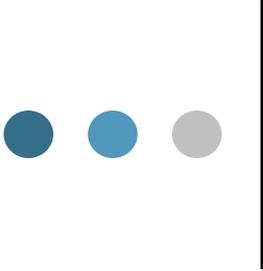


Crowd Out Effects of Place-Based Subsidized Rental Housing: New Evidence from the LIHTC Program

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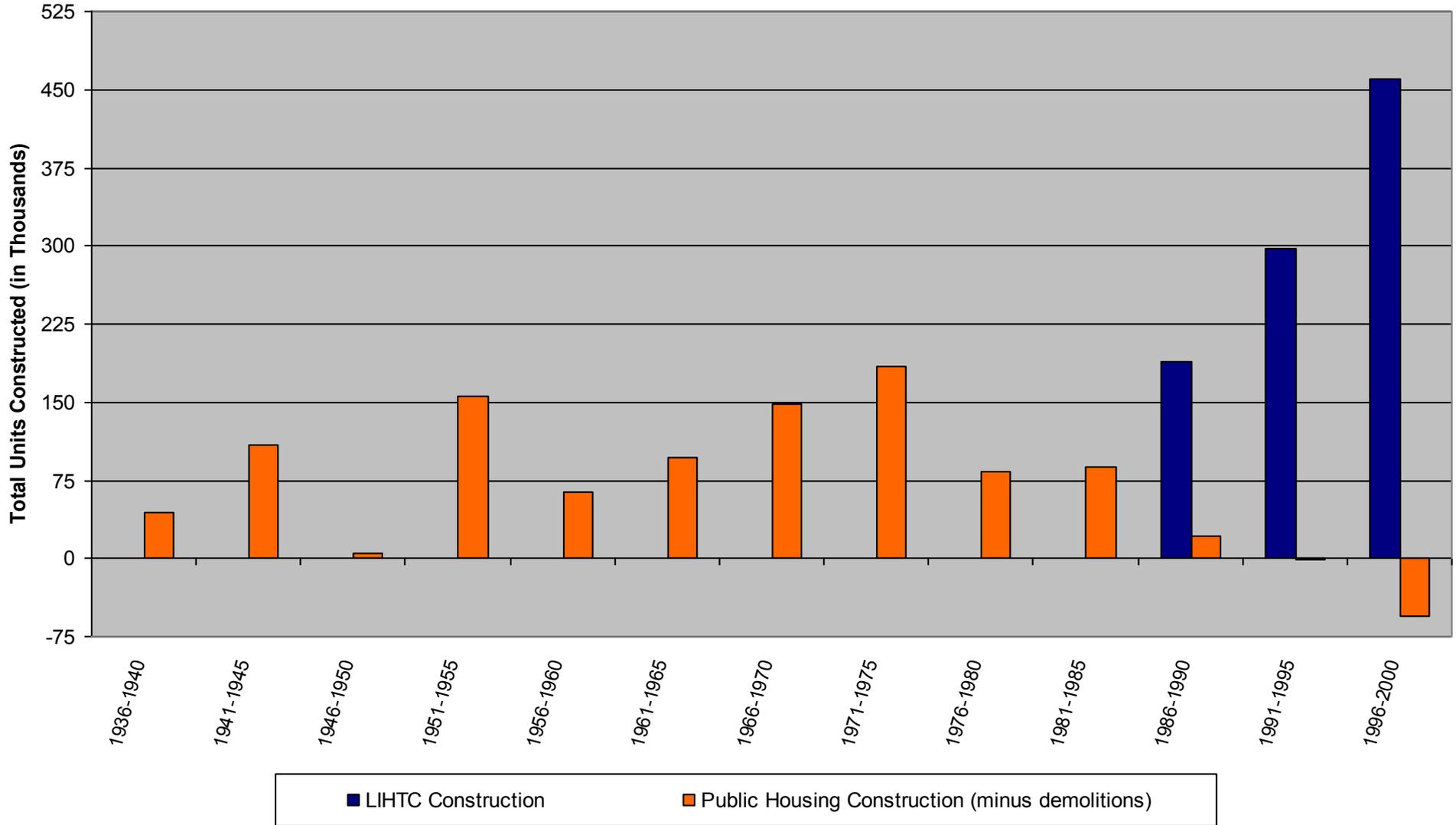
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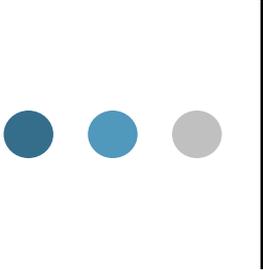
How to Provide Housing Support for the Poor?

- **Longstanding Controversy ...**
- **Invest in people (tenant based)**
 - Section 8 vouchers serve roughly 1.8 million households
- **Invest in buildings (place based)**
 - Public housing projects
 - Built from 1937 to the mid-1980s
 - Served up to 1.3 million families before demolitions in the 1990s
 - Low Income Housing Tax Credit (LIHTC) program
 - Subsidized construction of 1.5+ million units since 1987
 - Allocations increased 71% between 2000 and 2006
 - \$6.6 billion allocated to private developers in 2006

Figure 1. Place-Based Subsidized Construction and Demolitions of Housing Units



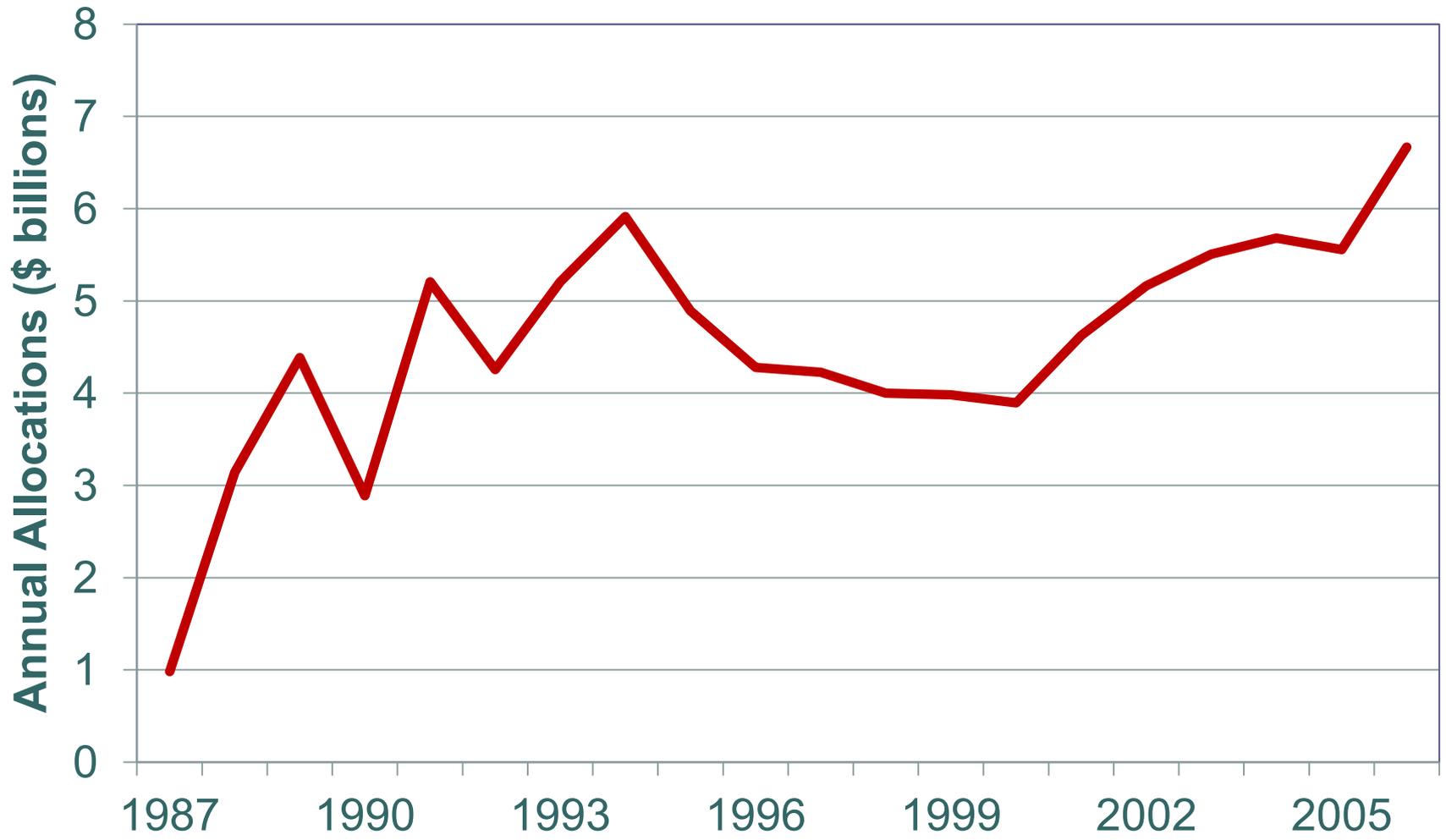
Source: Department of Housing and Urban Development (1998; 2006)



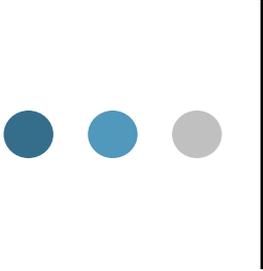
WHAT IS THE LIHTC?

- **Allocate Subsidy to Developers Who...**
 - Voluntarily Impose Rent Controls on Constructed Units
 - Only Rent to Low- and Low-Mod Income Families
- **Subsidy in the Form of Tax Credits**
 - 10-year Annuity Equal to 30-91% of Construction Costs
- **Grown to Largest Place-Based Program**
 - 1.6+ million units nationwide
 - \$6 billion allocated in 2006 (70% increase since '00)
 - Further Increase of 10% Passed During 2008

LIHTC Allocations (2006 \$'s)



Source: National Council of State Housing Authorities (2008)



Does the LIHTC Program Increase the Supply of Rental Housing?

➤ **Hypothesis: Crowd Out Occurs**

- The Program Results in Less Private, Unsubsidized Investment in Rental Housing

➤ **Intuition: Two Forms of Crowd Out**

- Limited # of Infra-Marginal Developers Apply to Receive the Credit (i.e, They Build Regardless)
- Below Market Rents Reduce the # of Households Seeking Housing from Private Market

➤ **Answer Depends on Elasticity of Demand**

- More Inelastic → More Crowd Out

Figure 3a: Crowd Out of Rental Housing With Elastic Demand

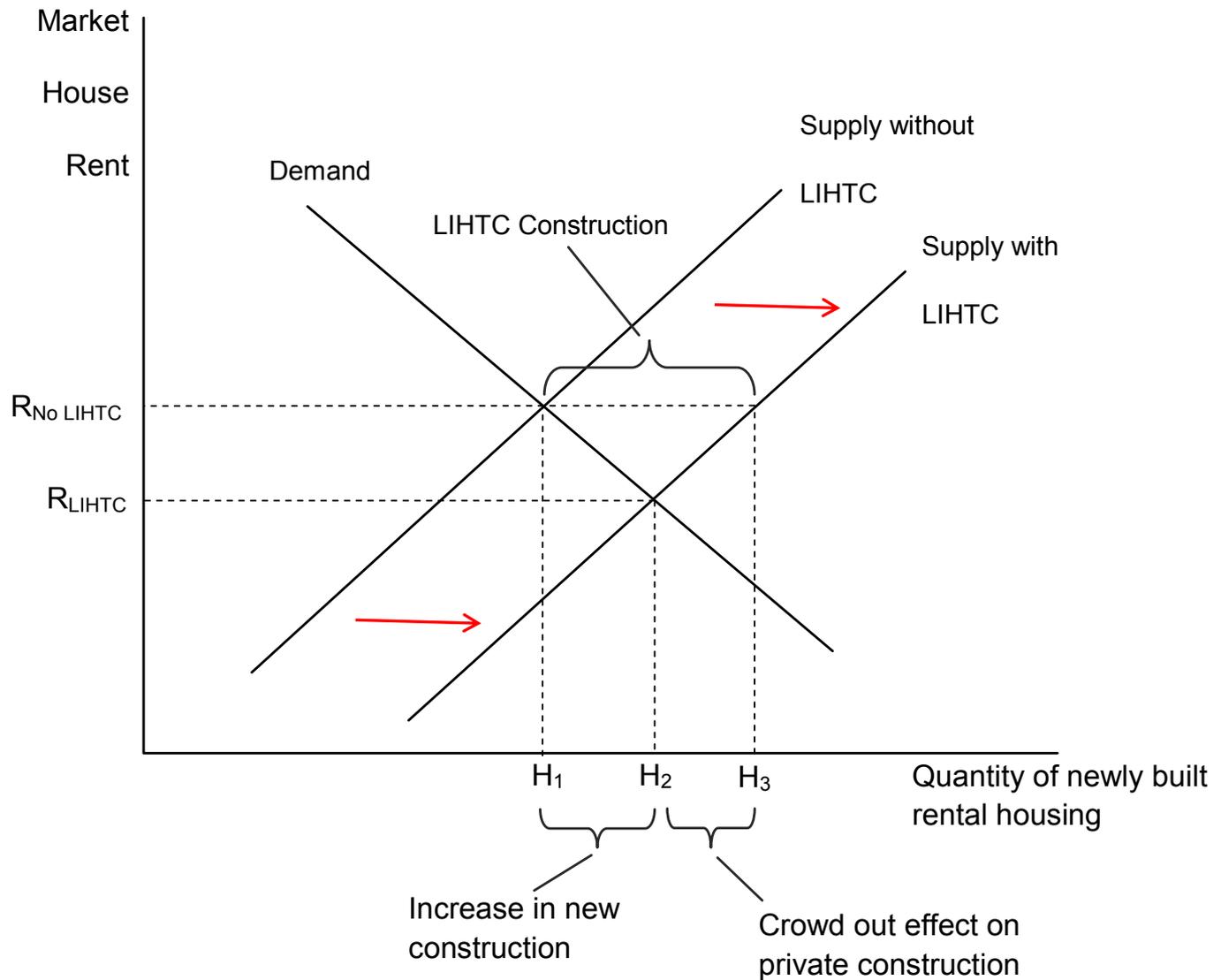
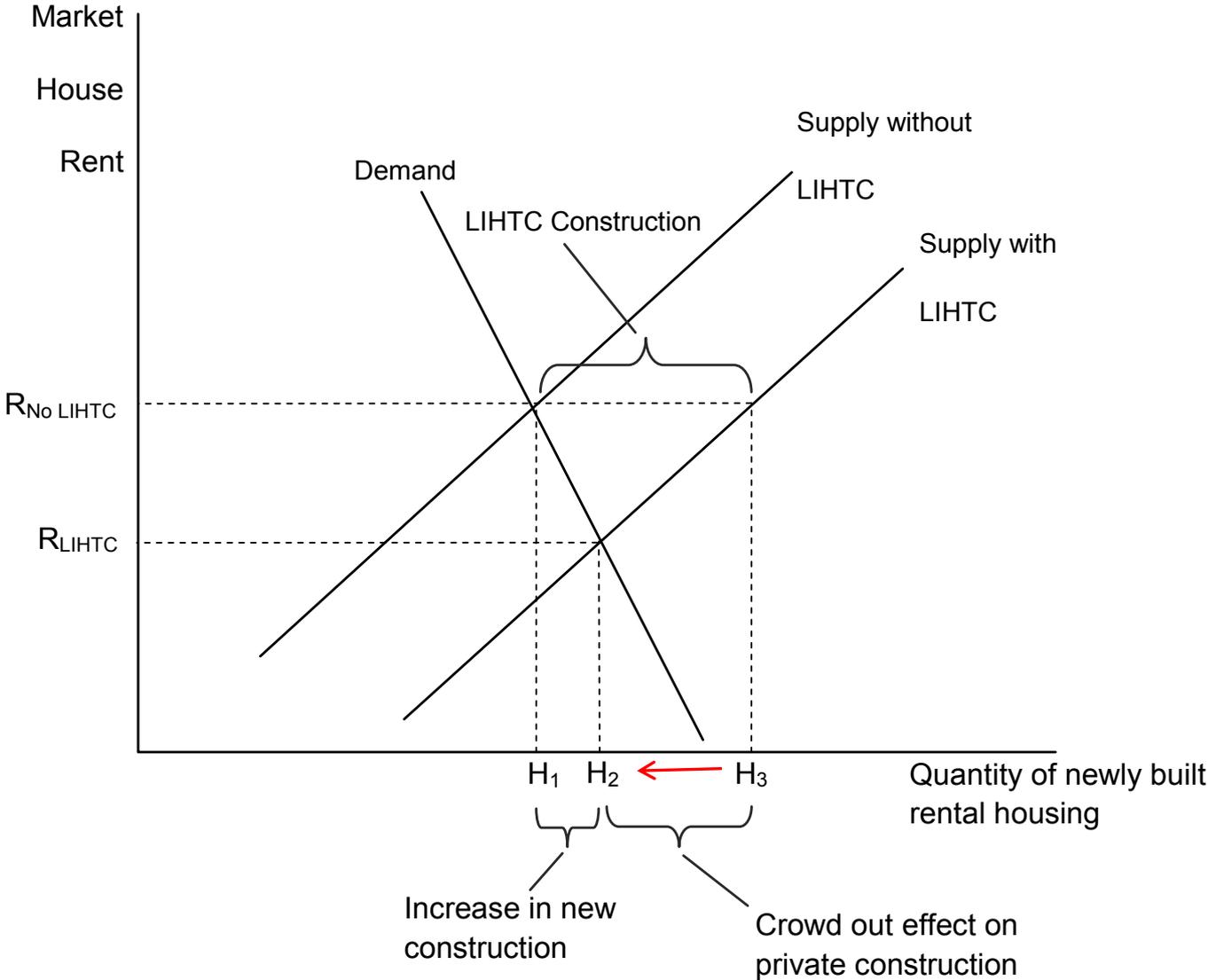
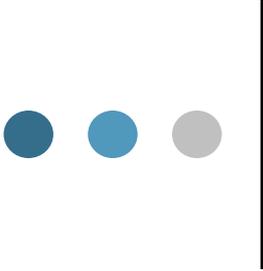


Figure 3b: Crowd Out of Rental Housing With Inelastic Demand





Empirical Strategy

Impact of LIHTC on Housing Starts during 1990's

- Starts are a flow (Mayer & Somerville, 2000)
- Sensitive to changes in substitutes and input prices
- Assume technology constant

Three Empirical Challenges:

1. Relevant Geographic Market Unclear

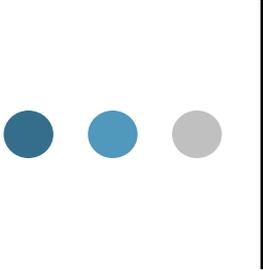
- Tract, Place, County, MSA, State, or National?

2. Potential for Unsubsidized Housing Starts for Area

- How much would have been built in absence of program?

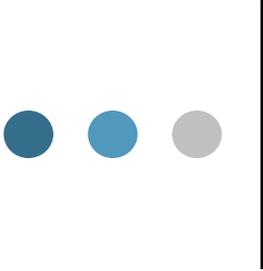
3. Endogenous Placement of LIHTC Units

- Where are LIHTC Units Located?



Relevant Geographic Market?

- **Previous Analysis of Crowd Out**
 - National Aggregate Data (Murray, 1980)
 - State Level (Green & Malpezzi, 2002)
 - Census Place (Sinai & Waldfogel, 200?)
- **Our Analysis**
 - Political Boundaries: County & MSA
 - Geographic Circles: 10m radius Circles drawn around each Census Tract (cluster std errs)



Potential for New Housing?

- **How Much New Construction Would Have Occurred in the Absence of the LIHTC Program?**
- **Use Lagged Housing Demand Proxies**
 - Rental & Owner Occupied Housing as of 1990
 - Decennial Census Vacancy Rates as of 1990
 - Change in Population and Income (1990-2000)
 - Distance to Central Business District (CBD)
 - Geographic (County, MSA, State) Fixed Effects

Empirical Specification

$$\Delta Q_{d,1990-2000} = \beta_1 LIHTC_{d,1990-2000} + \beta_2 Q_{d,1990}^{\text{Rental}} + \beta_3 Q_{d,1990}^{\text{Owner}} + \beta_4 \text{Vacancy}_{d,1990} + \beta X + \lambda + \varepsilon_d$$

LIHTC Subsidized Housing
from 1990 to 2000

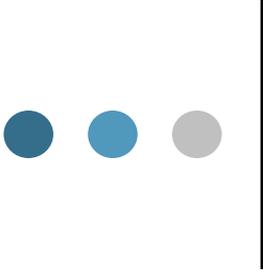
Age Distribution of Housing
Stock as of 1990

Unsubsidized rental
construction 1990 to 2000

Vacancy of Owner-Occupied
& Rental Housing in 1990

Other Housing Demand
Proxies Including Change in
Median Income & Population

$\beta_1 = -1$ Indicative of Full
Crowd Out



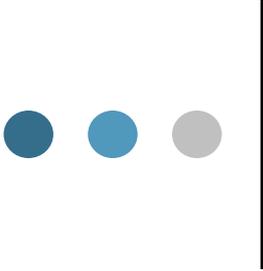
Endogenous LIHTC & 2SLS

Concern:

- Developers May Seek Out High Growth Areas
- Allocation Process May Target Lower Growth Areas
- Omitted Determinants May Bias Results

Solution: Instrumental Variables (2SLS)

- Federal government allocates LIHTC credits across states based on state share of U.S. population
- States Often Re-allocate Credits w/ Geo Preferences
- Using Voting Records to Determine Whether Geographic Area Received More than Proportionate Share



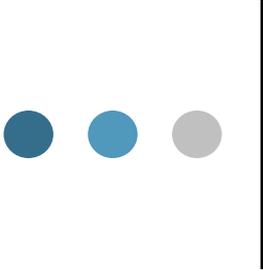
Endogenous LIHTC & 2SLS

➤ Instrument #1: Local Population Share

- Assume states mimic (in part) federal allocation procedures and re-allocate LIHTC credits within state based on local share of state population in 1990
- Instrument → Local population share x State LIHTC allocation

➤ Instrument #2: Cronyism

- Areas that vote for the winning gubernatorial candidate may subsequently receive a greater share of LIHTC credits relative to their share of state population
- Code whether an area voted for the sitting governor in 1988
- Instrument → Local population share x Dummy indicator of vote for sitting governor x State LIHTC allocation 1990-2000



Endogenous Control Vars?

➤ **Cure May Be Worst Than Disease**

- Inclusion of Such Vars May Bias Other Results
- Rely on Pre-Determined Status for Lagged Vars

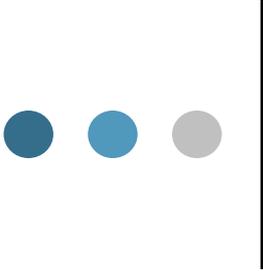
➤ **Two Problematic Variables**

▪ **Change in Area Population 1990 to 2000**

- Assume Exogeneity of % change in population at a broad level of geography
- Multiply 1990 local population by percent change in region population to proxy for change in local population

▪ **Change in Area median income 1990 to 2000**

- Analogous procedure as for change in local population



Organization of Results

- **OLS for Private Rental Construction**
 - Focus on County and 10m Circle Regressions
- **First-Stage Regressions**
 - Share Instrument Diagnostics
- **2SLS Results for Private Rental Constr**
 - Evidence of Significant Bias of OLS
- **OLS & 2SLS Results for Owner-Occupied**
 - Reinforces Claims of Bias, Large Std Errors

LIHTC Crowd Out of Private Rental Construction

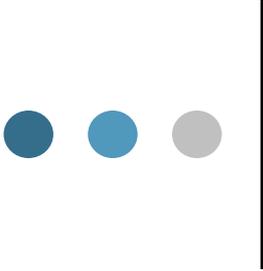
(Absolute value of t-ratios in parentheses)

	County-Level		10m Radius Circles	
	OLS	2SLS	OLS	2SLS
LIHTC Construction 1990-2000	-0.0513 (0.16)	-0.9811 (1.78)	-0.1995 (1.10)	-1.0692 (2.31)
Observations	3,052	3,052	49,794	49,794
Fixed Effects	MSA	MSA	County	County
Cluster	MSA	MSA	County	County
First Stage: StateAlloc*PopShare	-	0.7219 (3.82)	-	0.4570 (1.95)
First Stage: StateAlloc*PopShare*CntyWin	-	0.5588 (4.26)	-	0.3521 (1.84)
Kleibergen-Paap F-Statistic	-	18.76	-	11.24
Hansen-J OverID P-Value	-	0.6208	-	0.1283
R-squared	0.90	0.89	0.86	0.84
Root MSE	841	879	1973	2061

LIHTC Crowd Out of Owner-Occupied Construction

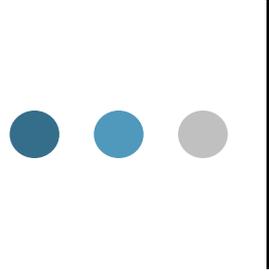
(Absolute value of t-ratios in parentheses)

	Owner-Occupied		Rental + Owner-Occ	
	OLS	2SLS	OLS	2SLS
LIHTC Construction 1990-2000	0.4922 (1.90)	-0.6877 (0.80)	0.3426 (0.84)	-1.4060 (1.52)
Observations	49,794	49,794	49,794	49,794
Fixed Effects	County	County	County	County
Cluster	County	County	County	County
First Stage: StateAlloc*PopShare	-	0.4570 (1.95)	-	0.4570 (1.95)
First Stage: StateAlloc*PopShare*CntyWin	-	0.3521 (1.84)	-	0.3521 (1.84)
Kleibergen-Paap F-Statistic	-	11.24	-	11.24
Hansen-J OverID P-Value	-	0.1283	-	0.1283
R-squared	0.69	0.68	0.76	0.75
Root MSE	3,962	4,056	5,221	5,362



Summary of Paper

- **LIHTC Is Increasingly Important Program to Understand (\$6.6+ billion per year)**
 - Income Targeted Rental Control w/ Subsidy
 - At Least 1.5m LIHTC Subsidized Units Nationwide
- **Evidence of Significant Crowd Out**
 - OLS Estimates are Biased Downwards (too little)
 - Politics Appear to Play Important Role in Allocations
 - 2SLS Point-Estimates Range from 98 to 107%
 - Relatively Large Confidence Intervals
- **Impact on Private Market = Hidden Costs**



Other Costly Elements of the LIHTC Program (Eriksen, 2009)

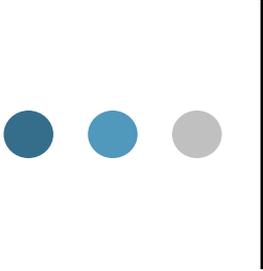
- **Subsidized Units Expensive to Construct**
 - Subsidy Amount = % of Construction Costs
 - Developers Only Pay \$0.09 per \$1 Increase of Costs
 - Median Project Costs 21% More Per Square Foot
- **Developers Sell Tax Credits to Investors**
 - Subsidy Provided as 10-year Annuity of Tax Credits
 - Projects Do Not Generate Sufficient Tax Liability
 - Buyers of Tax Credit Subject to Significant Risk
 - Estimate Investors Discount Tax Credits @ 11.2%
 - Approximately Pay \$0.71 Per PV \$1 of Tax Credit

● CONSTRUCTION COSTS PER SF

California LIHTC Projects (1999-2005)

Credit %	Projects	Cost per Square Foot (\$)		
		10p	Median	90p
70 Percent	42	92	129	176
91 Percent	219	93	128	189
Combined	261	93	128	186

Ratio of Actual to Region Estimate ^c		
10p	Median	90p
0.86	1.23	1.70
0.87	1.21	1.79
0.87	1.21	1.75



Policy Implications

- **Cannot Ignore Crowd Out Effects**
 - Some (perhaps all) development is infra-marginal
 - Limited evidence units offered at below market rents
- **Need to Redesign Allocation Process**
 - Increase Targeting of Units to Lowest Income
 - Provide Limited Subsidy as Lump Sum Payment
- **Explore Local Effects of Program**
 - Potential for Positive and Negative Externalities
 - Provide Opportunities for LI to Live in Better Areas
 - Highly Endogenous Placement, Need Good IV

44% of LIHTC Units in Middle and Higher Income Neigh.

Figure 2a. Location of Low-Income Housing Tax Credit Units by 2000 Neighborhood Income Status

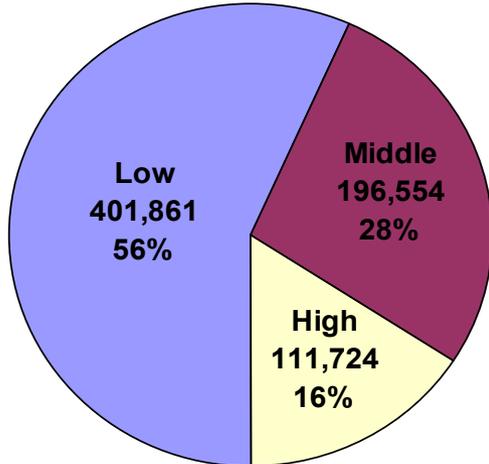


Figure 2b. Location of Traditional Public Housing Units by 2000 Neighborhood Income Status

