

Affordable housing near transit: A study of capitalization effects in southern California

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Transit-oriented development and Affordable Housing



- Two policy goals which are often linked
 - Federal Low Income Housing Tax Credit (LIHTC) provides additional "points" to developments in TOD areas
- Severe housing shortage in region, homelessness → focus on maximizing new housing provision
- Dislodgement → "suburbanization of poverty":
 - Are lower-income individuals moving away from transit? (Boamet et al. 2017)
- This is a preliminary analysis of these two goals using a hedonic model – refinement yet to come!

Literature and Background



- Price effects of nearby transit:
 - Most research has found a positive effect – transit an amenity (Bartholomew & Ewing 2011)
- Price effects of nearby affordable housing:
 - Negative perception of subsidized housing, neighborhood impacts.

"Few causes will mobilize American citizens, at least the 68 percent who own their homes, faster or more effectively than a perceived threat to the value of their property" (Green, Malpezzi, and Seah 2002)

- Woo and Van Zeldt (2016)
 - Negative effect in fast-growing regions (Charlotte, NC) but positive effect in slow-growth areas (Cleveland, OH)
- Baum - Snow and Marion (2009)
 - Positive effects in lower-income neighborhoods, negative effects in gentrifying neighborhoods (due to crowding-out of market rate construction)

Study Area

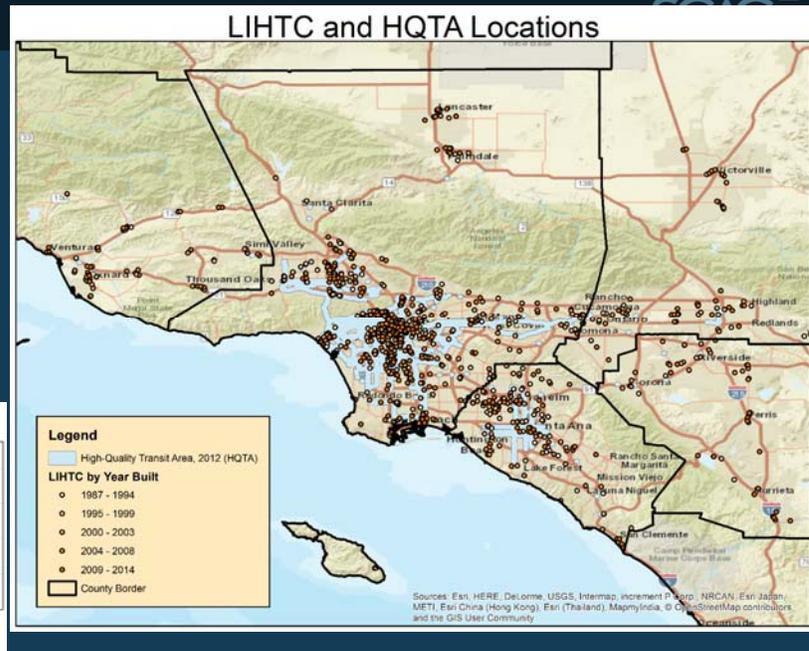
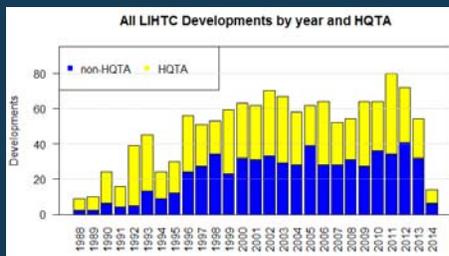


- 6 - county SCAG region
 - Population: 19.1 million
- High - Quality Transit Areas (HQ TAs):
 - ½ - mile to rail or high - frequency bus service
 - SCAG 2045 Regional Plan for HQ TAs:
 - 46% of housing growth
 - 55% of employment growth
- Socioeconomic status differences:
 - Average block group median income in region: \$66,054
 - Average BG median income in HQ TAs: \$54,623



LIHTC Developments

- Federal program, data since 1987
- HQTAs:
 - 53% of LIHTC developments
 - 37% of SCAG region population
- BG median income:
 - Region: \$66,054
 - BGs containing any LIHTC developments: \$42,333



Hedonic Model

- Concept: what contributes to the sales price of a home
 - **Strength:** revealed preference indicates actual behavior
 - **Weaknesses:** excludes rental housing, price appreciation not necessarily the objective
- Independent Variables:
 - Home characteristics
 - Neighborhood characteristics
 - Proximity to LIHTC development
 - Woo and Van Zeldt (2016) use 600m "micro-neighborhood"
 - Lee, Cuhane, and Wachter (1999) use 200m or 400m
 - This study: 200m (1/8-mile) - "about a block"
- Other dimensions whereby hypothesis variable's effect may differ structurally:
 - Regional/neighborhood income differentiation
 - Single vs. Multi-family housing (most analyses stick with single-family housing)

Data

- Residential transactions
 - Every property transaction in US, 1993-2016 (Zillow)
 - Single-family and multi-family sales
 - Study uses all transactions in HQTAs from 2010-2016
- LIHTC developments
 - From 1987-2014
 - Restrict to 2010-2014 and TOD credit eligible, (n = 138)
- Neighborhood Characteristics
 - Businesses within 1/8-mile: apparel retail, restaurants, grocery stores (Reference USA)
 - Public open space (California Protected Areas Database)
 - Block-group level socioeconomic characteristics (2011-2015 American Community Survey)

Category	Variable
Home	Home size (ln, sqft)
Home	Lot size (ln, sqft)
Home	Single family (1/0)
Home	Total Bedrooms
Home	Total Rooms
Home	Garage (Yes/No, Type)
Home	Bathrooms (Full/Half)
Home	Pool/Hot Tub
Home (age)	Building Age
Home (age)	Building Age cohort (by 20 yrs.)
Home (age)	Built in last 5 years (1/0)
Control	Sale year ('11-'16, 1/0)
Hypothesis	Recent LIHTC dev. w/in 1/8-mile
Neigh.	Median household income
Neigh.	% of Households < \$20k/yr.
Neigh.	% of Households with a car
Neigh.	% with B.A. degree
Neigh.	% age > 65
Neigh.	Apparel retail within 1/8-mi.
Neigh.	Restaurant within 1/8-mi.
Neigh.	Grocery store within 1/8-mi.
Neigh.	Public open space w/in 1/8-mi.

Results – All home sales

- Signs on model as expected
- Sales price logged: 1-unit change results in a β -percent change in price
- LIHTC nearby: negative effect; results in 8.4% lower home price

MODEL OF ALL HOME SALES IN SCAG HQTAs, 2010-2016

MODEL 1: ALL PROPERTIES

Variable	Estimate	Std. Error	t-value	Sig.
Intercept	10.782	0.029	373.28	***
lnsqft	0.181	0.002	115.574	***
lnlotsqft	0.004	0.001	6.549	***
is_sfr	0.193	0.005	36.514	***
TotalBedro	-0.046	0.002	-22.456	***
TotalRooms	0.021	0.001	16.2	***
garagetypeMini	-0.037	0.026	-1.429	
garagetypeOne Car	-0.085	0.026	-3.325	***
garagetypeTwo Car	-0.039	0.025	-1.56	
FullBath	0.331	0.002	154.471	***
HalfBath	0.064	0.008	8.083	***
pool	0.118	0.004	30.537	***
hottub	0.205	0.016	13.018	***
BldgAge	-0.002	0.000	-9.511	***
PeriodBuiltb1t40s50s	0.037	0.014	2.637	**
PeriodBuiltb1t60s70s	-0.187	0.010	-18.145	***
PeriodBuiltb1t80s90s	-0.247	0.008	-30.7	***
PeriodBuiltpre1939	0.094	0.019	4.915	***
BuiltLast5	0.101	0.009	11.527	***
saleyrCHAR2011	-0.034	0.005	-7.386	***
saleyrCHAR2012	0.038	0.005	8.29	***
saleyrCHAR2013	0.266	0.005	55.866	***
saleyrCHAR2014	0.396	0.005	79.862	***
saleyrCHAR2015	0.518	0.005	104.881	***
saleyrCHAR2016	0.541	0.010	55.876	***
LIHTC 200m	-0.084	0.010	-8.694	***
R-squared	0.377			

*** p<0.001, ** p<0.01, * p<0.05, . p<0.10

LIHTC proximity highly correlated with income!



- T-test on neighborhood median HH income:
 - Sales near LIHTC: \$39,500
 - Sales not near LIHTC: \$62,573
- Controlling for income, nearby LIHTC development increases home prices 5.46%
- Interaction term: Differential effect of income based on LIHTC:
 - Non-LIHTC: \$1000 higher median income raises sale price by 0.815%
 - LIHTC: \$1000 higher median income raises sale price by 1.16%

ALL HOME SALES IN SCAG HQTAs, 2010-2016

MODEL 2A: ADD INCOME

Variable	Estimate	Std. Error	t-value	Sig.
LIHTC_200m	0.055	0.009	6.113	***
medHHinc (\$1000s)	0.008	0.000	188.86	***
<i>R-squared</i>	0.473			
*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, . $p < 0.10$				

ALL HOME SALES IN SCAG HQTAs, 2010-2016

MODEL 2B: ADD INCOME, INTERACTION

Variable	Estimate	Std. Error	t-value	Sig.
LIHTC_200m	-0.084	0.020	-4.118	***
medHHinc (\$1000s)	0.008	0.000	187.79	***
LIHTC * medHHinc	0.003	0.000	7.541	***
<i>R-squared</i>	0.473			
*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, . $p < 0.10$				

Add in the neighborhood context:



- Controlling for poverty, auto ownership, college education rates, senior citizen population, presence of nearby parks, restaurants, groceries, clothing stores (1/8-mile),
 - LIHTC actually has a positive effect of 8.3% on home prices
- Very context dependent!

ALL HOME SALES IN SCAG HQTAs, 2010-2016

MODEL 3: ADD SES & NEIGHBORHOOD

Variable	Estimate	Std. Error	t-value	P-value
LIHTC_200m	0.083	0.009	9.536	***
medHHinc (\$1000s)	0.005	0.000	101.36	***
HHund20k	0.000	0.000	-5.241	***
pct_hascar	0.292	0.015	20.064	***
popBAplus	0.000	0.000	84.119	***
seniorshare	1.308	0.017	77.724	***
Apparel Retail	0.112	0.003	33.367	***
Restaurant	0.044	0.003	14.8	***
Grocery Store	-0.067	0.004	-18.88	***
Open space	0.018	0.004	5.034	***
<i>R-squared</i>	0.534			
*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, . $p < 0.10$				

Restrict to impacts on single-family housing

- Most concern over negative impacts likely comes from single-family homeowners:
 - 132,264 SFR sales (67%)
 - Only 1,997 (1.5%) of single-family homes are near LIHTC
- LIHTC proximity: 17.7% decrease in price
 - Controlling for median income, LIHTC proximity results in a 4.96% decrease in price
- Controlling for all SES/neighborhood; LIHTC proximity not significant
 - Highest model fit: R-squared = 0.5626

MODEL OF SFR SALES IN SCAG HQTAs, 2010-2016

MODEL 1: ALL SFR

Variable	Estimate	Std. Error	t-value	Sig.
(Intercept)	10.512	0.0349	300.81	***
lnsqft	0.162	0.0016	99.141	***
lnlotsqft	0.045	0.0018	25.71	***
TotalBedro	-0.036	0.0023	-15.678	***
TotalRooms	0.017	0.0017	9.974	***
garagetypeMini	0.005	0.0264	0.188	
garagetypeOne Car	-0.030	0.0253	-1.18	
garagetypeTwo Car	-0.031	0.0249	-1.247	
FullBath	0.326	0.0025	133	***
HalfBath	0.076	0.0093	8.123	***
pool	0.255	0.0054	47.513	***
hottub	0.357	0.0205	17.456	***
BldgAge	-0.002	0.0002	-9.045	***
PeriodBuilt40s50s	0.203	0.0186	10.874	***
PeriodBuilt60s70s	0.042	0.0168	2.481	*
PeriodBuilt80s90s	-0.002	0.0162	-0.095	
PeriodBuiltpre1939	0.275	0.0234	11.768	***
BuiltLast5	0.018	0.0174	1.045	
saleyrCHAR2011	-0.022	0.0054	-4.113	***
saleyrCHAR2012	0.045	0.0055	8.244	***
saleyrCHAR2013	0.264	0.0056	46.825	***
saleyrCHAR2014	0.397	0.0059	67.413	***
saleyrCHAR2015	0.522	0.0058	89.34	***
saleyrCHAR2016	0.553	0.0114	48.386	***
LIHTC_200m	-0.178	0.0134	-13.217	***
R-squared	0.406			

*** p<0.001, ** p<0.01, * p<0.05, . p<0.10

Restrict to impacts on condo/townhome sales

- Multifamily sales are roughly 1/3 of all sales
 - 3.2% near LIHTC (twice the rate of SFR)
- Without income controlled, effect of LIHTC proximity insignificant
- Controlling for income, 15.1% increase in property value based on LIHTC proximity
- Controlling for SES/neighborhood, 14.26% increase in property value based on LIHTC proximity

MODEL OF MFR SALES IN SCAG HQTAs, 2010-2016

MODEL 1: ALL MFR

Variable	Estimate	Std. Error	t-value	Sig.
(Intercept)	10.53357	0.157434	66.908	***
lnsqft	0.309988	0.004781	64.842	***
TotalBedro	-0.10684	0.004166	-25.644	***
TotalRooms	0.024853	0.002897	8.579	***
garagetypeMini	-0.391	0.154279	-2.534	*
garagetypeOne Car	-0.52063	0.154701	-3.365	***
garagetypeTwo Car	-0.33627	0.154468	-2.177	*
FullBath	0.292341	0.004569	63.988	***
HalfBath	0.044029	0.015123	2.911	**
pool	-0.02903	0.005518	-5.261	***
hottub	-0.02905	0.024242	-1.198	
BldgAge	-0.00269	0.000565	-4.768	***
PeriodBuilt40s50s	-0.1872	0.033462	-5.594	***
PeriodBuilt60s70s	-0.19758	0.020386	-9.692	***
PeriodBuilt80s90s	-0.24128	0.013168	-18.324	***
PeriodBuiltpre1939	-0.01567	0.049236	-0.318	
BuiltLast5	0.167173	0.010086	16.575	***
saleyrCHAR2011	-0.05335	0.008083	-6.6	***
saleyrCHAR2012	0.033709	0.008216	4.103	***
saleyrCHAR2013	0.280869	0.008528	32.936	***
saleyrCHAR2014	0.404648	0.008893	45.5	***
saleyrCHAR2015	0.519174	0.008961	57.94	***
saleyrCHAR2016	0.526069	0.017426	30.189	***
LIHTC_200m	0.008773	0.013939	0.629	
R-squared	0.3534			

*** p<0.001, ** p<0.01, * p<0.05, . p<0.10

Restrict to low/high income neighborhoods



- Baum - Snow and Marion's (2009):
 - Positive effect of LHTC proximity in neighborhoods below 30% of median incomes
 - 30th percentile in SCAG region HQTAs is \$36,419
- Below 30th percentile income:
 - No Income/SES/neighborhood: +6.67% effect of nearby LHTC
 - With Income/SES/neighborhood: +8.36% effect of nearby LHTC
- Above 30th percentile income:
 - No Income/SES/neighborhood: -2.93% effect of nearby LHTC
 - With Income/SES/neighborhood: +11.5% effect of nearby LHTC
- Above \$66k/yr (~70th %ile HQTA, SCAG region median)
 - No Income/SES/neighborhood: +18.1% effect of nearby LHTC
 - With Income/SES/neighborhood: +21.9% effect of nearby LHTC
- Even higher at \$100k/yr.. above 40% !

Aside: What is the effect of nearby amenities on sales prices?



- Criteria: is a destination within 1/8 - mile?
- Only includes sales in transit-rich areas of Southern California

	<i>Percent effect on sales price of:</i>	
	<u>Single-family homes</u>	<u>Multi-family homes</u>
Apparel Retailing	+9.56%	+9.90%
Restaurants	+3.74%	+6.00%
Grocery Stores	-7.98%	-2.60%
Public open space	+0.29%	+5.22%

Conclusions I



- Transit- rich areas expected to be a disproportionate area of growth
 - Other research needed to address displacement
- Effects of nearby affordable housing are clearly context- dependent
 - Both HQTAs and LIHTC- adjacent neighborhoods are (inherently?) lower income

EFFECT ON SALE PRICE OF NEARBY LIHTC:

	No income control	Income controlled	SES/neigh controlled
All sales	-8.4%	+5.5%	+8.3%
SFR	-17.7%	-4.96%	<i>Insignificant</i>
MFR	<i>Insignificant</i>	+15.1%	+14.26%
Low-inc	+6.67%	NA	+8.36%
Mid-High Inc	-2.93%	NA	+11.5%
High-inc	+18.1%	NA	+21.9%

Conclusions II



- Shortcomings:
 - Transit question not directly addressed
 - More complex functional form to account for development timing
- Mechanisms & Measures:
 - Outcome measure of property may not be socially optimal/ rationally- based
 - Does not take into account rental property, displacement
- Effect of nearby affordable housing is very context- specific!

Thank you

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