Housing Market Spillovers:

Evidence from the End of Rent Control in Cambridge MA

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Background

- Externalities are a major theme in urban economics
- Residential housing market spillovers
  - ✓ Maintenance, or attributes of residents in each housing unit may affect desirability and market value of nearby units
- Rent controls might affect externalities
  - ✓ Poor maintenance, unruly tenants, or high/low-income tenants may directly affect property values
- We study effects of end of rent control in Cambridge MA in 1995

Textbook example of price distortion in product market

- Classic economic issue - Milton Friedman and George Stigler (1946):

  Rent ceilings, therefore, cause haphazard and arbitrary allocation of space, inefficient use of space, retardation of new construction...

- Regulatory involvement in housing market widespread:
  - ✓ Intensively used in U.S. immediately after WWII (see Fetter 2011)
  - ✓ Remains in urban areas NYC, SF, DC, LA, CA and NJ towns
  - ✓ Popular w/affordable housing advocates. Common in Europe
- Markets with price controls:
  - ✓ Labor markets, alcohol and cigarettes, gasoline
  - ✓ Spillovers may be uniquely important in housing markets

Related literature and questions

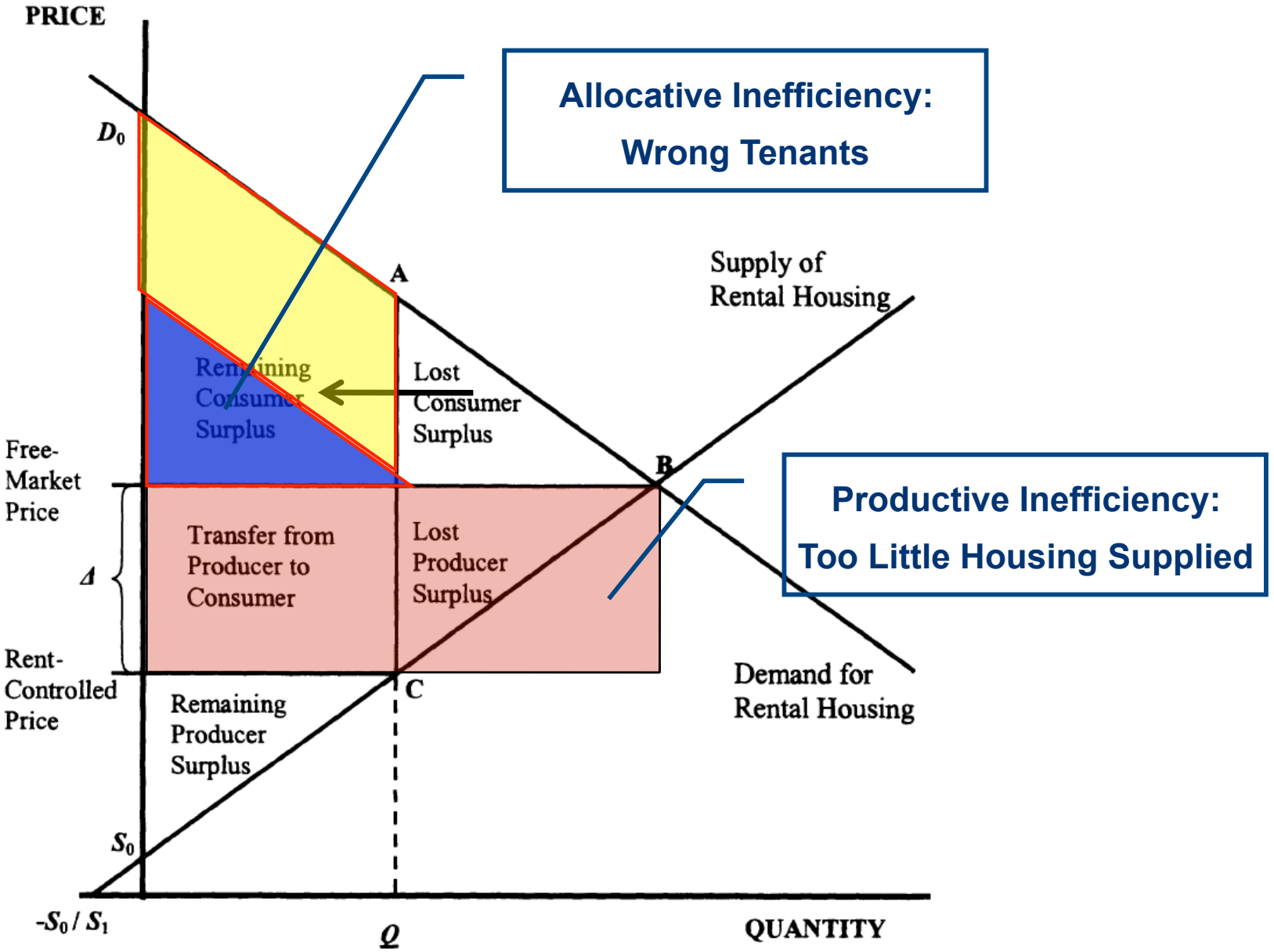
Residential externalities

- 'Extreme spillovers' (sex offender next door): Linden and Rockoff (2008), Pope (2008)
- Neighborhood revitalization: Rossi-Hansberg, et. al (2010)
- Foreclosures next door: Campbell, Giglio, Pathak (2011)
- Gentrification: Hurst, Guerrieri, Hartley (2011)

Rent control literature

- Olsen, Linneman, Gyourko: Investment effects
- Glaeser and Luttmer (2003): Allocative distortions
- Sims (2007): Effect on quantity and quality of rental housing

Effects of Rent Control Understood in Theory



Glaeser and Luttmer 2003

Effects of Rent Control Understood in Theory

- How does rent control affect housing market operation?
  1) Productive inefficiencies: Quality/quantity of rental housing 'too low'
  2) Allocative inefficiencies: Rationing means prices may not reveal willingness to pay
  3) Externalities: Poor maintenance, bad tenants may affect value of nearby non-controlled units

  Externalities stem from (1) and (2): Distortions in market for RC units inhibit efficient sorting into nearby non-controlled units

- But little solid evidence – absence of good experiments
  - ✓ *Rent control in Cambridge offers unique opportunity for study*

Outline

1) **Rent control in Cambridge**
2) Model: Price effects of rent control
3) Data sources and empirical approach
4) Estimates of effects on home sale prices and assessments
5) Robustness
6) Magnitudes
7) Potential mechanisms
8) Conclusions

Rent Control Adopted in Cambridge in 1971

- Scope
  - ✓ Applied to all non-owner-occupied rental housing built before 1969
  - ✓ Did not apply to: (1) Structures built 1969 forward or (2) Non-residential structures converted to rental after law adopted
- Price controls
  - ✓ 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
  - ✓ Hard for landlord to obtain individual permission to raise rent
- Quantity controls
  - ✓ Vacancy control: Difficult to take controlled units out of circulation

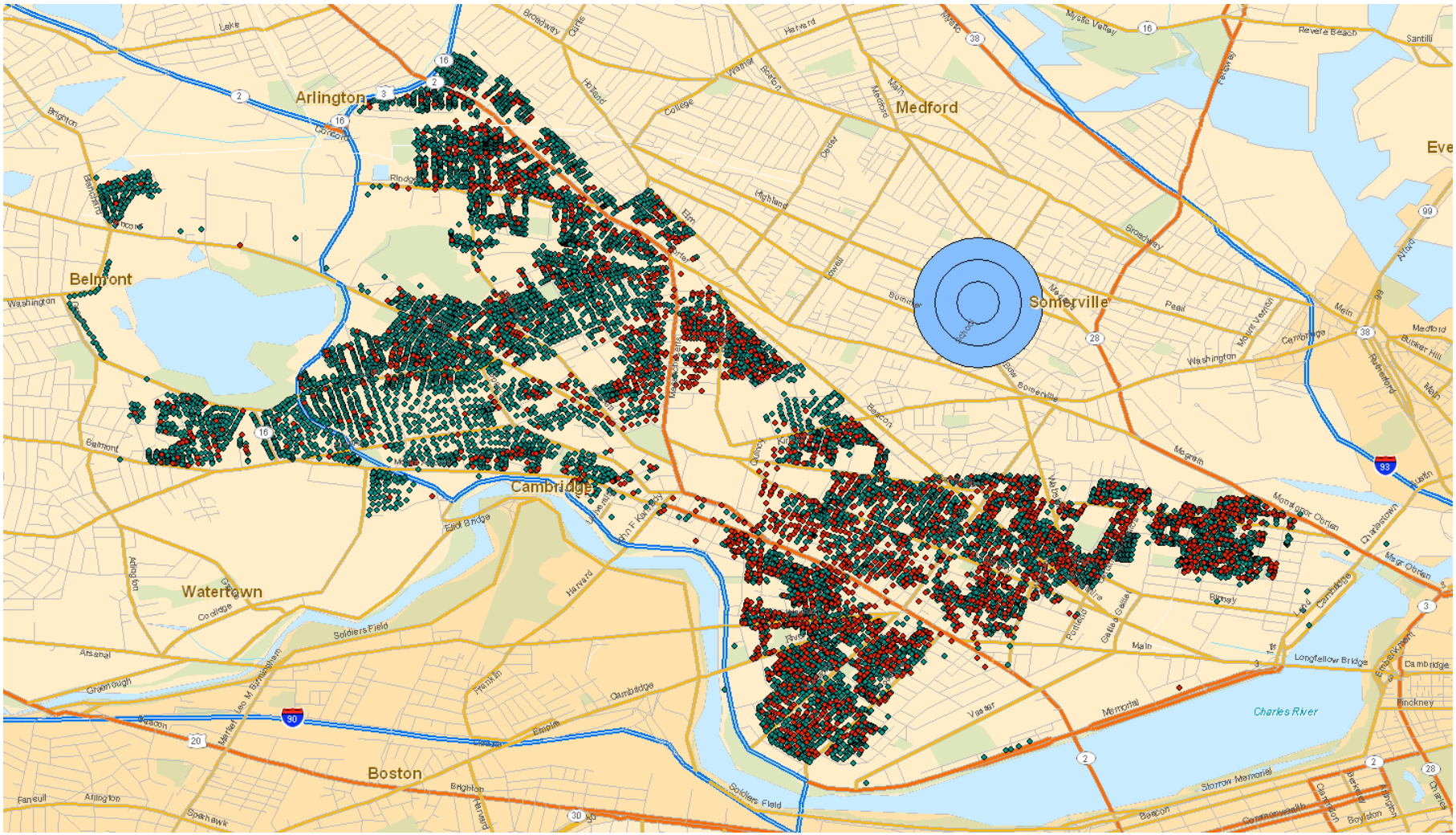


Figure 1: All Residential Structures in Cambridge
(Green=Uncontrolled Housing, Red=Rent Controlled Housing)
The blue circles correspond to 0.1, 0.2 and 0.3 mile radii circles


RUSSIANS CAN
NOW OWN AND
OCCUPY THEIR
APARTMENTS.
IN CAMBRIDGE
WE CANNOT!
LESS THAN COST RENTS
BAUHS 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 Small Property Owners Association (SPOA) to eliminate in Cambridge, Boston, Brookline
- Brilliant idea: Bring RC to state-wide ballot
  - ✓ Controversial referendum with uncertain outcome
  - ✓ Mass. residents voted 51 percent to 49 to end rent control
  - ✓ Residents from Boston, Brookline, and Cambridge voted to keep (about 60%)
- Immediate price decontrols in January 1995 unless:
  - ✓ Tenant income of 60% or less than median for Boston MSA, or elderly or disabled
- Final deadline
  - ✓ Multi-unit buildings de-controlled in 1/96 or 1/97 for largest

Analytic Virtues of 1995 Cambridge Decontrol

1) Only a fixed non-expanding set of units ever rent-controlled

   ✓ Gives rise to a natural comparison group of controlled and never-controlled structures in close geographic proximity.

2) No 'threat' effect of rent-control onto non-controlled units

   ✓ No danger that your new condo unit would be rent-controlled when finished. Thus, no expected price effect

3) Geographic variation in Rent Control Intensity (fraction of controlled units in a neighborhood)

   ✓ Depended on age of properties, owner-occupied status of in 1971

4) Unexpected overturn of RC in Nov 1994 yields quasi-experiment

   ✓ Even two years after passage, 1995-1996, doubts about whether it would stick

Differential Rise in Turnover of RC Residents After Repeal

Data source: Annual Cambridge City Census

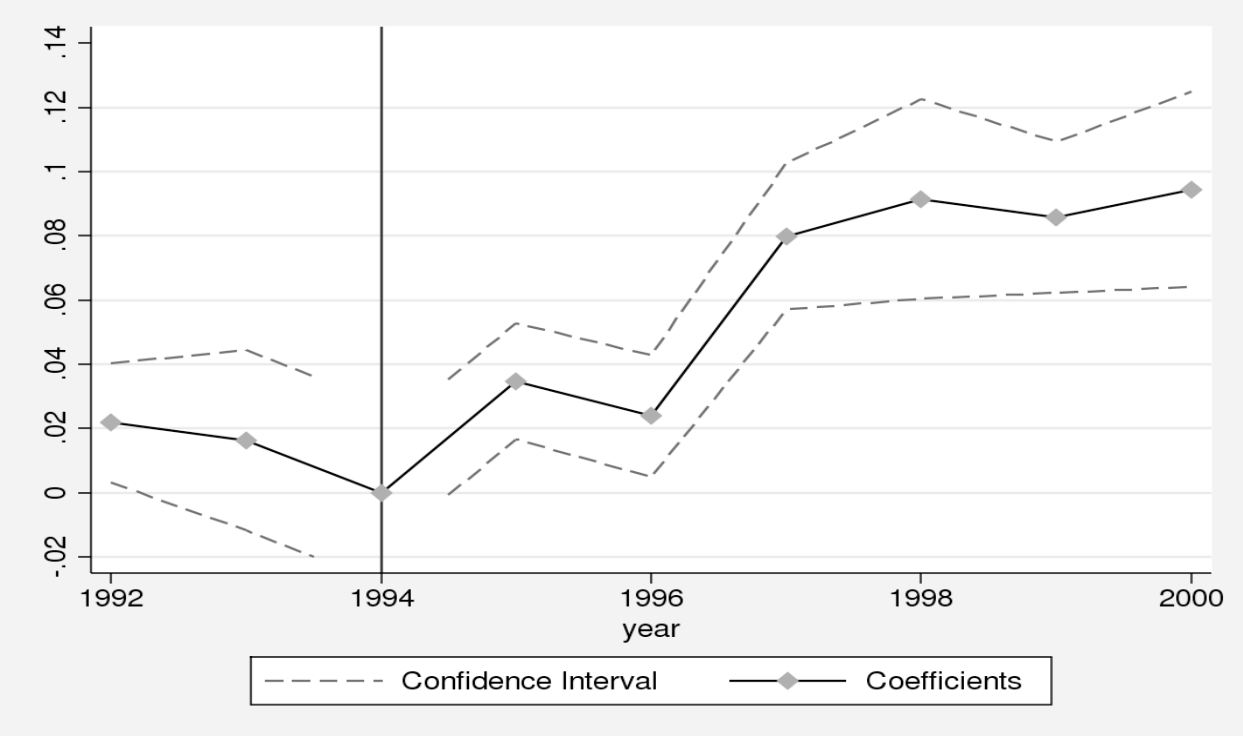
$$\text{Move}_{it} = \delta_t + \gamma_g + \lambda_1 \text{RC} + \lambda_2 \text{RC} \times 1\{t \geq 1995\} + \epsilon_{it}$$

Table 1. Turnover at Cambridge Residential Locations, 1992-2000

Dependent Variable: Indicator for New Resident at Location in Year				
	All Properties	Houses	Condominiums	Apartments
	(1)	(2)	(3)	(4)
Mean of dependent variable	0.269	0.232	0.297	0.335
	(0.197)	(0.178)	(0.209)	(0.223)
RC	-0.003	0.073***	-0.035**	-0.056**
	(0.008)	(0.008)	(0.016)	(0.026)
RC x Post	0.054***	0.025***	0.076***	0.057**
	(0.008)	(0.008)	(0.022)	(0.025)
N	310,949	172,996	70,558	67,395

Notes. Table reports estimates from regressing an indicator for whether there is a new resident at a Cambridge location in a given year on rent control (RC), RC x Post, year controls, structure type dummies, and geographic fixed effects for 88 block groups in the 1990 Census. RC is an indicator for a rent controlled location in 1994 and Post is an indicator for year 1995 and after. Data is from the Cambridge City Census and rent control file. Robust standard errors clustered by block group in parentheses.

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 specification 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. Vertical line in 1994 indicates year prior to rent control removal.

$$\text{MOVE}_{ijt} = \delta_t + \gamma_g + \sum_{j=1991}^{2000} \lambda_j \times 1\{t = j\} \times \text{RC}_i + \epsilon_{it}$$

Cambridge Rent Control Ends Jan 1, 1995

- Data on change in Cambridge **rents** before v. after end of rent control
- Source: 1998 Atlantic Marketing Survey commissioned by city of Cambridge

Table 2. Estimated Change in Median Rents 1994 to 1997

	Tenants who Remained in Controlled Units Following Decontrol	Tenants who Left Controlled Units Following Decontrol	New Tenants in Decontrolled Units	Tenants in Never Controlled Units
1994 Median Rents	$500	$543	$500	$800
1997 Median Rents	$700	$762	$925	$900
Change	$200	$229	$425	$100
% Change	40%	40%	85%	13%
N	293	97	179	431

Notes. Data from Atlantic Marketing Research Survey. All dollars are nominal.

Research Objectives

1. Estimate decontrol effect on **assessed values**, **transacted sale prices** of decontrolled units and spillovers to nearby never-controlled units
   - ✓ Mean 20% **direct effect** on values due to decontrol of formerly controlled properties
2. Estimate spillovers: Variation in neighborhood rent control exposure
   - ✓ Mean 16% **spillover effect** for nearby never-controlled housing
3. Investigation of possible mechanisms
   - ✓ Conversioning/supply effects
   - ✓ Permitting activity
4. Quantify role of decontrol to Cambridge residential price appreciation
   - ✓ Added $2 billion to value of Cambridge housing stock 1994-2004
   - ✓ Almost 84% of this added-value due to *spillovers*
   - ✓ Explains 13% of $6 billion appreciation of non-RC properties

Outline

1) Rent control in Cambridge
2) **Model: Price effects of rent control** ▸ Forward
3) Data sources and empirical approach
4) Estimates of effects on home sale prices and assessments
5) Robustness
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Price Effects in a Stylized Model of Housing Market

- City: $n = 1, ..., N$ neighborhoods, $\ell \in [0, 1]$ locations in each
- Each location (ℓ, n) is owned by an absentee landlord, who produces homogeneous housing services by choosing maintenance levels to maximize profits:

$$\pi = p \cdot \underbrace{f(m)}_{\text{prod. fn for housing}} - \underbrace{c(m)}_{\text{cost of maintenance}}$$

- Continuum of consumers: quasi-linear preferences, α relative taste for housing services, outside utility $\bar{U}_y$ (perfect mobility)

$$U(c, h) = Ac^{1-\alpha} h^{\alpha}$$

- A_n: amenities depend on neighborhood investment and types

$$A_n = \int_0^1 [m_n(\ell) y_n(\ell)]^{\beta} d\ell$$

- **Equilibrium**: Resident income, price, and housing service $\langle y_n(\ell), p_n(\ell), h_n(\ell) \rangle$ for each neighborhood n and location ℓ such that

  i) Each household obtains at least outside option

  ii) No household wishes to move to another neighborhood or location

  iii) Landlords maximize profits

Basic logic:

- Spatial arbitrage and landlord symmetry $\Rightarrow$ Neighborhood amenities A_n capitalize into prices p_n
- Prices pin down maintenance levels (which are rising in p_n)
- Preferences for housing services (α) determine which resident types live where
- Both maintenance levels and resident types in turn affect A_n (that's the externality)
- Equilibrium is fixed point where maintenance choices of landlords and location choices of residents (α) consistent with p_n

Price effects of imposition of Rent Control

How do Rent Control regs affect price of non-controlled units?

- ✓ Suppose λ_n of properties are controlled
- ✓ For controlled properties, Rent Control Board sets binding cap:

$$p_n(\ell) = \bar{p}_n(\ell),$$

Has two effects on neighborhood amenities:

1) **Direct maintenance effect**

   Capped price reduces maintenance (no marginal return)

   κ_n^1: Aggregate maintenance in controlled units in neighborhood

2) **Allocative effect**: Who obtains controlled housing?

   κ_n^2: Aggregation of types who obtain controlled housing (unmodelled)

   In theory, could be higher or lower types

Price effects of imposition of Rent Control

- In assortative equilibrium (with n types), with quadratic costs and linear production

$$\underbrace{\Delta \log(p_n(\ell))}_{\text{uncont. price } \Delta} = \frac{\lambda_n \beta}{\alpha - \beta(1-\lambda_n)} \{ \underbrace{[\ln(m_n^u) - \kappa_n^1]}_{\text{maintenance effect}} + \underbrace{[\ln y_n - \kappa_n^2]}_{\text{allocative effect}} \}$$

- When rent control imposed or removed, price Δ at never-controlled properties a **sufficient statistic** for Δ amenities
- Effect of Rent Control on price of never-controlled units *negative* if:

$$\underbrace{[\ln(m_n^u) - \kappa_n^1]}_{\text{maintenance effect}} > -\underbrace{[\ln y_n - \kappa_n^2]}_{} \tag{1}$$

- If pre-RC equilibrium efficient, then allocative effect is negative
- Note: Additional **direct** effect of decontrol on controlled properties

Effect of **elimination** of RC on non-controlled prices

Proposition. *Assume condition (1). Following elimination of RC, change in prices for never-controlled properties is greater for :*

1) With more rent control intensity (i.e., greater share of RC neighbors)

2) Where the price of controlled properties is further depressed from their market price (i.e, RC price cap more binding)

3) Where there is a greater mis-allocation of household types relative to the types in the never-controlled economy (further from assortative equilibrium).

Also note: Controlled properties experience an additional price effect due to the direct effect of decontrol (capitalization of rent).

Some missing ingredients...

1) Houses services are homogenous
   - ✓ No substitution motive within a geography

2) Static housing services
   - ✓ No distinction between prices and rents (so no realistic dynamics due to say, option value of ownership)

3) Consumer heterogeneity in income only
   - ✓ Assortative equilibrium relatively simple

Recap of Potential Channels

1) Increase in potential rents: Direct *transfer* from tenants to owner
2) Increased investments at decontrolled units: Also raises values
3) Increase in neighborhood value: *Spillovers to never-controlled*
   - ✓ Externalities from nearby investment or tenant changeover
   - ✓ Induced investment effects at never-controlled properties
   - ✓ Price appreciation at never-controlled properties net of investment costs represent *economic gains*
4) Supply effects
   - ✓ Additional units enter market when RC ends (condos!). May mitigate positive price effects

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Data sources

1. Enumeration of rent controlled units
   - ✓ Cambridge RC file (FOIA request + David Sims)
   - ✓ Enumeration of non-rent controlled units
2. Cambridge assessors database (MIT FOIA)
   - ✓ Digitized 1994 Assessment database
   - ✓ 2004: Electronic with property values
3. Sales data
   - ✓ Warren Group Cambridge residential transactions file, 1988-2005
   - ✓ Removal of non-arms-length transactions, other cleaning
4. Lingua franca: Map-Lot Code (about 15K)
   - ✓ Some textual address mapping as well (building permits)

Putting these data sources together

- **Geographies**
  - ✓ 1990 Census Tract
    - ◇ 30, Average residents: 3,145 / Residential structures: 1,292 / Area (square mile): 0.22 miles
  - ✓ 1990 Block groups
    - ◇ 89, Average residents: 986 / Residential structures: 428 / Area (square mile): 0.07 miles
  - ✓ 1990 Blocks
    - ◇ 587, Average residents: 135 / Residential structures: 63 / Area (square mile): 0.01 miles
  - Rent control intensity: circles with radius 0.10 - 0.30 miles (as crow flies); also Census geographies

$$\textbf{RCI} \equiv \#\text{ units controlled in circle / total units in circle}$$

Table 2. Descriptive Statistics - Assessed Values (2008 Dollars) and Distribution of Rent Control Intensity

	Never Controlled		Decontrolled	
	1994	2004	1994	2004
		I. Houses		
log Value	12.72	13.65	12.56	13.61
	(0.56)	(0.55)	(0.48)	(0.45)
RCI	0.30	0.30	0.34	0.35
	(0.15)	(0.15)	(0.14)	(0.14)
N	7,426	7,145	829	839
		II. Condominiums		
log Value	12.36	13.10	11.66	12.77
	(0.58)	(0.46)	(0.67)	(0.38)
RCI	0.32	0.31	0.45	0.43
	(0.19)	(0.18)	(0.14)	(0.14)
N	3,602	4,921	3,618	4,600

e.g., $11.66 \Rightarrow 116{,}000$, $12.77 \Rightarrow 351{,}000$

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Estimating equation: Triple-Differences

- **Price changes in RC vs. Non-RC properties: Main effects + interactions w/RCI**

$$\begin{aligned}\log(p_{igt}) = \gamma_g + \delta_t + \beta' X_i \\ + \lambda_1 \text{RC}_i + \lambda_2 \text{RC}_i \cdot \text{Post}_t \\ + \rho_1 \cdot \text{Non-RC}_i \cdot \text{RCI}_i + \rho_2 \cdot \text{Non-RC}_i \cdot \text{RCI}_i \cdot \text{Post}_t \\ + \rho_3 \cdot \text{RC}_i \cdot \text{RCI}_i + \rho_4 \cdot \text{RC}_i \cdot \text{RCI}_i \cdot \text{Post}_t + \epsilon_{igt}.\end{aligned}$$

- δ_t: year of sale, γ_g geographic fixed effects (Census Block Groups)
- X_i: property characteristics
- RC_i: rent control indicator, Non-RC_i is the complement
- RCI_i: exposure of unit to rent control
- Post_t: indicator if $t \geq 1995$
- se's clustered at 1990 Census Block group level (88)

Identification assumptions

- **Identification assumes:**
  - ✓ Change in RC status is exogenous (not fully anticipated)
  - ✓ Exposure variable (RCI) conditional on block group effects measures only effects of RC, and not other factors (not due to RC)
- **Meaning of Rent Control Intensity spillovers from decontrol:**
  - ✓ Improved maintenance of RC units
  - ✓ 'Better' neighbors
  - ✓ Changes in neighborhood amenities
    - *All are causal effects of decontrol in this framework...*

Threats to Research Design

1. Our sample ends in 2005 – but dramatic rise in foreclosures in Massachusetts doesn't begin until 2007
   - ✓ Mian and Sufi (2009):
     - Expansion of credit in subprime *zipcodes* began in 2002
     - We are looking at variation w/in 89 block groups vs. 4 zip codes
   - ✓ Some models also include tract $\times$ year effects, which allow for flexible evolution of prices within 30 tracts
2. Other variations we'll explore
   - ✓ Sensitivity to definition of surrounding area
   - ✓ Sensitivity to geographic controls

RC Main Effect

Table 3. Effects of Rent Decontrol on Assessed Values

	(1)	(2)	(3)	(4)
RC	-0.504***	-0.504***	-0.515***	-
	(0.075)	(0.052)	(0.052)	-
RC x Post	0.217***	0.227***	0.249***	0.221***
	(0.039)	(0.037)	(0.034)	(0.040)
Block Group FEs	-	y	y	-
Tract Trends	-	-	y	y
Map Lot FEs	-	-	-	y
R-squared	0.605	0.759	0.763	0.938

Notes. N = 32,980 properties. Dependent variable is log assessed value. Assessed values are from 1994 and 2004. RC is an indicator for rent control and Post is an indicator for year equal to 2004. Year fixed effects and structure-type dummies are included in all regressions. Block group fixed effects correspond to each of the 88 Cambridge block groups using 1990 Census boundaries. Tract trends are tract*post dummies for each of 30 tracts from the 1990 Census. In column (4), RC main effects are absorbed by map lot fixed effects. Robust standard errors clustered by 1990 block group are in parentheses.

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

Diff-in-Diff: RCI Main Effect

Table 4. Effects of Rent Decontrol and Rent Control Intensity on Assessed Values

	(1)	(2)	(3)	(4)
RC	-0.440***	-0.484***	-0.503***	
	(0.057)	(0.050)	(0.052)	
RC x Post	0.175***	0.196***	0.233***	0.208***
	(0.038)	(0.036)	(0.034)	(0.040)
RCI	-0.581*	-0.792	-0.938*	
	(0.325)	(0.479)	(0.494)	
RCI x Post	0.328**	0.258*	0.545***	0.475***
	(0.136)	(0.138)	(0.191)	(0.180)
Block Group FEs	-	y	y	-
Tract Trends	-	-	y	y
Map Lot FEs	-	-	-	y
H_0: No Spillovers	0.018	0.065	0.006	0.010
H_0: Spillovers Equal	-	-	-	-
R-squared	0.611	0.761	0.765	0.938

Triple-Diff: Adding Interaction with RC and Non-RC

Table 4. Effects of Rent Decontrol and Rent Control Intensity on Assessed Values

	(5)	(6)	(7)
RC	-0.232	-0.217	
	(0.188)	(0.184)	
RC x Post	0.202*	0.174	0.132
	(0.114)	(0.107)	(0.114)
Non-RC x RCI	-0.568	-0.686	
	(0.546)	(0.561)	
Non-RC x RCI x Post	0.281*	0.514**	0.415*
	(0.168)	(0.227)	(0.220)
RC x RCI	-1.211**	-1.416**	
	(0.535)	(0.555)	
RC x RCI x Post	0.249	0.651***	0.607**
	(0.215)	(0.231)	(0.256)
Block Group FEs	y	y	-
Tract Trends	-	y	y
Map Lot FEs	-	-	y
H_0: No Spillovers	0.126	0.010	0.028
H_0: Spillovers Equal	0.909	0.598	0.514
R-squared	0.764	0.767	0.938

Property Conversions

Table 5. Property Conversions, 1994-2004:
Status in 1994 of Units that Were Designated as Houses and Condominiums in 2004

	2004 Houses			2004 Condominiums		
1994 Structure Type	All Houses	Formerly Controlled	Never Controlled	All Condo-miniums	Formerly Controlled	Never Controlled
Same as 2004	13,480 (97.3%)	1,567 (89.9%)	11,913 (98.3%)	7,085 (74.1%)	3,507 (76.2%)	3,578 (72.1%)
Converted from	381 (2.7%)	177 (10.1%)	204 (1.7%)	2,476 (25.9%)	1,093 (23.8%)	1,383 (27.9%)
Houses				1,058 (11.1%)	151 (3.3%)	907 (18.3%)
Condominiums	20 (0.1%)	3 (0.2%)	17 (0.1%)			
Apartments	153 (1.1%)	115 (6.5%)	38 (0.3%)	647 (6.8%)	599 (13%)	48 (1%)
Other Residential	50 (0.4%)	35 (2%)	15 (0.1%)	347 (3.6%)	284 (6.2%)	63 (1.3%)
Non-Residential	158 (1.1%)	24 (1.4%)	134 (1.1%)	424 (4.4%)	59 (1.3%)	365 (7.4%)
Total	13,861	1,744	12,117	9,561	4,600	4,961

Triple-Diff: Houses Only

Table 6. Effects of Rent Decontrol and Rent Control Intensity on Assessed Values by Structure Type

	(1)	(2)	(3)	(4)	(5)	(6)
			I. Houses			
RC x Post	0.065***	0.045***	0.024	0.035	0.035	0.035
	(0.011)	(0.016)	(0.023)	(0.036)	(0.023)	(0.032)
RCI x Post	0.205*	0.200				
	(0.103)	(0.144)				
Non-RC x RCI x Post			0.194*	0.197	0.192**	0.190
			(0.103)	(0.142)	(0.095)	(0.135)
RC x RCI x Post			0.315**	0.227	0.232*	0.231
			(0.130)	(0.196)	(0.128)	(0.181)
Block Group FEs	y	-	y	-	y	-
Map-Lot FEs	-	y	-	y	-	y
Tract Trends	y	y	y	y	y	y
Excluding Converted Structures	-	-	-	-	y	y
H_0: RCI x Post coeffs equal			0.080	0.782	0.553	0.675
R-squared	0.855	0.984	0.855	0.984	0.858	0.983
N	16,239	16,239	16,239	16,239	14,917	14,917

Triple-Diff: Condos Only

Table 6. Effects of Rent Decontrol and Rent Control Intensity on Assessed Values by Structure Type

	(1)	(2)	(3)	(4)	(5)	(6)
			II. Condominiums			
RC x Post	0.354***	0.345***	0.361***	0.276**	0.235*	0.236*
	(0.038)	(0.037)	(0.135)	(0.131)	(0.132)	(0.136)
RCI x Post	0.669**	0.492**				
	(0.256)	(0.211)				
Non-RC x RCI x Post			0.678**	0.397	0.443**	0.454**
			(0.308)	(0.258)	(0.205)	(0.206)
RC x RCI x Post			0.648**	0.569**	0.722**	0.724**
			(0.291)	(0.266)	(0.323)	(0.328)
Block Group FEs	y	-	y	-	y	-
Map-Lot FEs	-	y	-	y	-	y
Tract Trends	y	y	y	y	y	y
Excluding Converted Structures	-	-	-	-	y	y
H_0: RCI x Post coeffs equal			0.925	0.586	0.398	0.429
R-squared	0.714	0.889	0.714	0.889	0.725	0.89
N	16,741	16,741	16,741	16,741	11,778	11,778

Triple-Diff: RCI Definitions and Trends

Table 7. Effect of Rent Decontrol and Rent Control Intensity on Assessed Values for Various RCI Measures

	(1)	(2)	(3)	(4)
	0.10 miles	0.20 miles	0.30 miles	Census Block Group
	I. Varying the Geographies Used to Measure RCI			
RC x Post	0.132	0.132	0.149	0.128
	(0.089)	(0.114)	(0.125)	(0.098)
Non-RC x RCI x Post	0.185	0.415*	0.477*	0.095
	(0.143)	(0.220)	(0.245)	(0.177)
RC x RCI x Post	0.377**	0.607**	0.646**	0.318
	(0.183)	(0.256)	(0.281)	(0.228)
H_0: RCI x Post coeffs equal	0.379	0.514	0.594	0.367
Std Dev of RCI measure	0.192	0.165	0.145	0.179
Geographic FEs	Map-Lot	Map-Lot	Map-Lot	Map-Lot
Tract x Yr FEs	Yes	Yes	Yes	Yes
N	32,980	32,980	32,980	32,980

Comparing Assessor and Price Samples

Assessor's dataset:

- Contains information on all residential structures
- Assessments are not market prices
- 1994 and 2004 only

Transactions (**summary**):

- Only transacted properties (**composition tests**)
- Market prices, with rich property characteristics (**validation**)
- 1988-2005 $\Rightarrow$ allows to measure evolution over time, and more flexibly control for underlying trends (quadratic tract trends)
- Coverage of surrounding towns

Fig 3A. RC Main Effect on Houses & Condos

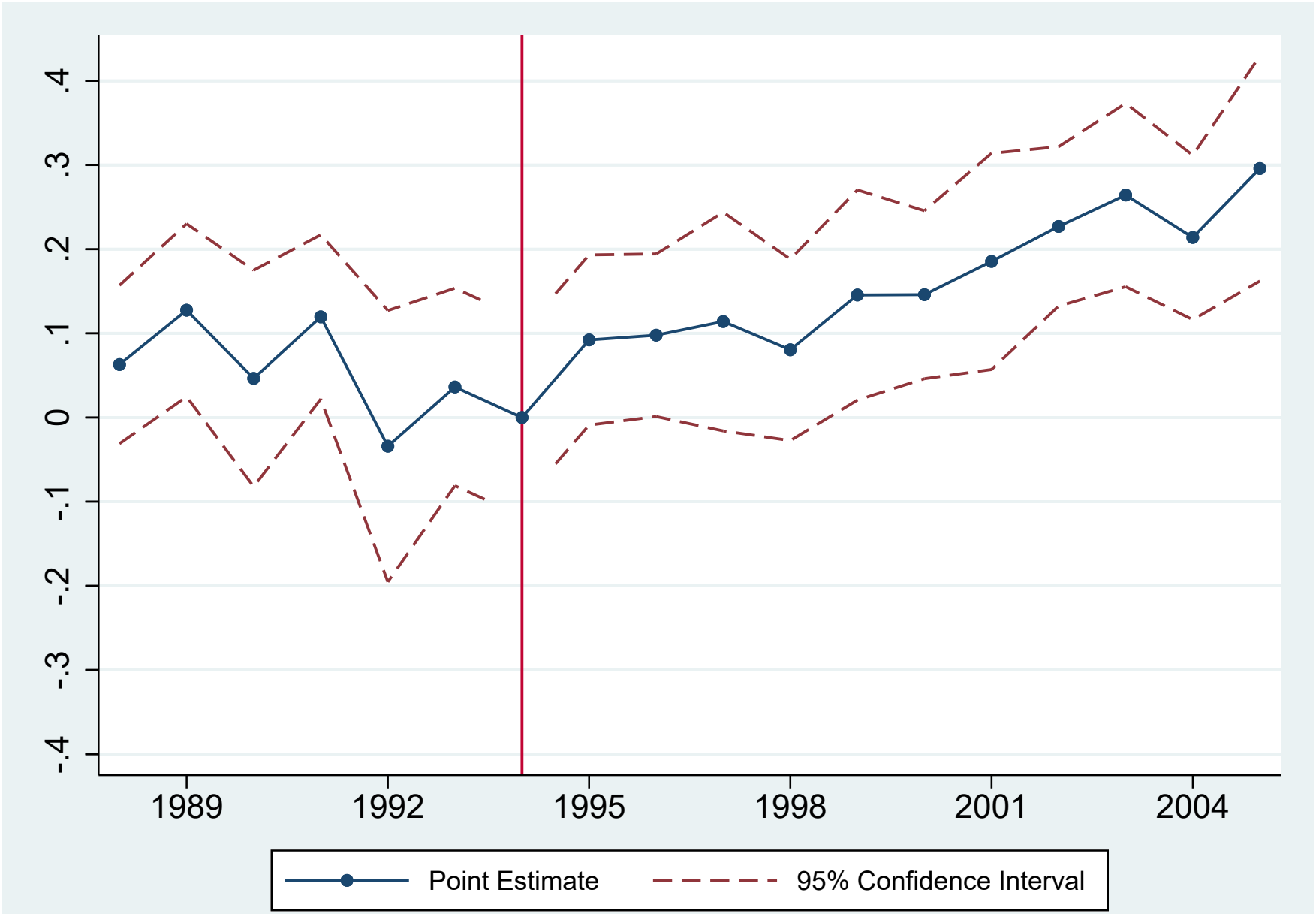


Fig 3B. RCI Spillover: Never-Controlled Properties

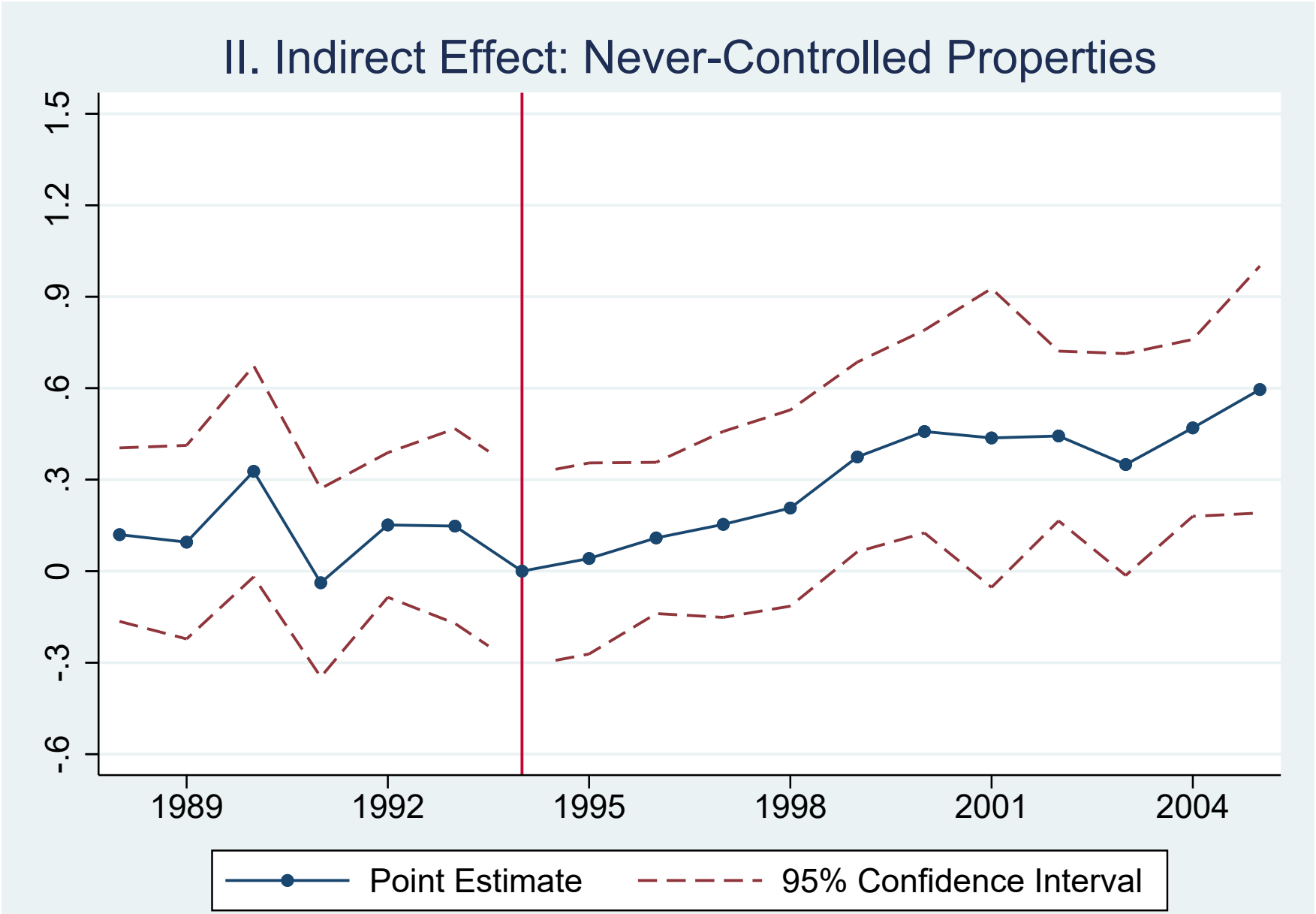
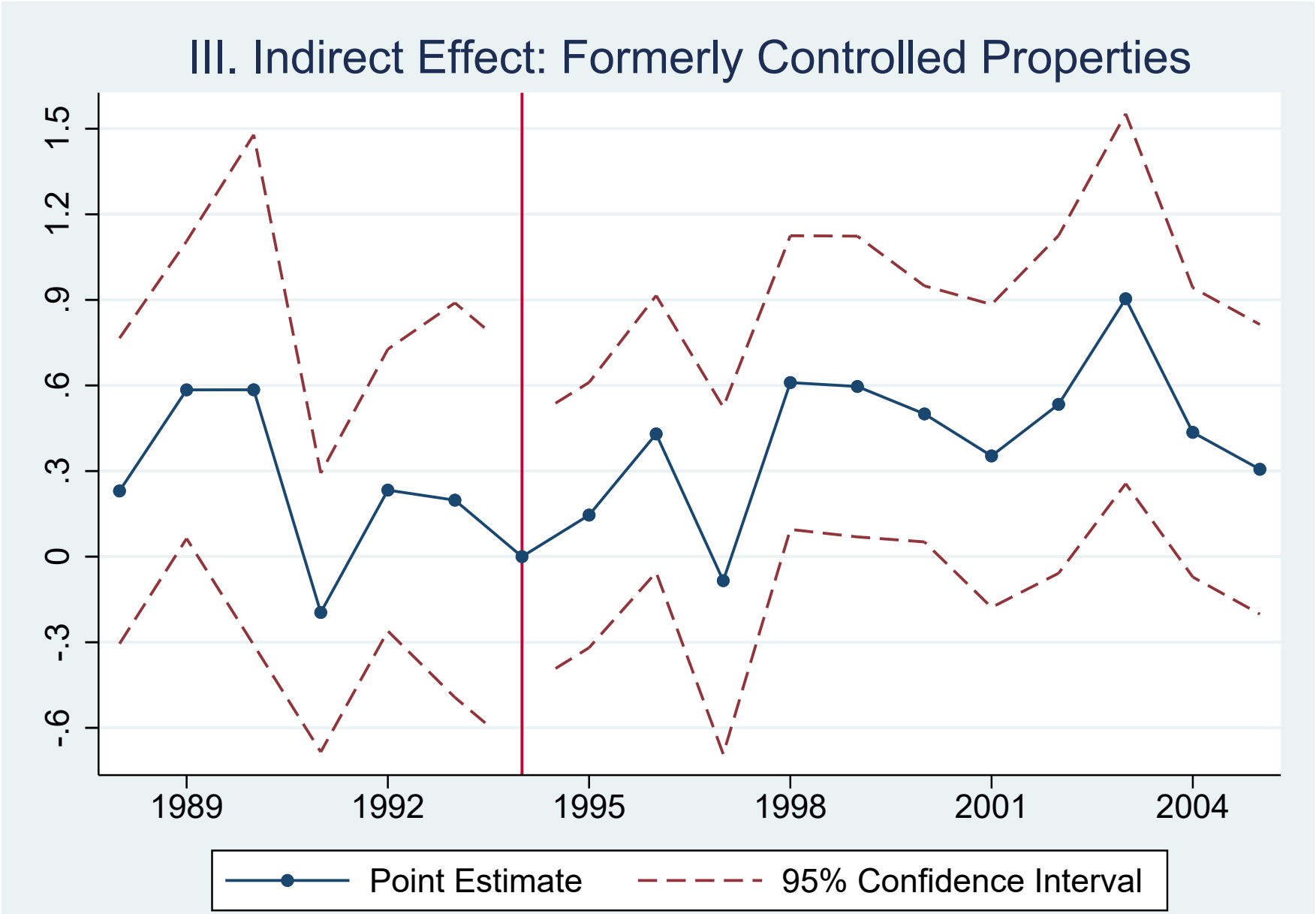


Fig 3C. RCI Spillovers: Formerly-Controlled Condos



Transaction Prices

Table 8. Effects of Rent Decontrol and Rent Control Intensity on Transaction Prices

	(1)	(2)	(3)
RC	-0.305***	-0.204***	-0.193***
	(0.043)	(0.024)	(0.024)
RC x Post	0.060*	0.106***	0.086***
	(0.030)	(0.026)	(0.027)
Block Group FEs	-	y	y
Other Xs	-	y	y
Quadratic Tract Trends	-	-	y
H_0: No Spillovers	-	-	-
H_0: Spillovers Equal	-	-	-
R-squared	0.318	0.674	0.681

Transaction Prices: Spillovers

Table 8. Effects of Rent Decontrol and Rent Control Intensity on Transaction Prices

	(4)	(5)	(6)	(7)
RC	-0.189***	-0.185***	-0.166***	-0.161***
	(0.025)	(0.024)	(0.025)	(0.024)
RC x Post	0.087***	0.079***	0.079***	0.068***
	(0.026)	(0.025)	(0.025)	(0.024)
RCI	-0.510*	-0.494		
	(0.305)	(0.317)		
RCI x Post	0.205***	0.166*		
	(0.056)	(0.098)		
Non-RC x RCI			-0.305	-0.276
			(0.274)	(0.275)
Non-RC x RCI x Post			0.197***	0.132
			(0.067)	(0.089)
RC x RCI			-0.884**	-0.883**
			(0.360)	(0.368)
RC x RCI x Post			0.246*	0.246
			(0.146)	(0.177)
Block Group FEs	y	y	y	y
Other Xs	y	y	y	y
Quadratic Tract Trends	-	y	-	y
H_0: No Spillovers	0.000	0.095	0.002	0.208
H_0: Spillovers Equal	-	-	0.773	0.512
R-squared	0.675	0.682	0.678	0.684

Transaction Prices: By Structure

Table 9. Effects of Rent Control and Rent Control Intensity on Transaction Prices by Structure Type

	Houses			Condominiums		
	(1)	(2)	(3)	(4)	(5)	(6)
RC x Post	0.089**	0.101**	0.102**	0.092***	0.078***	0.069**
	(0.042)	(0.043)	(0.045)	(0.030)	(0.029)	(0.027)
RCI x Post	0.337***			0.152**		
	(0.078)			(0.072)		
Non-RC x RCI x Post		0.359***	0.274**		0.080	-0.007
		(0.085)	(0.128)		(0.086)	(0.128)
RC x RCI x Post		0.080	-0.024		0.308*	0.306
		(0.262)	(0.294)		(0.155)	(0.197)
Tract trends	-	-	y	-	-	y
H_0: Spillovers Equal		0.326	0.315	0.235	0.124	0.774
H_0: No Spillovers		0.000264	0.0927		0.0659	0.264
R-squared	0.695	0.696	0.705	0.628	0.630	0.639
N	4,814	4,814	4,814	9,975	9,975	9,975

Summary of Main Results

1) Direct effect of Rent Control on RC properties
   - ✓ Cannot assert that RC caused lower prices
   - ✓ Can assert that end of RC raised prices
     - ◇ RC $\times$ Post highly significant
     - ◇ 8-10% price/assessed effect for houses, larger assessed effects for condos

2) Spillovers
   - ✓ Large and robust spillover for houses
     - ◇ Mean RCI*Post effect about 8% – similar across assessment or transactions
   - ✓ Less clear-cut evidence of spillovers for condos
   - ✓ Large supply shock of condominiums (32% increase)

Outline

1) Rent control in Cambridge
2) Model: Price effects of rent control
3) Data sources and empirical approach
4) Estimates of effects on home sale prices and assessments
5) **Robustness**
6) Magnitudes
7) Potential mechanisms
8) Conclusions

Robustness

We've already covered some of these issues

1) Unanticipated change: event studies

2) Measurement issues
   - ✓ Variations on RCI definitions and geographies
   - ✓ Assessments vs. transactions
   - ✓ Eliminating **converted structures**

3) Confounding neighborhood trends
   - ✓ Models including flexible tract specific trends
   - ✓ Throwing out transactions financed by **subprime** banks (2% of transactions)

4) Placebo test: Price patterns in nearby cities

Placebo Test: Prices in Somerville, Malden & Medford

- Did prices in nearby towns appreciate comparably to Cambridge?
- Strategy:
  - ✓ Construct block group $\widehat{\text{RCI}}$ using 1990 Census block group characteristics in Cambridge
  - ✓ Validate $\widehat{\text{RCI}}$ within Cambridge
  - ✓ Estimate $\widehat{\text{RCI}}$ impacts on surrounding towns

Placebo RCI Estimates for Never Controlled

Table 10. Placebo Estimates of the Relationship between Imputed Rent Control Intensity and Property Price Appreciation in Cambridge and Adjoining Cities, 1988 - 2005

	Houses (1)	Condo-miniums (2)	Houses (3)	Condo-miniums (4)	House (5)	Condo-miniums (6)
	A. Cambridge: Actual RCI		B. Cambridge: Predicted RCI		C. Somerville, Medford and Malden	
RCI	-0.183	-0.257	-0.203**	-0.504*	-0.034	0.101
	(0.112)	(0.226)	(0.096)	(0.256)	(0.057)	(0.205)
RCI x Post	0.261***	0.063	0.278***	-0.055	0.088	-0.574***
	(0.088)	(0.093)	(0.092)	(0.102)	(0.055)	(0.206)
N	4,223	5,764	4,223	5,764	17,270	3,346
	D. Somerville		E. Malden		F. Medford	
RCI	-0.162	0.238	0.023	-0.176	-0.056	0.832***
	(0.133)	(0.555)	(0.077)	(0.172)	(0.079)	(0.268)
RCI x Post	-0.090	-0.406	0.052	-0.562***	0.174**	-1.201***
	(0.151)	(0.507)	(0.066)	(0.171)	(0.086)	(0.278)
N	6,605	1,868	6,506	1,197	4,159	281

Outline

1) Rent control in Cambridge
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6) **Magnitudes**
7) Potential mechanisms
8) Conclusions

Magnitudes

What would have happened to the value of never-controlled housing if rent control had remained?

- Going from mean RCI at 0.20 miles to 0 leads to about 8% increase in average price of never-controlled housing
- Need to factor in **which** house affected: both RC units and nearby non-RC units (receiving spillovers)
- Three margins of price effects
  1) direct effect of rent control on RC units
  2) spillovers on never-controlled
  3) spillovers on controlled

Magnitudes

Our approach:

- Total value of never-controlled residential housing stock in 1994 is \$3.98 billion
- Total never-controlled residential housing stock is in 2004 assessed at \$10.02 billion, houses are 73%
- For each location, compute RCI and use regression estimates to decompose how much of price change is due to rent control exposure
- Use Assessed values for 1994 and 2004
- Counterfactuals: Remove Non-RC x RCI x Post effects

Key Assumptions

- ✓ Were rent control not eliminated, the relationship between RC, RCI and house prices estimated in 88-94 would continue
- ✓ Approach may be conservative approach if spillovers affect entire city, we miss overall Cambridge-wide effects

Magnitudes for Never Controlled

Table 12. Observed and Counterfactual Changes in Assessed Values of Decontrolled and Never-Controlled Units, 1994 to 2004 (in millions of 2008 dollars)

	1994 Assessed (mil$)	2004 Assessed (mil$)	Direct Effect ($)	Indirect Effect ($)	Direct Effect (%)	Indirect Effect (%)
			I. Never-Controlled Units			
Houses	$2,961	$7,320	n/a	$822	n/a	13%
Condominiums	$1,017	$2,699	n/a	$306	n/a	13%
All	$3,978	$10,020	n/a	$1,128	n/a	13%

Magnitudes for Decontrolled

Table 12. Observed and Counterfactual Changes in Assessed Values of Decontrolled and Never-Controlled Units, 1994 to 2004 (in millions of 2008 dollars)

	1994 Assessed (mil$)	2004 Assessed (mil$)	Direct Effect ($)	Indirect Effect ($)	Direct Effect (%)	Indirect Effect (%)
			II. Decontrolled Units			
Houses	$267	$760	$94	$149	18%	29%
Condominiums	$518	$1,746	$216	$390	19%	34%
All	$785	$2,507	$310	$539	19%	33%

Outline

1) Rent control in Cambridge
2) Model: Price effects of rent control
3) Data sources and empirical approach
4) Estimates of effects on home sale prices and assessments
5) Robustness
6) Magnitudes
7) **Potential mechanisms**
8) Conclusions

Potential mechanisms

What accounts for price impacts? We are working on unpacking this in detail

1) Productive channels
   - ✓ Increased supply of residential housing
   - ✓ Increased investment activity? Quality upgrading?
2) Allocative channels
   - ✓ Change in characteristics of residents (gentrification)
   - ✓ Reduction in local crime

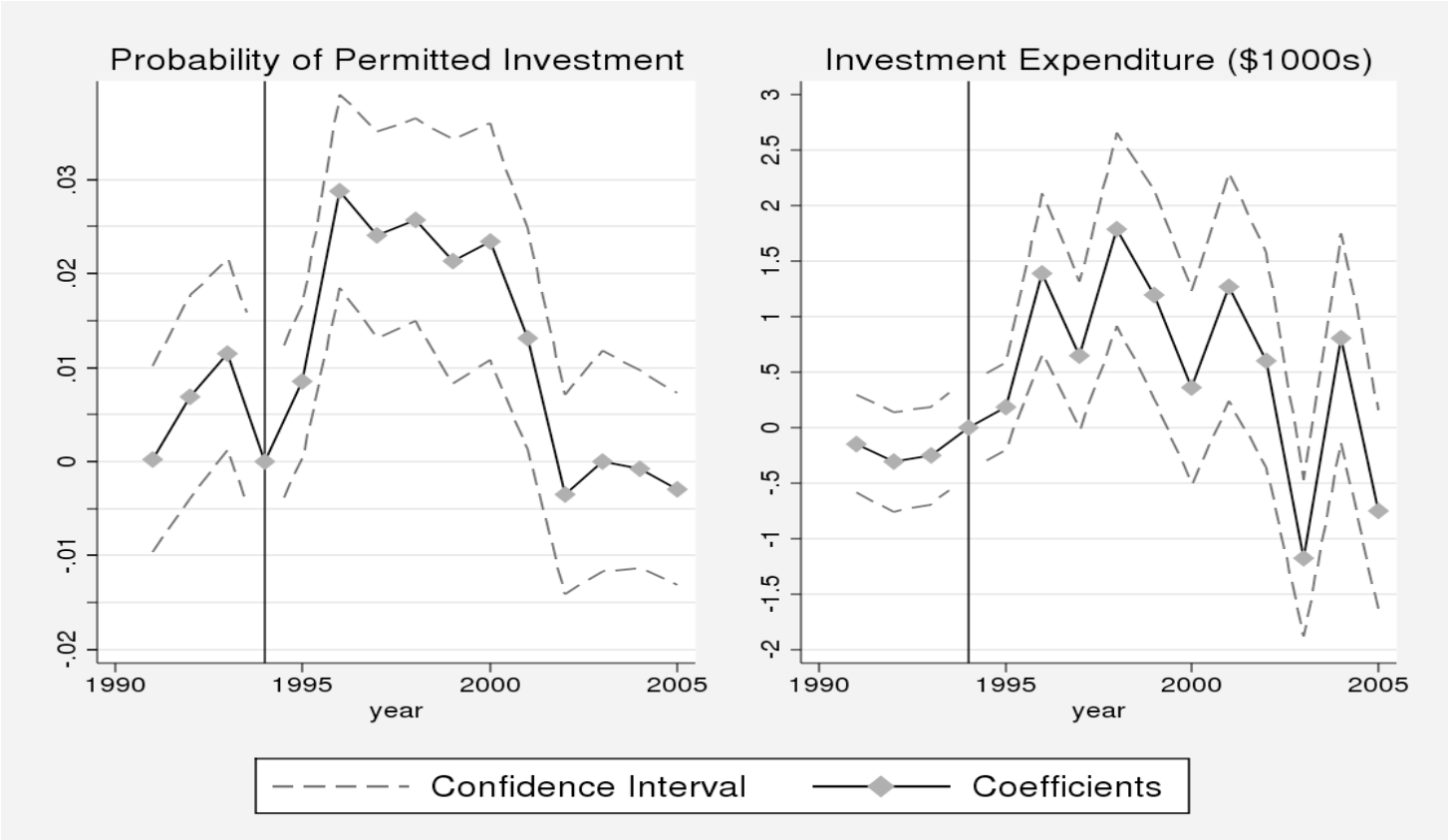
Some brief direct evidence on these channels...

Investments data

- Cambridge building permits 1991 through 2004 (Cambridge Inspectional Services)
- Required by anyone "seeking to construct, alter, repair or demolish a structure"
- No permit for ordinary repairs such as painting, wallpapering, adding shingles to roofs

  "any Maintenance which does not affect the structure, egress, fire protection systems, fire ratings, energy conservation provisions, plumbing, sanitary, gas, electrical or other utilities" do not require a permit

Figure 4. Investment Activity Event Study



Notes. Figure plots RC x Year coefficients from an event study regression. In the left panel, the dependent variable is an indicator for whether a structure received a building permit in a given year. In the right panel, the dependent variable is the permitted expenditure of each structure in each year, winsorized by structure type and year to the 99.5th percentile. Both specifications control for year fixed effects, 1990 Census block group fixed effects, a quadratic in the number of units in condominium structures, and structure type indicators. 1994 is the omitted RC x Year category. 95% confidence intervals are calculated using robust standard errors clustered at the block group level.

Relationship to Price Results

Magnitude of investment versus price effects of RC elimination?

- **Aggregate** Cambridge residential investment rose (**details**)
  - ✓ 1991-1994: total $83 mil (21 mil per year)
  - ✓ 1995-2004: total $455 mil (45 mil per year)
- But this is **tiny** relative to effect of RC repeal on property values...
  - ✓ Aggregate rise in investment: **$24 mil/year**
  - ✓ Effect of RC repeal on value of housing stock: **$179 mil/year**
- Clearly, investment not the main channel
- Price effects are likely related to gentrification... rent control may have led to unwinding of allocative distortions

Conclusions

[1]. Large, positive spillover impact from decontrol on value of never-controlled, roughly 16%

- ✓ Concentrated on houses, with less clear-cut evidence for condos
  - ◇ Countervailing effects coming from quality ↑ and supply ↑?
- ✓ 13% increase never-controlled housing stock value due to end of RC

[2]. Investment response is statistically, but **not** economically significant

[3]. Price controls usually evaluated in terms of surplus transferred from landlords to renters vs. deadweight loss from quality/quantity undersupply

- ✓ Here, spillover impact larger than value of transfer

[4]. Residential spillovers non-negligible for evaluating housing market regulations and other place-based policies

Thank You!

Extra Material

Table A1. Descriptive Statistics for Geographies

	mean	std dev	min	max	median
			I. Census Blocks		
Area (sq miles)	0.01	0.02	0.00	0.53	0.00
1990 Census Population	135.05	162.71	0.00	2833.00	99.00
2001 Residential Units	62.77	58.71	0.00	441.00	45.00
1994 Rent Control Units	22.92	34.48	0.00	236.00	11.00
2001 Residential Structures	18.53	12.08	0.00	81.00	16.00
1994 Rent Control Structures	4.08	3.77	0.00	21.00	3.00
Count of Blocks			587		
			II. Census Block Groups		
Area (sq miles)	0.07	0.07	0.01	0.56	0.05
1990 Census Population	986.17	506.00	98.00	3093.00	836.00
2001 Residential Units	428.15	253.62	23.00	1418.00	387.00
1994 Rent Control Units	155.75	155.19	6.00	854.00	107.00
2001 Residential Structures	122.93	58.53	9.00	382.00	124.00
1994 Rent Control Structures	27.26	16.30	3.00	61.00	24.00
Count of Block Groups			89		

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Table A1. Descriptive Statistics for Geographies

	mean	std dev	min	max	median
			III. Census Tracts		
Area (sq miles)	0.22	0.17	0.05	0.72	0.16
1990 Census Population	3144.73	1291.67	1736.00	7123.00	2650.00
2001 Residential Units	1291.68	510.60	336.00	2984.46	1244.07
1994 Rent Control Units	470.77	341.71	101.00	1534.00	379.50
2001 Residential Structures	365.00	149.06	117.00	860.00	338.50
1994 Rent Control Structures	80.90	30.41	27.00	156.00	73.00
Count of Tracts			30		
			IV. 0.2 mile radius		
Area (sq miles)	0.13	-	0.13	0.13	0.13
1990 Census Population	3160.48	1765.02	0.00	15796.90	2935.48
2001 Residential Units	1141.15	573.10	5.00	3427.54	1066.16
1994 Rent Control Units	422.34	330.59	0.00	1702.00	376.00
2001 Residential Structures	348.40	116.72	1.00	676.00	351.00
1994 Rent Control Structures	80.15	46.52	0.00	180.00	77.00
Count of Maplots			10,968		

Investment Activity

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Table 11. Descriptive Statistics for Cambridge Residential Building Permitting Activity, 1991 through 2004
Permits Issued and Permitted Expenditures

	Houses				Condominiums			
	Never Controlled		Decontrolled		Never Controlled		Decontrolled	
	1991-1994	1995-2004	1991-1994	1995-2004	1991-1994	1995-2004	1991-1994	1995-2004
				I. Permits Issued				
Number of Permits	1,507	4,385	259	694	247	852	185	672
Annual Average Fraction of Units Permitted	0.030	0.035	0.029	0.031	0.014	0.019	0.011	0.016
Mean Units in Permitted Structures	1.72	1.72	2.54	2.81	12.06	10.95	15.69	16.34
				II. Annual Expenditure (1,000s of 2008 dollars)				
Total	14,044	29,954	1,588	3,486	3,723	7,595	1,451	4,435
Average Yearly Expenditure per Unit	1.11	2.37	0.72	1.57	0.82	1.67	0.34	1.05
				III. Yearly Expenditure per Permitted Unit (1,000s of 2008 dollars)				
Mean	37.3	68.3	24.5	50.2	60.3	89.1	31.4	66.0
Standard Deviation	164.5	178.0	46.8	105.6	190.2	338.4	118.1	269.6
Median	10.3	18.0	8.3	13.8	12.4	19.3	11.2	19.2
Min	0.1	0.1	0.4	0.3	0.5	0.3	0.4	0.4
Max	5,675.5	4,365.5	451.2	1,208.9	2,121.2	6,589.3	1,480.1	4,450.3

Transaction Sample, 1988-2005

Table A2. Descriptive Statistics - Covariates of Transacted Properties

	Houses				Condominiums			
	Never Controlled		Decontrolled		Never Controlled		Decontrolled	
	1988-1994	1995-2005	1988-1994	1995-2005	1988-1994	1995-2005	1988-1994	1995-2005
log Price	12.84	13.26	12.59	13.03	12.56	12.81	12.20	12.57
	(0.69)	(0.74)	(0.67)	(0.67)	(0.51)	(0.55)	(0.56)	(0.55)
Total Rooms	9.16	9.40	10.24	10.27	4.77	5.03	4.40	4.41
	(3.33)	(3.43)	(3.57)	(3.67)	(1.53)	(1.91)	(1.60)	(1.55)
Bedrooms	4.05	4.10	4.56	4.61	2.00	2.12	1.68	1.75
	(1.69)	(1.72)	(1.80)	(1.85)	(0.78)	(0.96)	(0.70)	(0.81)
Bathrooms	2.77	2.81	2.93	2.91	1.57	1.63	1.17	1.24
	(0.94)	(0.95)	(0.87)	(0.85)	(0.67)	(0.75)	(0.44)	(0.52)
Interior sq. ft.	2363.41	2387.34	2408.88	2409.76	1202.67	1269.57	927.85	949.69
	(1131.25)	(1071.66)	(920.96)	(902.49)	(834.76)	(819.75)	(434.02)	(449.68)
Has Lot (y/n)	0.99	0.99	0.99	0.99	0.02	0.04	0.04	0.03
	(0.11)	(0.09)	(0.09)	(0.09)	(0.14)	(0.19)	(0.18)	(0.17)
Lot Size sq. ft.	4211.71	4253.09	3320.15	3462.02	113.24	157.66	191.18	151.38
	(3433.26)	(3437.64)	(1964.22)	(2031.41)	(1595.75)	(1145.06)	(1222.04)	(1148.19)
Year Built	1903.25	1903.31	1890.81	1892.71	1944.51	1935.16	1915.12	1916.42
	(36.93)	(37.81)	(24.67)	(24.94)	(44.72)	(45.58)	(27.94)	(30.86)
N	1,624	2,599	255	336	2,138	3,626	1,446	2,765

Composition Changes for Transacted Houses

Table A3. Tests for Changes in Attributes: Transacted Houses

	Total Rooms (1)	Bathrooms (2)	Bedrooms (3)	Interior Sqft (10s) (4)	Lot Size Sqft (100s) (5)	ln(Age) (6)	χ^2 Test (row) (7)
				I. Models with common RCI effect			
Constant	7.26***	2.46***	3.16***	204.17***	23.40***	4.83***	
	(0.358)	(0.121)	(0.220)	(13.203)	(4.189)	(0.108)	
RC x Post	-0.16	-0.05	-0.00	1.53	1.62	-0.09	6.44
	(0.203)	(0.064)	(0.125)	(7.040)	(2.378)	(0.058)	(0.38)
RCI x Post	0.20	0.03	0.02	18.09	-0.44	0.04	3.13
	(0.457)	(0.145)	(0.281)	(15.833)	(5.348)	(0.130)	(0.79)
				II. Models where RCI effect differs by RC			
Constant	8.10***	2.46***	3.17***	204.17***	25.91***	4.76***	
	(0.381)	(0.121)	(0.220)	(13.203)	(4.458)	(0.102)	
RC x Post	-0.09	-0.04	0.03	2.87	2.09	-0.09	6.04
	(0.210)	(0.066)	(0.129)	(7.274)	(2.456)	(0.060)	(0.42)
Non-RC x RCI x Post	0.46	0.06	0.19	22.36	1.54	0.03	4.22
	(0.482)	(0.153)	(0.296)	(16.695)	(5.637)	(0.137)	(0.65)
RC x RCI x Post	-1.92	-0.24	-1.14	-18.13	-15.26	0.11	2.43
	(1.426)	(0.452)	(0.876)	(49.448)	(16.697)	(0.405)	(0.88)
H_0: No Spillovers	0.26	0.79	0.35	0.38	0.63	0.94	
H_0: Spillovers Equal	0.11	0.52	0.15	0.44	0.34	0.86	

Composition Changes for Transacted Condominiums

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Table A4. Tests for Changes in Attributes: Transacted Condominiums

	Total Rooms (1)	Bathrooms (2)	Bedrooms (3)	Interior Sqft (10s) (4)	Has Lot (5)	ln(Age) (6)	χ^2 Test (row) (7)
			I. Models with common RCI effect				
Constant	3.41***	1.50***	1.43***	91.64***	1.05***	2.01***	
	(0.174)	(0.068)	(0.077)	(7.344)	(0.016)	(0.088)	
RC x Post	-0.15**	0.03	-0.03	-2.67	0.02***	-0.55***	186.46
	(0.070)	(0.027)	(0.036)	(2.949)	(0.007)	(0.041)	(0.00)
RCI x Post	0.04	-0.19**	0.04	-4.50	-0.00	0.09	9.77
	(0.217)	(0.084)	(0.111)	(9.157)	(0.023)	(0.126)	(0.13)
			II. Models where RCI effect differs by RC				
Constant	3.40***	1.59***	1.49***	97.19***	1.04***	2.51***	
	(0.158)	(0.061)	(0.093)	(6.661)	(0.019)	(0.105)	
RC x Post	-0.19***	0.03	-0.05	-3.46	0.02**	-0.55***	180.96
	(0.071)	(0.028)	(0.037)	(3.020)	(0.008)	(0.042)	(0.00)
Non-RC x RCI x Post	-0.28	-0.17	-0.12	-9.62	0.01	0.02	17.86
	(0.262)	(0.102)	(0.135)	(11.091)	(0.028)	(0.153)	(0.01)
RC x RCI x Post	0.71*	-0.24	0.40**	6.54	-0.02	0.25	2.70
	(0.383)	(0.149)	(0.197)	(16.195)	(0.041)	(0.223)	(0.85)
H_0: No Spillovers	0.101	0.072	0.082	0.633	0.873	0.531	
H_0: Spillovers Equal	0.033	0.668	0.028	0.410	0.605	0.399	

Matched Comparison: Assessment and Transactions Values

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Table A5. Comparison of Estimated Relationship between Rent Control Status, Rent Control Intensity, and Transacted Prices vs. Assessed Values for Units Transacted in 1994 and 2004

	Transacted Prices			Assessed Values: Transacted Units		
	(1)	(2)	(3)	(4)	(5)	(6)
			I. Houses			
RC x Post	0.199	0.127	0.352**	0.114	0.059	0.194
	(0.124)	(0.125)	(0.163)	(0.078)	(0.081)	(0.137)
RCI x Post		0.606**			0.452**	
		(0.294)			(0.189)	
Non-RC x RCI x Post			0.736***			0.522***
			(0.278)			(0.193)
RC x RCI x Post			-0.539			-0.172
			(0.828)			(0.615)
N	685	685	685	652	652	652
			II. Condominiums			
RC x Post	0.163**	0.085	0.073	0.168**	0.133*	0.122*
	(0.072)	(0.068)	(0.063)	(0.071)	(0.074)	(0.069)
RCI x Post		0.512**			0.255	
		(0.200)			(0.201)	
Non-RC x RCI x Post			0.406			0.110
			(0.280)			(0.294)
RC x RCI x Post			0.709**			0.516
			(0.291)			(0.366)
N	937	937	937	7,897	7,897	7,897

Transactions without Converted Structures

back

Table A6. Robustness: Relationship between Rent Control, Rent Control Intensity and Transaction Price, 1988 - 2005. Eliminating Transactions Financed by Subprime Lenders and Units that Were Converted from Their 1994 Structure Type

	Houses			Condominiums		
	(1)	(2)	(3)	(4)	(5)	(6)
	I. Eliminating Converted Structures					
RC x Post	0.093**	0.104**	0.106**	0.076**	0.072**	0.065**
	(0.045)	(0.046)	(0.047)	(0.031)	(0.028)	(0.027)
RCI x Post	0.361***			0.029		
	(0.082)			(0.072)		
Non-RC x RCI x Post		0.389***	0.290**		-0.025	-0.153
		(0.091)	(0.136)		(0.107)	(0.146)
RC x RCI x Post		0.054	-0.034		0.149	0.195
		(0.282)	(0.297)		(0.154)	(0.180)
N	4,527	4,527	4,527	7,875	7,875	7,875
Block Group FEs	y	y	y	y	y	y
Quadratic Tract trends	-	-	y	-	-	y

Transactions without Subprime

back

Table A6. Robustness: Relationship between Rent Control, Rent Control Intensity and Transaction Price, 1988 - 2005. Eliminating Transactions Financed by Subprime Lenders and Units that Were Converted from Their 1994 Structure Type

	Houses			Condominiums		
	(1)	(2)	(3)	(4)	(5)	(6)
	II. Eliminating Subprime Lenders					
RC x Post	0.085**	0.096**	0.097**	0.095***	0.081***	0.071**
	(0.041)	(0.042)	(0.043)	(0.030)	(0.029)	(0.027)
RCI x Post	0.339***			0.152**		
	(0.079)			(0.073)		
Non-RC x RCI x Post		0.361***	0.268**		0.074	-0.014
		(0.086)	(0.126)		(0.086)	(0.130)
RC x RCI x Post		0.092	-0.013		0.317**	0.307
		(0.253)	(0.282)		(0.154)	(0.197)
N	4,706	4,706	4,706	9,772	9,772	9,772
Block Group FEs	y	y	y	y	y	y
Quadratic Tract trends	-	-	y	-	-	y

Table B1. Residual Variation in Rent Control Intensity

	mean (1)	std dev (2)
Unit		
Radius = 0.10	0.00	0.06
Radius = 0.20	0.00	0.05
Radius = 0.30	0.00	0.03
Radius = 0.40 miles	0.00	0.03
N	10,968	

Residual variation computed by taking out Census block group fixed effects from 0.2-0.4 mile radius RCI measures and Census block fixed effects from 0.1 mile radius RCI.