} \cdot \text{Post}_t + \varepsilon_{gt}$$

  - α_g: geographic fixed effects (Adjusted Block), δ_t: year fixed effects
  - RCI_g^{λ}: exposure of location to rent control
  - Post_t: indicator if $t \geq 1995$
  - s.e.s. clustered at Adjusted Block level
- β_1: measures differential change in crime in high versus low rent control intensity areas after rent control's elimination

Assumptions

- **Identification assumes:**
  - Change in RC status is exogenous (not fully anticipated)
  - Exposure variable (RCI) conditional on block effects measures only effects of RC, and not other factors (not due to RC)
  - Need only apply in differences (pre/post) not levels
- **Meaning of Rent Control Intensity (RCI):**
  - Measure of how much neighborhood affected by RC (both direct and indirect effects)
  - Potential concern:
    - high-crime areas reducing crime more than low-crime areas
    - RCI correlated with initial crime $\rightarrow$ corr w/ downward trend in crime
    - Many strategies to address concern: trends, poisson, local linear regs

Implied Reduction in Crime

- Implied Reduction in Crime:

$$\frac{\sum_g \widehat{\beta_1} \times \text{RCI}_g \times \text{Area}_g}{\sum_{t=1992}^{1994} \text{Total Crimes}_t / 3}$$

  - $\widehat{\beta_1}$: A regression coefficient on $\text{RCI}_g^{\lambda} \cdot \text{Post}$, as in the estimating equation.
  - RCI_g: Rent control intensity of a block g.
  - Area_g: Area of a block g.
  - $\sum_{t=1992}^{1994} \text{Total Crimes}_t/3$: Average total crime per year in pre-rent decontrol period.

Main Estimates

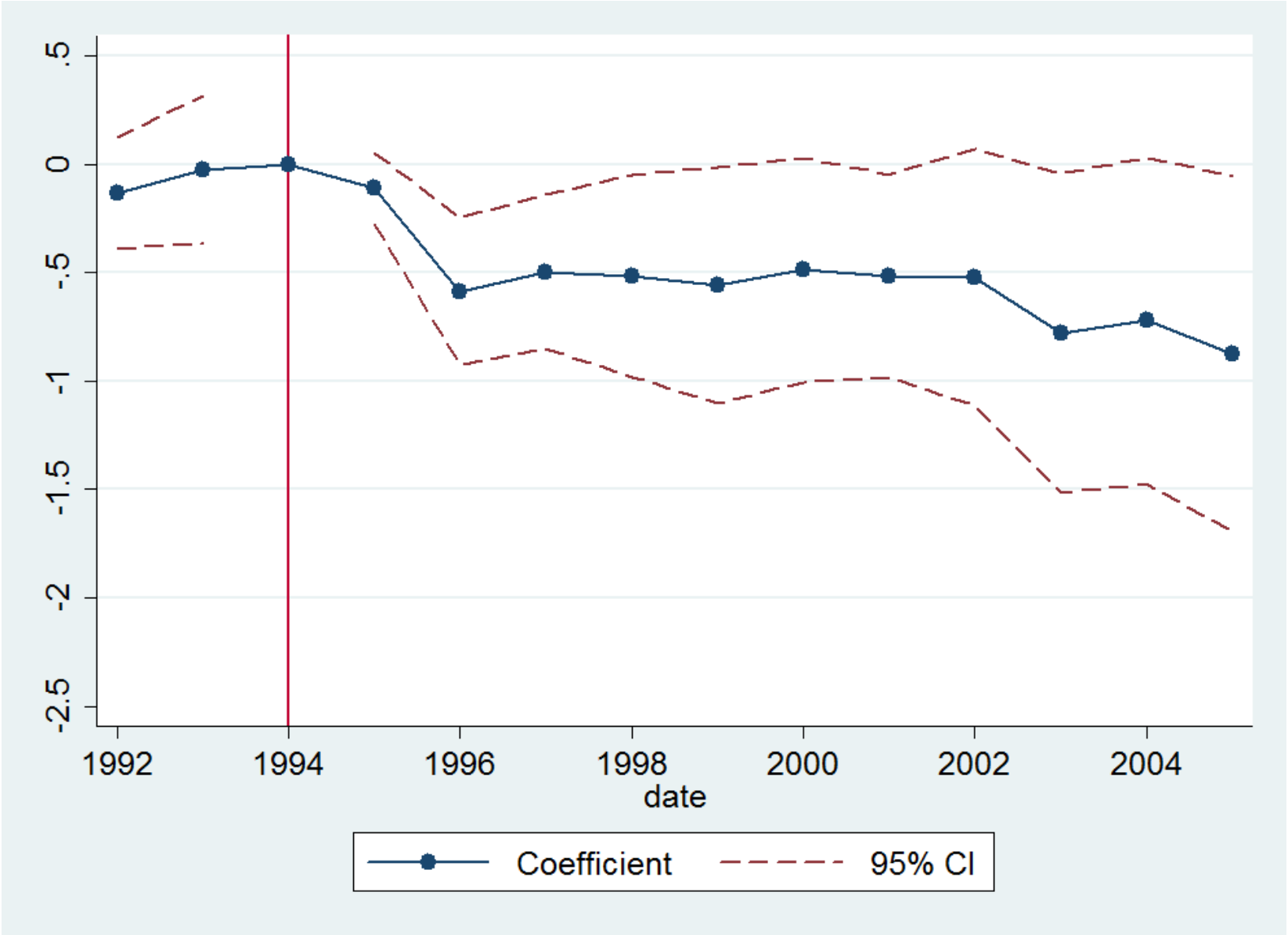
Table: Effect of Rent Control Intensity on Total Crimes
Dependent Variable: Total Reported Crimes per Area

	(1)	(2)	(3)	(4)
Exponential Weight	λ=3	λ=3	λ=15	λ=15
RCI x Post	-0.545***	-0.390***	-0.431**	-0.343**
	(0.184)	(0.121)	(0.175)	(0.152)
Constant	0.578***	0.584***	0.578***	0.586***
	(0.0163)	(0.0180)	(0.0163)	(0.0184)
Mean of RCI	0.439	0.439	0.407	0.407
Standard Deviation of RCI	0.101	0.101	0.172	0.172
Implied Reduction in Crime	56%	40%	39%	31%
Implied Crime Fall at 20%-80% RCI	68%	49%	44%	35%
R-squared	0.851	0.853	0.852	0.853
Linear Tract Trends	NO	YES	NO	YES

N = 11,410. Standard errors in parentheses clustered at the adjusted block level. All specifications include year and block fixed effects. Dependent variable is Total Reported Crimes per 1000m². The mean of dependent variable is 0.553, and the standard deviation of dependent variable is 1.048.

*** p<0.01, ** p<0.05, * p<0.1

Event Study: With Linear Census Tract Trends



Main Estimates: Crime Categories

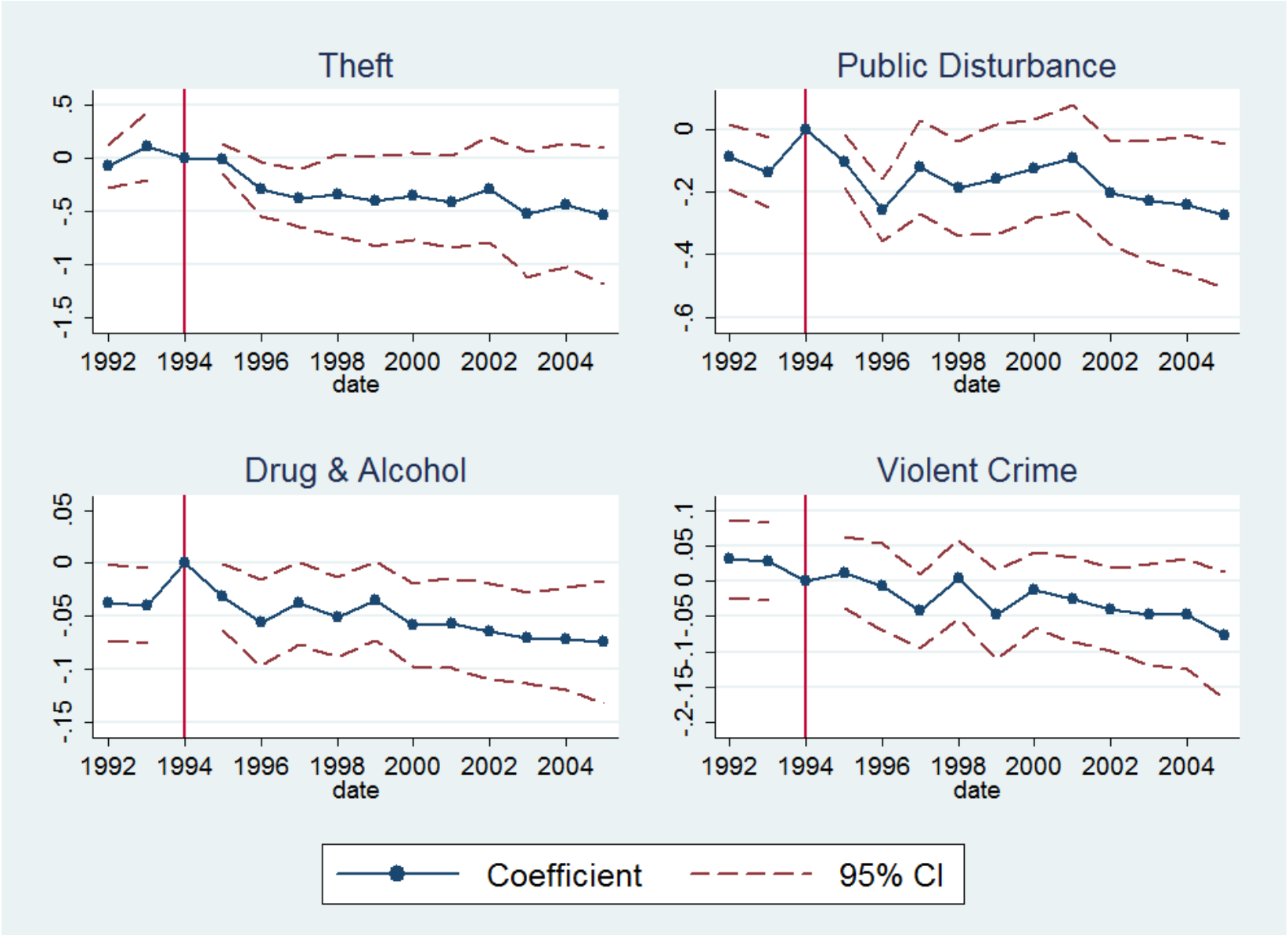
Table: Effect of Rent Control Intensity on Crime Categories
Dependent Variable: Reported Crimes per Area

	(1)	(2)	(3)	(4)
Crime Category	Theft	Public Disturbance	Drug & Alcohol	Violent Crime
		Panel A. Specifications Without Tract Trends		
RCI x Post	-0.373***	-0.0486	-0.0130*	-0.0384*
	(0.144)	(0.0351)	(0.00725)	(0.0220)
Constant	0.391***	0.141***	0.0170***	0.0661***
	(0.0118)	(0.00593)	(0.00174)	(0.00385)
Implied Reduction in Crime	48%	19%	43%	34%
		Panel B. Specifications With Linear Tract Trends		
RCI x Post	-0.260**	-0.0747**	-0.0170	-0.0265
	(0.128)	(0.0321)	(0.0108)	(0.0210)
Constant	0.394***	0.146***	0.0180***	0.0670***
	(0.0134)	(0.00655)	(0.00183)	(0.00413)
Implied Reduction in Crime	33%	29%	56%	24%
Mean of Dependent Variable	0.352	0.157	0.015	0.053
SD of Dependent Variable	0.747	0.296	0.063	0.132

Notes: N = 11,410, λ = 15. All specifications include year fixed effects, and fixed effects for 815 adjusted blocks. Standard errors in parentheses clustered at the block level. The mean of RCI term is 0.407, and the standard deviation of RCI term is 0.172.

*** p<0.01, ** p<0.05, * p<0.1

Event Study: Crime Categories, With Census Tract Trends



Robustness and Threats

1. Different values of λ
2. Concern: Larger proportional reduction in crime in high RCI areas, independent of RCI (Common issue in DiD specifications). Multiple approaches
    1. Linear tract trends specs provide some comfort
    2. Poisson models, effectively a proportional estimator
    3. Local linear estimator

Different λ Values

Table: Effect of Rent Control Intensity on Total Crimes
Dependent Variable: Total Crimes per Area

	(1)	(2)	(3)	(4)	(5)
Exponential Weight	λ=3	λ=6	λ=9	λ=12	λ=15
		Panel A. Specifications Without Tract Trends			
RCI x Post	-0.545***	-0.459***	-0.455***	-0.453***	-0.431**
	(0.184)	(0.156)	(0.163)	(0.174)	(0.175)
Constant	0.578***	0.578***	0.578***	0.578***	0.578***
	(0.0163)	(0.0162)	(0.0162)	(0.0163)	(0.0163)
R-squared	0.851	0.852	0.852	0.852	0.852
Implied Reduction in Crime	56%	44%	42%	41%	39%
		Panel B. Specifications with Linear Tract Trends			
RCI x Post	-0.390***	-0.336***	-0.353***	-0.362**	-0.343**
	(0.121)	(0.106)	(0.122)	(0.144)	(0.152)
Constant	0.584***	0.584***	0.584***	0.585***	0.586***
	(0.0180)	(0.0180)	(0.0180)	(0.0182)	(0.0184)
R-squared	0.853	0.853	0.853	0.853	0.853
Implied Reduction in Crime	40%	32%	33%	33%	31%

N = 11,410. All specifications include year fixed effects and fixed effects for 815 adjusted Census blocks. Specifications in Panel B include linear trends for 30 Census tracts. Standard errors in parentheses clustered at the block level.

*** p<0.01, ** p<0.05, * p<0.1

Estimates Using Block Level RCI ($\lambda \to \infty$)

Table: Effect of Rent Control Intensity on Crime Categories, using Block Level RCI
Dependent Variable: Reported Crimes per Area

	(1)	(2)	(3)	(4)	(5)
Crime Category	Theft	Public Disturbance	Drug & Alcohol	Violent Crime	Total
		Panel A. Specifications Without Tract Trends			
RCI x Post	-0.179**	-0.0289	-0.00959	-0.0342*	-0.228**
	(0.0870)	(0.0254)	(0.00767)	(0.0175)	(0.113)
Constant	0.404***	0.152***	0.0181***	0.0731***	0.609***
	(0.0136)	(0.00666)	(0.00207)	(0.00434)	(0.0192)
Implied Reduction in Crime	17.15%	8.15%	22.32%	21.00%	15.02%
		Panel B. Specifications With Linear Tract Trends			
RCI x Post	-0.120*	-0.0325	-0.00474	-0.0237	-0.168*
	(0.0672)	(0.0226)	(0.00728)	(0.0155)	(0.0896)
Constant	0.409***	0.160***	0.0194***	0.0741***	0.623***
	(0.0146)	(0.00734)	(0.00215)	(0.00466)	(0.0208)
Implied Reduction in Crime	11.48%	9.15%	11.03%	14.55%	11.05%
Mean of Dependent Variable	0.358	0.169	0.016	0.059	0.576
SD of Dependent Variable	0.718	0.297	0.065	0.137	1.033

Notes: N = 9,114. All specifications include year fixed effects, and fixed effects for 651 adjusted blocks with residential units. Standard errors in parentheses clustered at the block level. The mean of RCI term is 0.371, and the standard deviation of RCI term is .302.

*** p<0.01, ** p<0.05, * p<0.1

Optimal λ: One that minimizes Nonlinear SSE

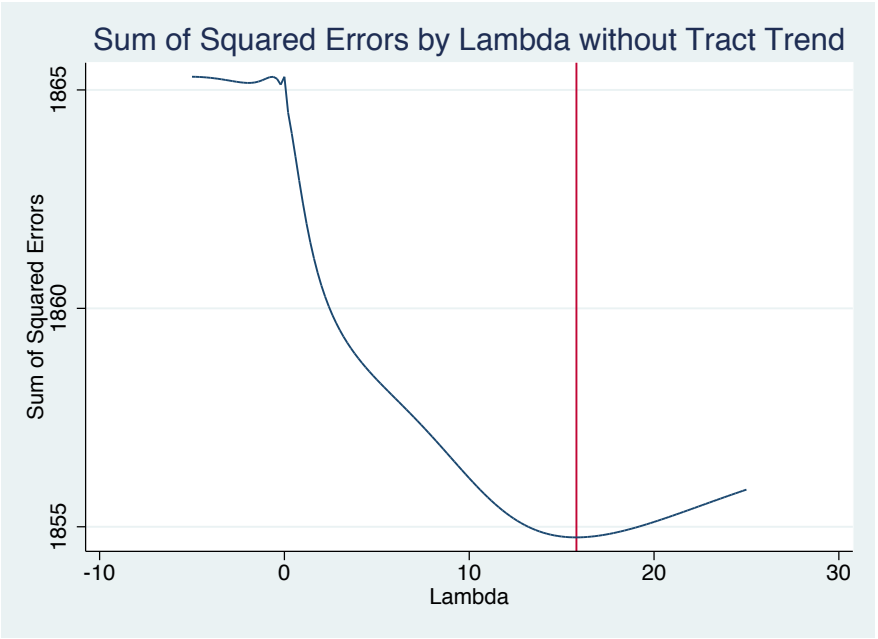


Figure: Sum of Squared Errors Envelope without Trend

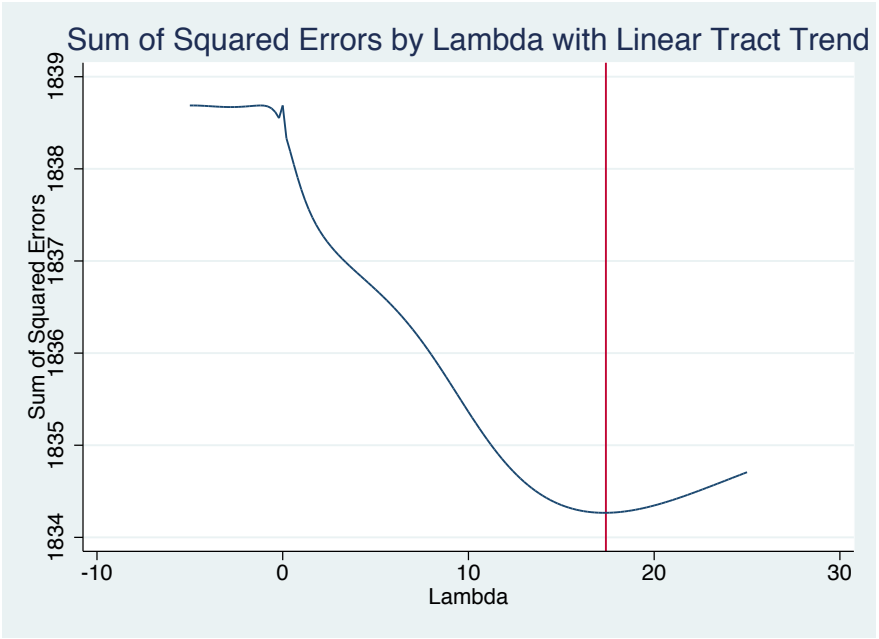


Figure: Sum of Squared Errors Envelope with Linear Tract Trend

Fixed Effect Poisson Model

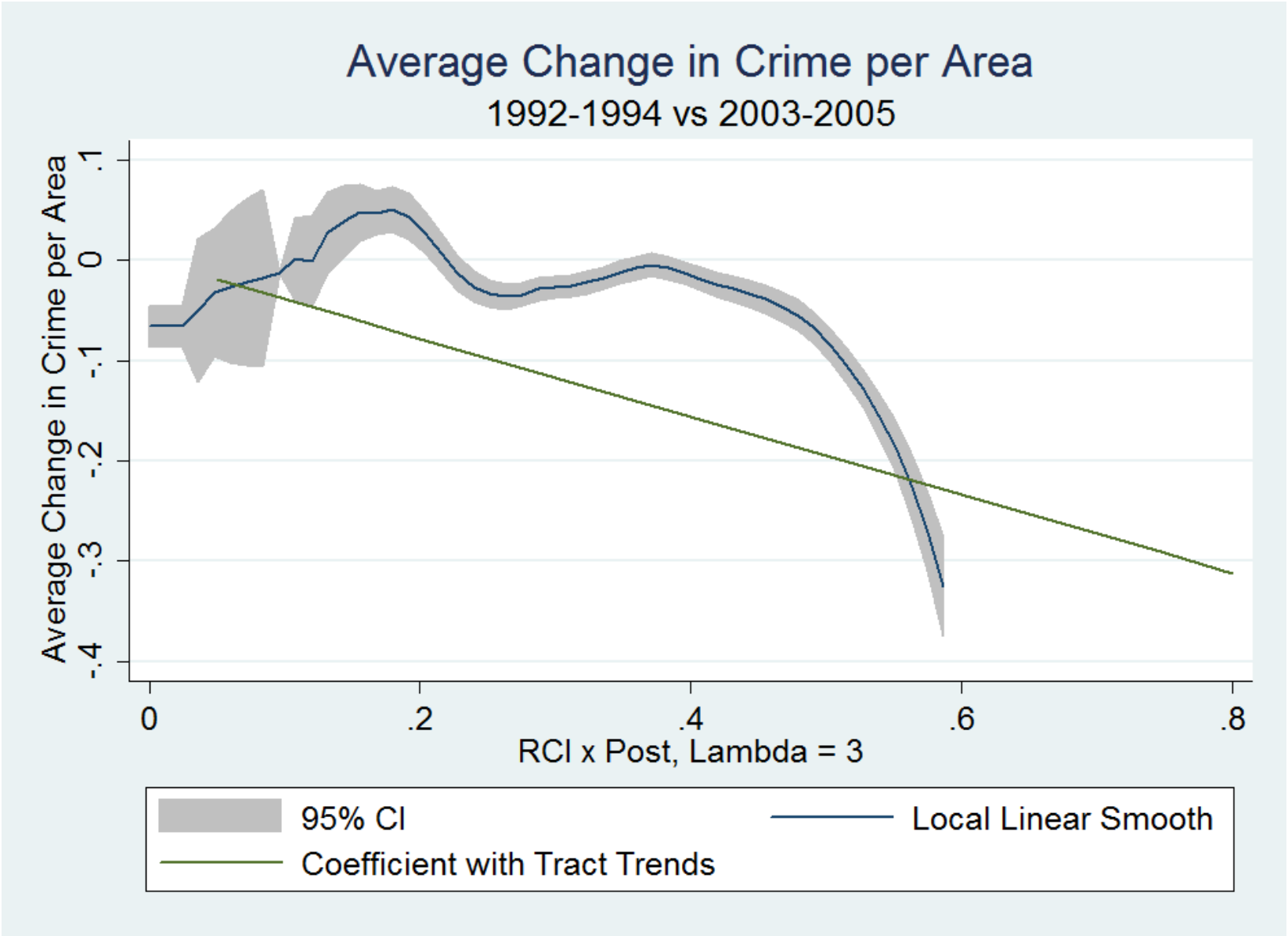
Table: Effect of Rent Control Intensity on Total Crimes using FE Poisson Model
Dependent Variable: Total Reported Crimes

	(1)	(2)	(3)	(4)
Exponential Weight	λ=3	λ=3	λ=15	λ=15
RCI x Post	-0.488*	-0.172	-0.257*	-0.0865
	(0.260)	(0.265)	(0.132)	(0.105)
Linear Tract Trends	NO	YES	NO	YES

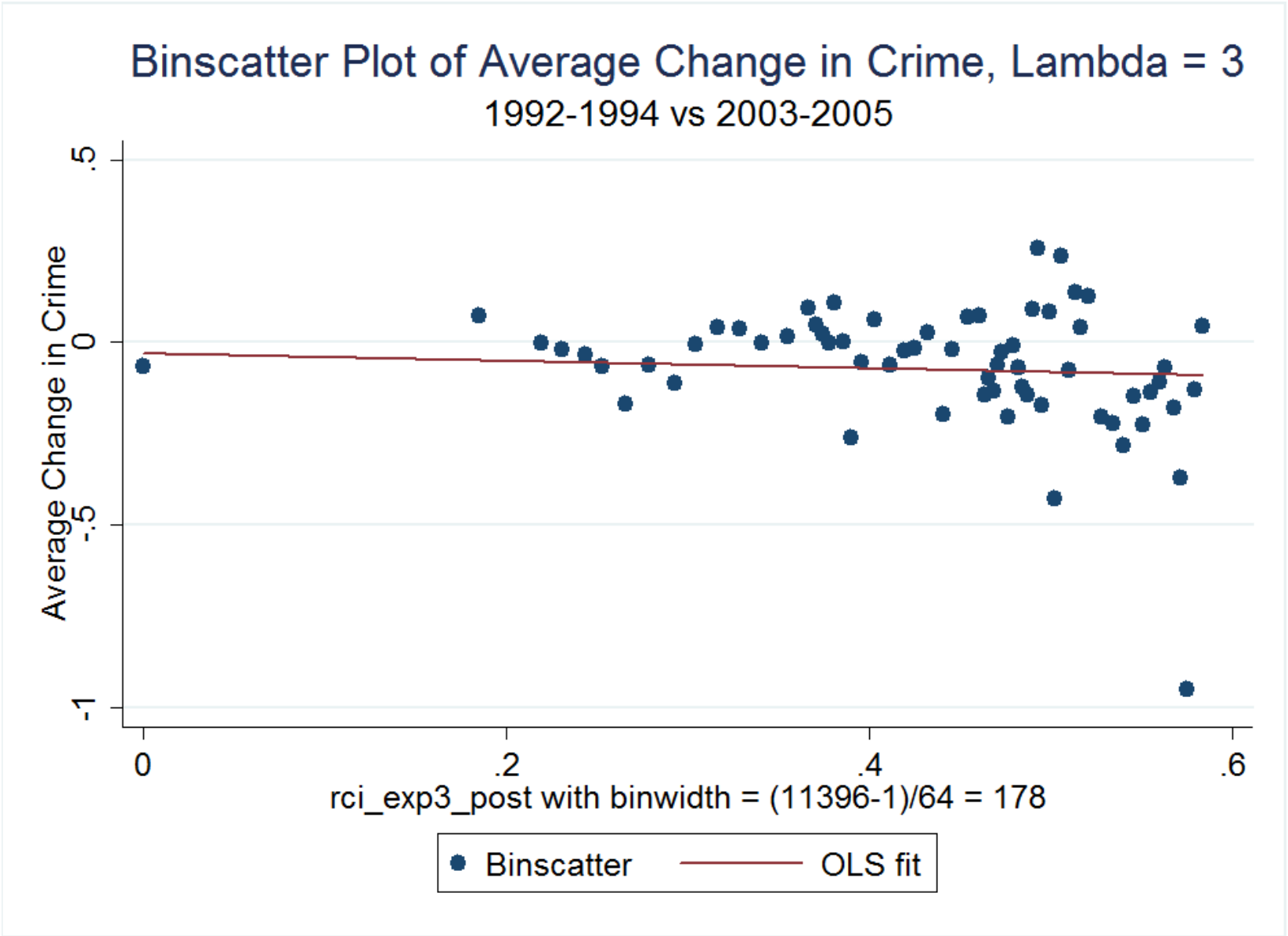
N = 10,752. All specifications include year and block fixed effects. 47 adjusted blocks are dropped because of zero outcomes. Standard errors are clustered at the adjusted block level.

*** p<0.01, ** p<0.05, * p<0.1

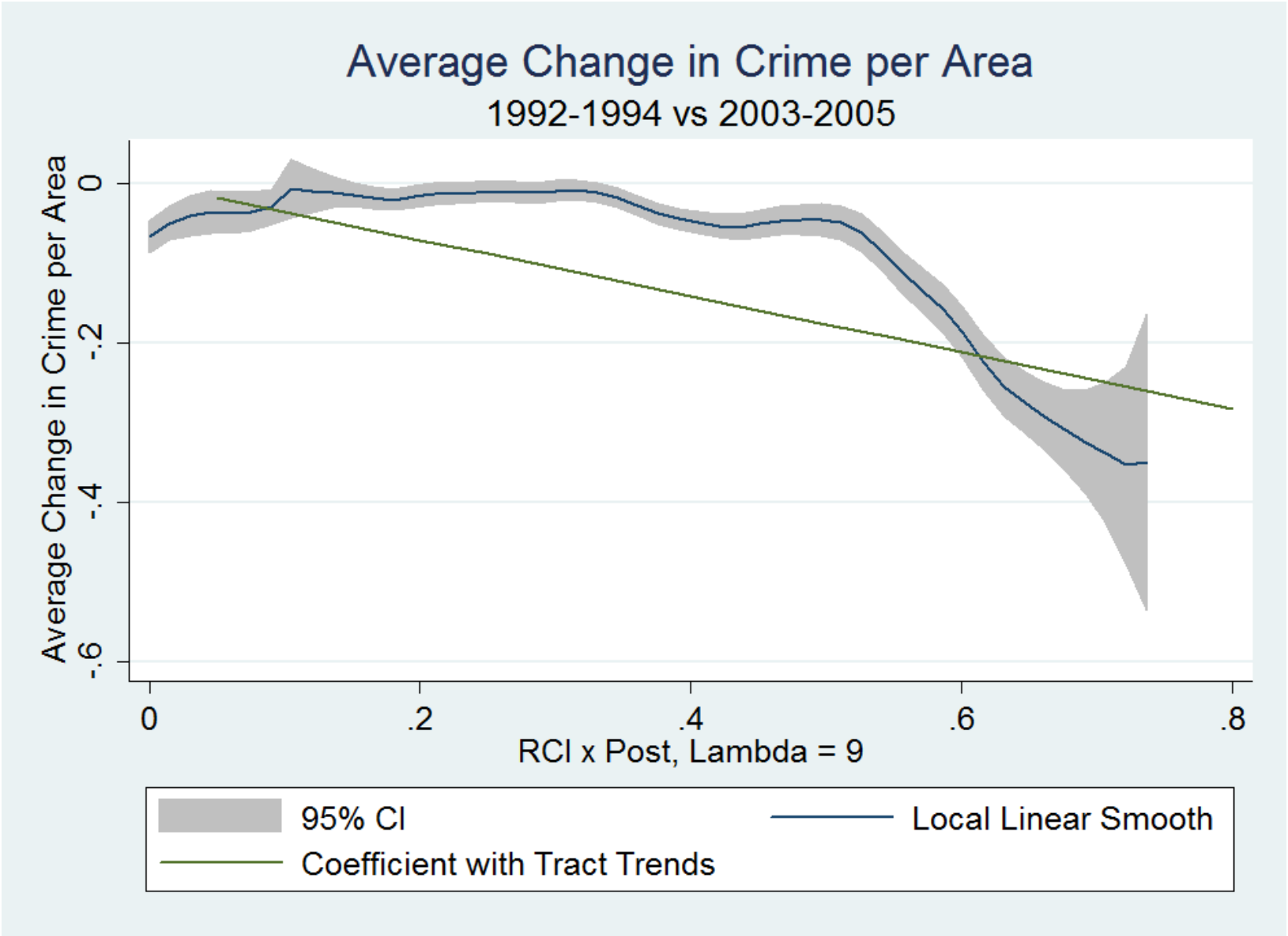
Local Linear Regression, λ=3



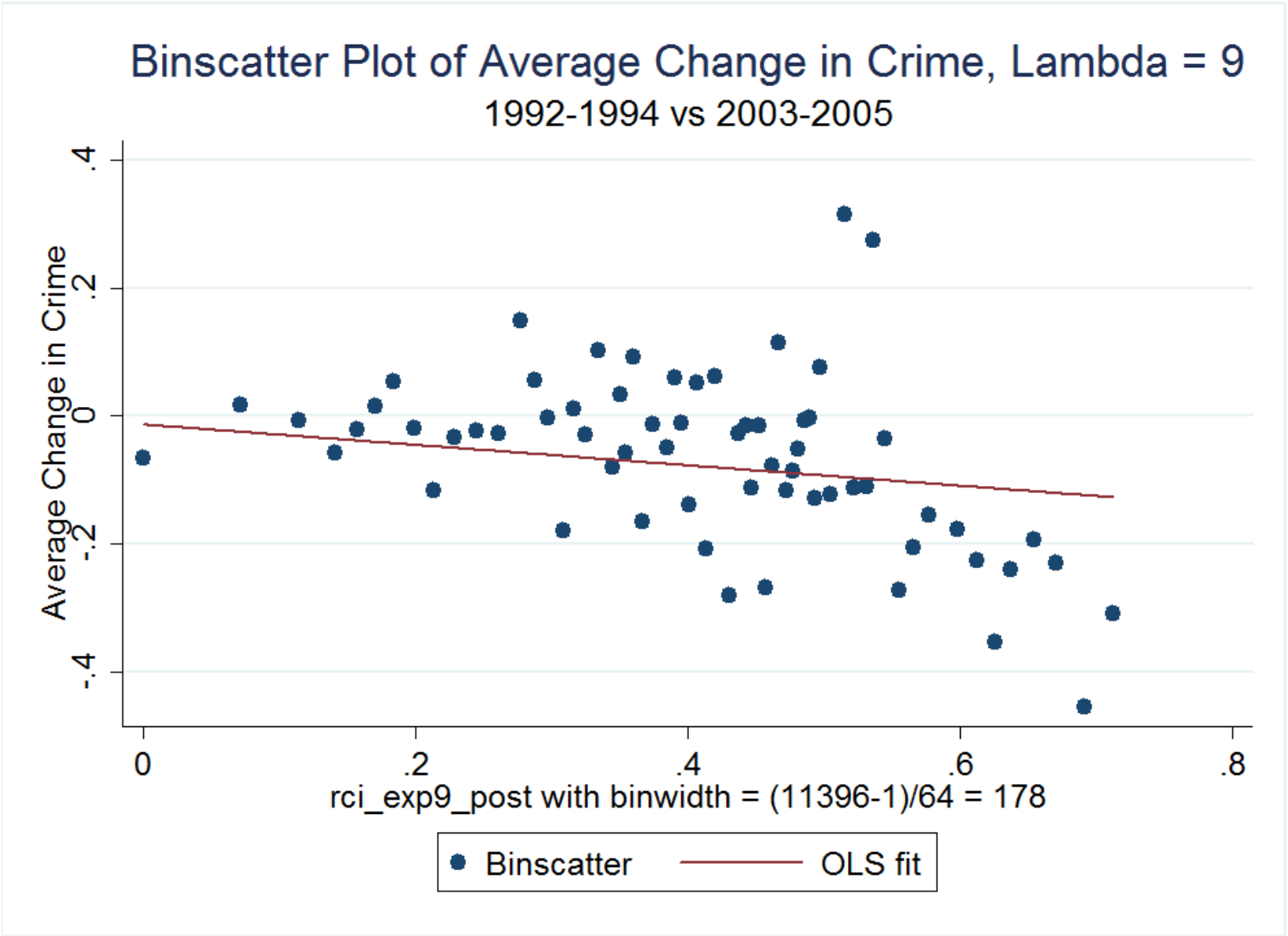
Binscatter Plot, λ=3



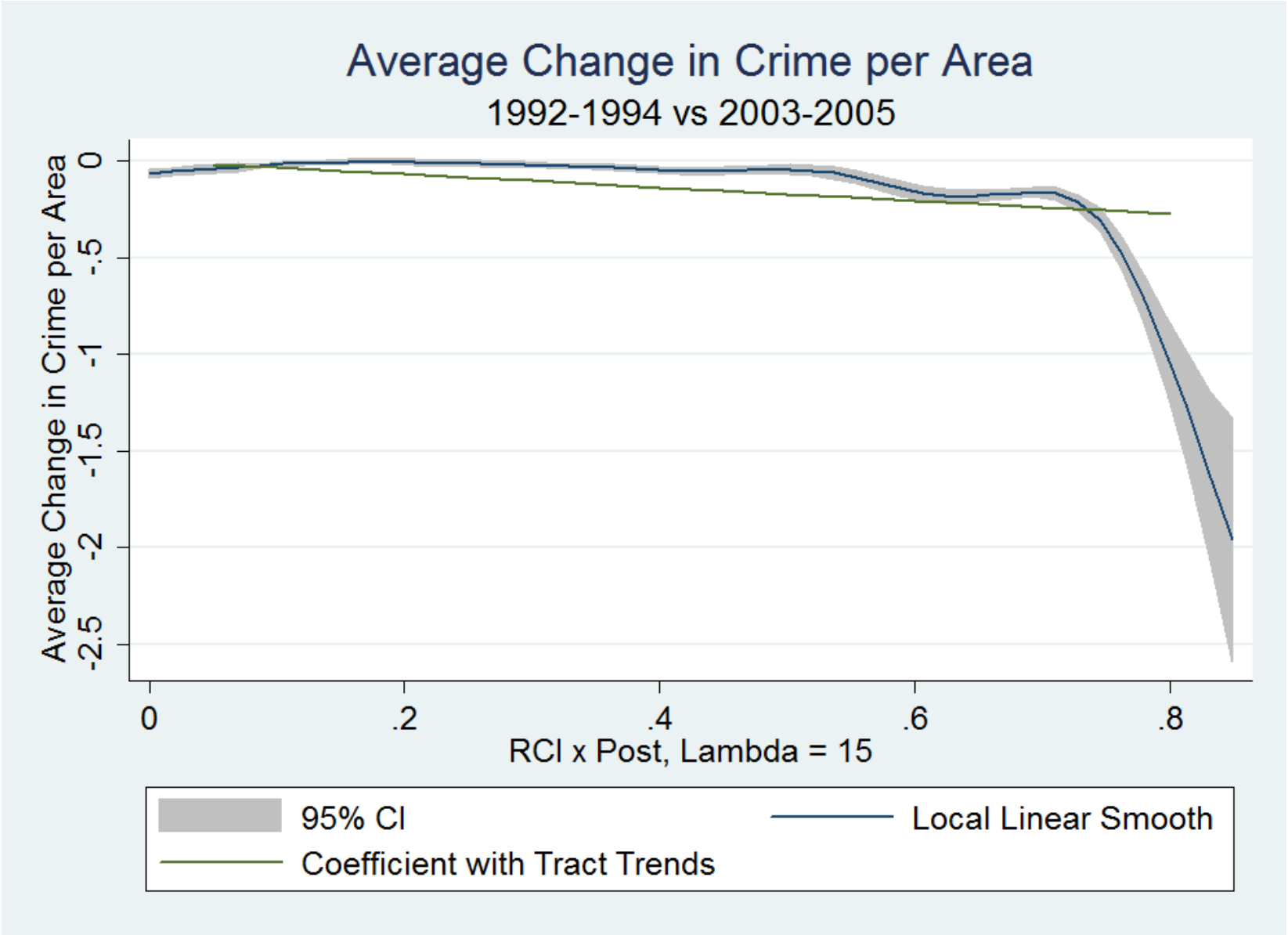
Local Linear Regression, λ=9



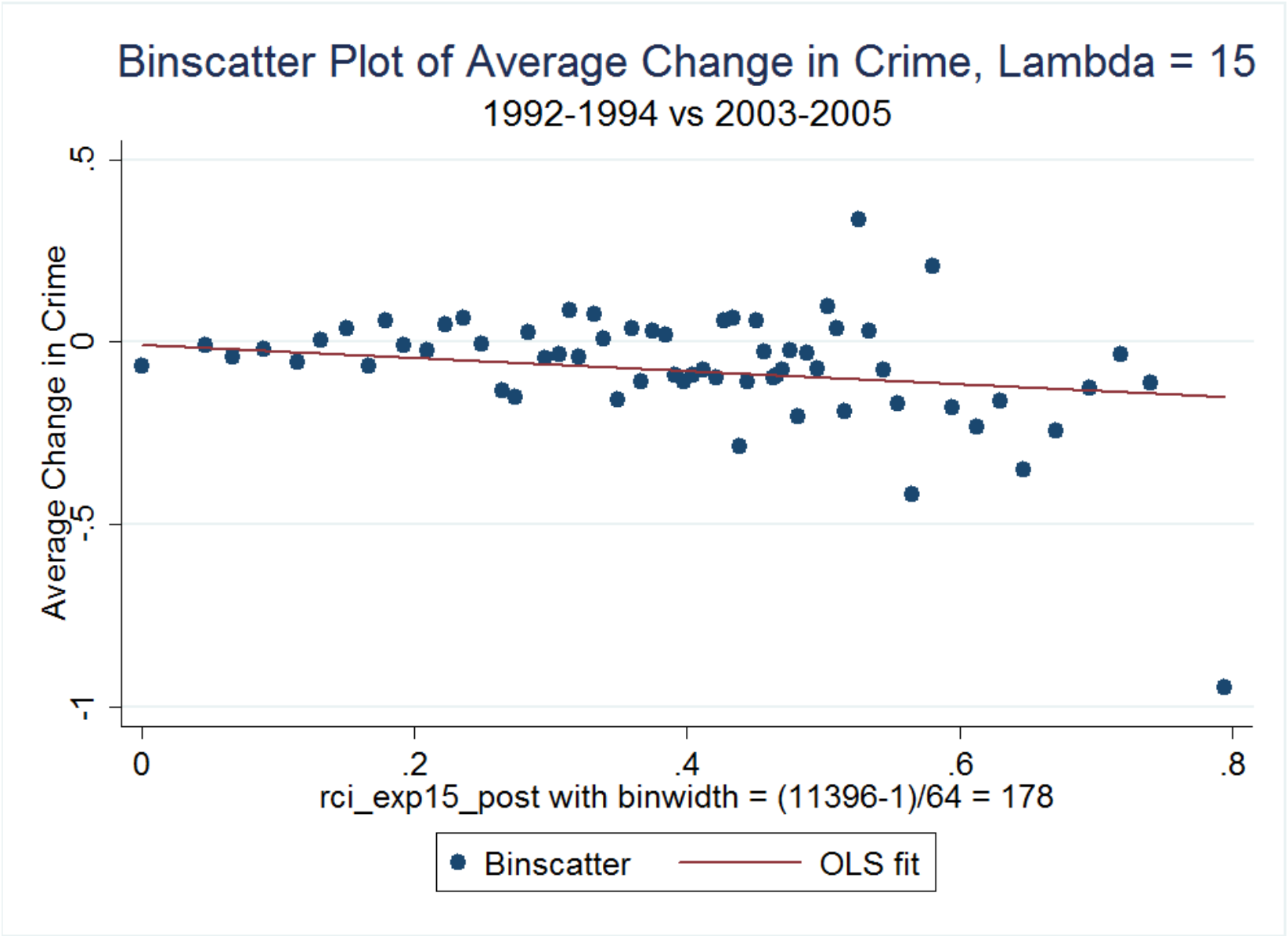
Binscatter Plot, λ=9



Local Linear Regression, λ=15



Binscatter Plot, λ=15



Effect of Rent Control Intensity by RCI Terciles

Table: Total Crimes by RCI Terciles
Dependent Variable: Total Crimes per Area

	(1) λ=3	(2) λ=6	(3) λ=9	(4) λ=12	(5) λ=15
			Panel A. Specifications Without Tract Trends		
Second RCI Tercile Dummy x Post	-0.00227	-0.00984	-0.0164	-0.00813	-0.0207
	(0.0272)	(0.0227)	(0.0225)	(0.0227)	(0.0225)
Third RCI Tercile Dummy x Post	-0.150***	-0.126**	-0.123**	-0.118**	-0.117**
	(0.0467)	(0.0493)	(0.0495)	(0.0494)	(0.0493)
			Panel B. Specifications with Linear Tract Trends		
Second RCI Tercile Dummy x Post	-0.00886	-0.0182	-0.0235	-0.00452	-0.0150
	(0.0255)	(0.0279)	(0.0263)	(0.0267)	(0.0263)
Third RCI Tercile Dummy x Post	-0.117***	-0.0696*	-0.0645	-0.0603	-0.0624
	(0.0365)	(0.0412)	(0.0415)	(0.0427)	(0.0421)
Mean of Second RCI Tercile	0.459	0.437	0.426	0.421	0.416
Mean of Third RCI Tercile	0.539	0.564	0.573	0.581	0.591

N = 11,410. All specifications include year fixed effects and fixed effects for 815 adjusted blocks. Standard errors in parentheses clustered at the block level. Specifications in Panel B include 30 Linear Census Tract Trends.

*** p<0.01, ** p<0.05, * p<0.1

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6. Conclusion

Estimating Counterfactuals

- Estimate the total number of crimes in the post period that would have happened but for RCI $\times$ Post effect:

$$\widehat{\Delta Crimes} = \sum_{g} \sum_{t=1995}^{2005} \hat{\beta}_1 \cdot RCI_g^{\lambda} \cdot Area_g$$

- Estimate β_1 separately for each crime category.
- Use preferred specification: tract trends, $\lambda = 15$.

Literature Evaluating the Economic Cost of Crime

- Criminology and economics literatures on estimating the economic costs of crime using variety of methods:
  - Contingent valuation
  - Hedonic regressions on property values
  - Quality of life measures
  - Accounting estimates
  - Jury awards

- We use estimates of economic cost of crime to victims from Cohen and Piquero (2009), which is the updated version of commonly cited Miller et al. (1996) Department of Justice report

Monetizing the Value of Averted Crimes

Table: Weighted Cost per Crime

Crime Category	Victimization Cost	Criminal Justice Cost	Offender Productivity	Total Cost	WTP estimate
Theft	$1,275	$2,030	$839	$4,144	$13,797
Public Disturbance	$650	$347	$6	$1,002	$1,974
Drugs & Alcohol	-	-	-	-	-
Violent Crime	$110,677	$18,415	$9,023	$122,260	$339,203
Weighted Average	$11,015	$3,020	$1,339	$13,934	$39,862

Note: Table reports the weighted costs per crime in 2008 dollars. The costs are weighted by the frequency of the crimes in Cambridge by types, using the estimates from Cohen and Piquero (2009). Estimates for the cost of Drug & Alcohol crimes are unavailable.

Monetizing the Value of Averted Crimes

Table: Annual Value of Averted Crimes Attributable to Rent Decontrol

Crime Category	Estimated Number of Averted Crimes	Victimization Cost	Criminal Justice Cost	Offender Productivity	Total Cost	Present Discount Value of Averted Crimes
Theft	1639	$2,090,142	$3,327,091	$1,374,943	$6,792,175	$135,843,509
Public Disturbance	471	$305,895	$163,309	$2,625	$471,828	$9,436,569
Drugs & Alcohol	107	-	-	-	-	-
Violent Crime	167	$18,501,595	$3,078,385	$1,508,326	$20,437,928	$408,758,560
Weighted Average	2162	$23,815,991	$6,528,420	$2,895,343	$30,126,060	$602,521,198

Notes: Table reports estimates of the annual reduction in reported crimes from 1995-2005 attributable to rent decontrol using the specification with lambda= 15 and linear tract trend fixed effects. Estimates of the economic cost per crime come from Cohen and Piquero (2009), and are in 2008 dollars. Estimates for the economic cost to victims of Drug & Alcohol crime are unavailable. The present discount value of averted crimes assumes a discount rate of 5%.

Monetizing the Value of Averted Crimes: Willingness to Pay Estimates

Table: Annual WTP Value of Averted Crimes Attributable to Rent Decontrol

Crime Category	WTP Cost	Present Discount Value of Averted Crimes
Theft	$22,611,471	$452,229,426
Public Disturbance	$929,408	$18,588,169
Drugs & Alcohol	-	-
Violent Crime	$56,703,783	$1,134,075,650
Weighted Average	$86,183,377	$1,723,667,545

Notes: Table reports estimates of the annual reduction in reported crimes from 1995-2005 attributable to rent decontrol using the specification with lambda= 15 and linear tract trend fixed effects. Estimates of the economic cost per crime come from Cohen and Piquero (2009), and are in 2008 dollars. Estimates for the costs of Drug & Alcohol crime are unavailable. The present discounted value of averted crimes assumes a discount rate of 5%.

Indirect Contributions of Rent Decontrol to Changes in Residential Property Values

TABLE 8
ESTIMATED DIRECT AND INDIRECT CONTRIBUTIONS OF RENT DECONTROL TO CHANGES IN CAMBRIDGE ASSESSED RESIDENTIAL PROPERTY VALUES, 1994–2004
(in Millions of 2008 Dollars)

	A. Assessed Housing Values				B. Estimated Effects of Decontrol on Housing Values			
	Assessed ($ Millions)		Change 1994–2004		Increase in Value ($)		Increase in Value (%)	
	1994	2004	Δ$	Δ%	Direct Effect	Indirect Effect	Direct Effect	Indirect Effect
Decontrolled units:								
Houses	$267	$760	$493	185%	$94	$149	18%	29%
Condominiums	$518	$1,746	$1,228	237%	$216	$390	19%	34%
All	$785	$2,507	$1,722	219%	$310	$539	19%	33%
Never-controlled units:								
Houses	$2,961	$7,320	$4,359	147%	NA	$822	NA	13%
Condominiums	$1,017	$2,699	$1,683	166%	NA	$306	NA	13%
All	$3,978	$10,020	$6,042	152%	NA	$1,128	NA	13%
All units:								
Houses	$3,229	$8,081	$4,852	150%	$94	$971	1%	14%
Condominiums	$1,535	$4,446	$2,911	190%	$216	$696	6%	20%
All	$4,763	$12,526	$7,763	163%	$310	$1,667	3%	16%

NOTE.—Assessed values are from the 1995 and 2005 Cambridge assessor's databases, reflecting property valuations as of 1994 and 2004, respectively. Counterfactual log property values are estimated separately for houses and condos using the specification in col. 7 of table 4. Counterfactuals for RCI effects subtract non-RC × RCI × Post and RC × RCI × Post effects, and counterfactuals for the direct effect of decontrol subtract RC × Post effects from actual log property values. Aggregate effects in 2008 dollars are calculated by summing exponentiated counterfactual log property values.

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Conclusion

- Cambridge residential property appreciation 1994-2004 was $7.8B
- Rent decontrol lowered Cambridge crime by ≈2,150 crimes (31%) per year during 95/05 vs. 92/94
- Economic cost: $30m annual benefit to would-be victims (in $2008)
  - PDV of $600M at 5% discount → 30% ($600M of $2B) of appreciation due to decontrol (APP '14)
  - Three times as large a contributor as residential investment
  - Using WTP instead of victim cost, RC accounts for 80% of effect: $1.7B of $2.0B
- Takeaway: Public safety improvements play large role in price impact of Cambridge's post-decontrol gentrification
- On-going work:
  1. Commuting criminals
  2. Neighborhood turnover
  3. Where did the crime go?

BACKUP SLIDES

Compositional Changes

Table. Relationship Between Block-Level Rent Control Intensity and Changes in Demographic and Occupancy Characteristics, 1990 - 2000

	A. Population Characteristics			
		Age Distribution (shares)		
	Log Population	Age 0 - 17	Age 18 - 64	Age 65+
RC Intensity of Block	-0.0436	-0.0485***	0.0905***	-0.0420**
	(0.0765)	(0.0125)	(0.0193)	(0.0176)
Constant	0.0790***	0.00978*	-0.00702	-0.00276
	(0.0264)	(0.00520)	(0.00708)	(0.00626)
Observations	571	571	571	571
R-squared	0.001	0.028	0.057	0.017

Compositional Changes

Table. Relationship Between Block-Level Rent Control Intensity and Changes in Demographic and Occupancy Characteristics, 1990 - 2000

	A. Population Characteristics				
	Race Distribution (shares)				
	White	Black	Native Amer	Asian/Pacific	Other
RC Intensity of	-0.0389	-0.00158	-0.00309	0.0178	0.0258***
Block	(0.0247)	(0.0131)	(0.00230)	(0.0184)	(0.00990)
Constant	-0.0478***	-0.00441	0.00591***	0.0296***	0.0167***
	(0.00929)	(0.00536)	(0.00112)	(0.00637)	(0.00378)
Observations	571	571	571	571	571
R-squared	0.006	0.000	0.003	0.003	0.014

Compositional Changes

Table. Relationship Between Block-Level Rent Control Intensity and Changes in Demographic and Occupancy Characteristics, 1990 - 2000

	B. Occupancy Characteristics			
	Log Occupied HU	Log Average Persons per HU	Log One-Person HH's	Log 2-Plus-Person HH's
RC Intensity of Block	-0.0499	0.128***	-0.293***	0.143**
	(0.0442)	(0.0442)	(0.0873)	(0.0645)
Constant	0.103***	-0.0379**	0.190***	0.0577**
	(0.0201)	(0.0161)	(0.0370)	(0.0244)
Observations	570	570	562	569
R-squared	0.003	0.023	0.024	0.012

Compositional Changes

Table. Relationship Between Block-Level Rent Control Intensity and Changes in Demographic and Occupancy Characteristics, 1990 - 2000

	B. Occupancy Characteristics				
	Log Housing Units	Fraction HU Occupied	Fraction HU Vacant	Fraction HU Owner Occ	Fraction HU Renter Occ
RC Intensity of Block	-0.0644*	0.0154	-0.0154	-0.00354	0.0190
	(0.0373)	(0.0171)	(0.0171)	(0.0180)	(0.0224)
Constant	0.0843***	0.0130*	-0.0130*	0.0246***	-0.0117
	(0.0167)	(0.00724)	(0.00724)	(0.00869)	(0.00999)
Observations	570	570	570	570	570
R-squared	0.006	0.002	0.002	0.000	0.001