VALUING NATURALLY AFFORDABLE HOUSING:
EVIDENCE FROM LOS ANGELES AND ORANGE COUNTIES OF HOW INCLUSIONARY
ZONING REDUCES AFFORDABILITY

Jacob T. Denney, B.A.

Thesis Advisor: Eliane Catilina, Ph.D.

ABSTRACT

Americans currently face an unprecedented housing affordability crisis. Nowhere is this crisis more pronounced than for the rental households in the Los Angeles Metro area. Inclusionary zoning is one tool local jurisdictions have used to provide affordable housing units, but there is debate over the negative secondary effects this policy could have in the market. As inclusionary zoning has just been re-authorized by the California legislature, now is a particularly apt time to take a closer look at its effects on the broader rental housing market. This research utilizes American Community Survey data to estimate the effects of inclusionary zoning on affordability rates in LA and Orange counties.
# Table of Contents

1. Introduction .......................................................................................................................... 1

2. Background .......................................................................................................................... 5

3. Review of the Literature ...................................................................................................... 8

4. Conceptual Framework and Hypothesis ............................................................................. 12

5. Data and Empirical Strategy .............................................................................................. 15
   5.1 Descriptive Statistics ...................................................................................................... 15
   5.2 Empirical Strategy .......................................................................................................... 17

6. Results .................................................................................................................................. 21
   6.1 Descriptive Results ........................................................................................................ 21
   6.2 Regression Results .......................................................................................................... 22
   6.3 Limitations and Suggestions for Future Research .......................................................... 25

7. Discussion ............................................................................................................................. 26
   7.1 Policy Recommendations ............................................................................................... 26
   7.2 Conclusion ....................................................................................................................... 28

Bibliography ........................................................................................................................... 29
List of Figures

1. American Community Survey Observations ................................................................. 15
2. American Community Survey Observations by City .................................................. 16
3. Regression Results under Final Specification ............................................................. 23
4. Correlation of Education and Inclusionary Zoning Variables ..................................... 23
5. Correlation of Inclusionary Zoning Policy and Affordability Rate ............................. 24
6. Results under Simple Pooled Analysis with Clustered Errors .................................... 25
1. Introduction

Housing is the largest expense most Americans face, and in California, its cost is driving citizens into poverty.\(^1\) A wealthy state with one of the largest economies in the world, California also boasts the highest poverty rate among all fifty states – a staggering 20.6% - using the Supplemental Poverty Measure, which accounts for cost of living differences.\(^2\) Housing costs are the primary driver of this high cost of living and even those above this poverty line struggle; more than half of Californian households pay over 30% of their income to rent, and nearly a third pay over 50%, the levels at which one is considered cost-burdened and severely cost-burdened.\(^3\) Further, things have been getting worse. For the poorest twenty percent of households, 63% of income goes to paying rent, while this share was 47% in 1960.\(^4\) To address this long-running housing affordability crisis, lawmakers, zoning officials. and in some cases voters have stepped in to implement a variety of affordable housing programs, including mandatory inclusionary zoning.

Inclusionary zoning policies require developers of multifamily housing to provide a certain percentage of that housing at set rents determined to be affordable. A strong argument for inclusionary zoning is outcome driven; by dispersing affordable units throughout new and often high-end developments, inclusionary zoning prevents the formation of pockets of poverty and

provides better long-term outcomes for the children it benefits than those in similar economic bands but who grow up in Section 8 housing.\(^5\) Additionally, costs are born by developers rather than the Department of Housing and Urban Development (HUD), who’s funding covers an increasingly small fraction of the population who qualify for their voucher programs.

However, in pushing the cost onto the developer, opponents argue inclusionary zoning makes housing less affordable to the majority who do not benefit from the relatively few affordable units the policies produce. The quantity of units produced can be so paltry and are at such a fantastic value to the tenant that developers commonly make comparisons to winning the lottery. Because of these concerns, Governor Brown vetoed a bill reinstating inclusionary zoning (AB-1229) in 2013. In his veto message, Gov. Brown reflected on his experiences as mayor of Oakland, saying, “I saw how difficult it can be to attract development to low and middle income communities. Requiring developers to include below-market units in their projects can exacerbate these challenges, even while not meaningfully increasing the amount of affordable housing in a given community.”\(^6\)

It is the hope of the author that this research will be informative to policymakers in Southern California and beyond. This thesis therefore seeks to investigate the effect of mandatory inclusionary zoning policies on the supply of affordable rental housing (natural and designated) in LA and Orange counties. In 2009, when Los Angeles was considering adopting an inclusionary zoning policy as a means of creating more affordable housing, a California court decision (Palmer/
Sixth Street Properties v. City of Los Angeles) blocked implementation on rental housing. However, after being signed into law in September 2017, California Assembly Bill 1505 puts the power to enact inclusionary zoning on rental housing back in the hands of cities and counties, while specifying the inclusionary provision to be a 15% set-aside for tenant earning wages less than or equal to 80% of the Area Median Income. Los Angeles once again has the option to enact mandatory inclusionary zoning provisions on rental housing as a means of address an ongoing affordability crisis.

Inclusionary zoning policies are found in the largest and most expensive US cities and are typically set at a local level, resulting in wildly varying requirements, incentives, and implementation structures. As a result, it can be very difficult to quantify the effects of policies, particularly given the extremely local and cyclical nature of real estate. However, the Palmer ruling, which will be discussed in the following chapter, created something of a natural experiment; this statewide ruling weakened inclusionary zoning mandates and can be treated as a source of exogenous variation to identify the impacts of inclusionary zoning policies on the market.

There were several jurisdictions in LA and Orange counties with inclusionary zoning policies before Palmer. Of those with mandates, some halted enforcement following Palmer but others, such as Santa Monica, have continued their policies. Still others modified their policies to accommodate the ruling. This study seeks to use these differences to understand the effect of inclusionary zoning mandates on the supply of affordable rental housing, both naturally affordable and designated affordable, in Los Angeles and Orange counties.

---

8 Washington DC, San Francisco, and Boston are among the cities that pioneered policies mandating inclusionary zoning.
The data used is collected from the American Community Survey, conducted annually by the US Census Bureau. While methodology will be detailed later in this thesis, the dependent variable is worth discussing here, as it is a key differentiator of this research. While some papers attempt to draw a relationship between inclusionary zoning and depressed housing starts, new developments are rarely affordable due to current economic conditions, so that measure was not used. As the research question is one of the effect on the quantity of affordable housing, and naturally affordable housing supply is not tracked on an aggregate scale by housing authorities, a novel means of measuring this variable had to be devised. Using individual level data, an affordability rate for each city in the area of interest was developed for each year of the study period. A simple linear regression was performed to understand the relationship between inclusionary zoning mandates and the incidence of affordable rental housing.
2. Background

In California, a substantial amount of research was done on data from 1988-2005, as Los Angeles and Orange counties and other jurisdictions throughout the state considered implementing county-wide inclusionary zoning mandates for rental housing. Some localities in LA and Orange counties did have mandatory inclusionary zoning policies on rental housing during the study period. A court decision, Palmer/ Sixth Street Properties v. City of Los Angeles, 175 Cal. App 4th 1396 (2009) (Palmer), restricted local jurisdictions from enacting mandatory inclusionary policies on rental housing, finding this to be a form of rent control at odds with existing state laws. In theory, this should have required all localities to suspend enforcement of their inclusionary zoning mandates on apply to rental housing.

Traditional economics understands inclusionary zoning as a tax, increasing costs and reducing supply. Therefore, when inclusionary zoning policies were suspended, more housing units should have been delivered and those units should have been more affordable, on average and when controlling for other known factors. While the popular consensus is that housing has only gotten less affordable, that popular feeling does not consider whether costs would have been worse if inclusionary zoning policies were maintained or expanded during the period.

Hollingshead (2015) looks at the impact of Palmer on average rental prices across California. Hollingshead found inclusionary zoning pre-Palmer exerted slight downward pressure on lower-quartile rental prices, hypothesizing that by delivering more designated affordable units to the market, market forces caused prices of naturally affordable housing to fall further. Hollingshead failed to find evidence of a statistically significant relationship between Palmer and

---

9 Of particular note is “Housing market effects of inclusionary zoning” by Bento, Lowe, Knaap, and Chakraborty, Cityscape (2009).
upper quartile rental prices. While the relationship between inclusionary zoning and rental prices may be marginal, Hollingshead’s study did not consider the quantity of affordable rental units in the market.\textsuperscript{10}

Due to the mechanics of multifamily housing development, the unintended impact of inclusionary zoning may be more effectively measured as an effect on the quantity of housing rather than on its price. Demand for rental housing is conditionally inelastic because within rental housing, apartments are not interchangeable commodities outside of a subset of price range, finish level, and location. Adding complication is the nature of housing as a durable good, making supply dynamics different than with typical commodities.

A new development will simply not start if the forecasted rents and resale price cannot cover the costs of development plus healthy risk-adjusted returns, with the sale price largely determined by the projected rents over the next fifteen years or more. Rents rise in periods of economic expansion but tight housing supply, which has been seen in many cities post-2008 because housing construction in these urban markets typically takes 2-4 years from land purchase to construction completion. Prices for rental housing only fall during periods of considerable over-supply, when population and jobs flee an area or a large number (thousands) of housing units are delivered in a concentrated area in a short period of time. In this way, housing development is very cyclical, but periods of depression in the cycle are marked by extremely limited construction activity and no rent growth, rather than by substantially falling rents.

Due to the mechanics described, the effects of taxes on housing development should be expected to be seen to effect quantity of development, rather than have an immediate and direct effect on price. As delivery of units typically lags market changes by three to five years, a price change can be expected to decrease less than proportionally to a change in quantity. An anecdotal example can be seen in San Francisco, where a ballot measure (Prop. C) raising the required percent of affordable units from 15% to 25% in new developments was considered in the summer of 2016. That June, voters passed the ballot measure and the quarter following saw new proposals for housing units fall 58% compared to the same period in the year before but changes in rental prices were not nearly as substantial. Using variation in housing policies resulting from the Palmer decision, this thesis sets out to answer whether the loosening of inclusionary zoning mandates can spur delivery in the same way increasing mandates slows delivery. This research adds to the understanding of the impacts of inclusionary zoning policies on the quantity of naturally affordable units supplied to the market. In doing so, policy makers will have an additional information when considering whether to bring inclusionary mandates to their jurisdictions.
3. Review of the Literature

The following review of the literature while show that while inclusionary zoning programs have been implemented across the United States, they vary greatly in terms and requirements, and debate continues over their impact on market-rate housing. Some markets, such as Boston, have demonstrated negative external effects on the price and quantity of housing following their implementation, while others, such as Washington, D.C., have not shown such evidence. Experts generally agree larger market forces driving housing development override the comparatively small impacts of inclusionary zoning. As inclusionary zoning is only implemented in markets with very strong growth dynamics and where housing is already expensive, it has therefore proven difficult to parse out the impact of inclusionary zoning from larger market forces affecting housing. Depressive tendencies of the policy that we may later see during a down cycle have been masked by the extended growth cycle experienced since the crash in 2008/2009. Additionally, the majority of research has focused largely on home prices and new housing starts, overlooking impacts to multifamily rental housing in particular. Due to changes in implementation from judicial challenges and the availability of previous research, Los Angeles and Orange counties remain interesting subjects for this study.

Brunick (2003) asks whether inclusionary zoning programs (broadly) slow development throughout the country. The author argues larger market forces will determine levels of development in each community, with inclusionary zoning rules being a much smaller driver. While acknowledging few studies have examined the impact of inclusionary housing on housing deliveries, Brunick relies on market theory to hypothesize the burden from inclusionary zoning is
mitigated by cost offsets and a resultant depression in land prices. This notion that the burden is being carried in part from downward pressure on land prices is both intriguing and testable.

Bento, Lowe, Knaap, Chakraborty (2009) examine data for California cities from 1988 through 2005, finding that in areas with inclusionary zoning, multifamily housing starts increased, single family housing starts were unaffected, and prices of housing increased by various degrees. A key finding was that housing prices in cities adopting inclusionary zoning policies increased 2-3 percent faster than those without the program, with higher rates of increase for more expensive housing. In summary, the authors find an impact from inclusionary zoning; an increase to the price of more expensive homes in markets where residents were less sensitive to price, and a decrease to the size of less expensive homes in markets where residents were more sensitive to price. This study contrasts with other works which argue there is no cost relationship between inclusionary zoning and housing prices. While my work focuses on affordable rental supply and this study on purchase prices, the two are known to be strongly related. Additionally, some the data sources and structures used by Bento, et al (2009) can be updated and applied in this analysis. To determine base levels of housing, US Census data was used. Data on inclusionary zoning regulations was taken from a 2003 survey conducted by the California Coalition for Rural Housing.\(^{11}\) This data has been updated by more recent work but presents a structure to follow.

Powel and Stringham (2004) is the most critical study of the negative consequences of inclusionary housing mandates, and is often addressed and cited as such by subsequent studies. It is notable that the Reason Foundation, which funds the Reason Policy Institute, is a libertarian organization and uses their research to influence policymakers. The authors find inclusionary zoning produces few units and does so at a high cost. Additionally, the authors find the policy

\(^{11}\) Survey of Inclusionary Housing Policies (2003), California Coalition for Rural Housing.
makes market-priced homes more expensive, with the magnitude of the burden dependent on the relative price sensitivity of the various groups. Their most critical finding for this analysis was that inclusionary zoning restricts the supply of new housing; for all of the thirteen cities with inclusionary ordinances in LA and Orange counties at the time of the study, they found new housing starts fell the year following policy adoption. The authors find that for the eight cities with seven years of data prior to and following implementation of an inclusionary zoning ordinance, only 770 affordable units were created by the policy and 17,296 fewer market rate homes were constructed as a result. While this gets to the primary concern of my research (reduced quantity of housing as an effect of inclusionary zoning), like much of the other research discussed in this review, the study focuses on single family homes and housing sales, rather than rental housing. Lastly, Powell and Stringham (2004) have been criticized by other researchers for failing to employ advanced statistical techniques in their analysis, despite providing strong empirical research.

Mukhija, Regus, and Slovin (2010) provide the basic framework for this research through their qualitative review of the evidence and practices surrounding inclusionary zoning in LA and Orange counties. Their paper concludes in favor of inclusionary zoning policies, while advocating for a nuanced approached. The different structures and cost-offsetting incentives used across the study’s geographical range were outlined and discussed. Mukhija, et al (2010) is critical of the conclusions by Powell and Stringham (2004), arguing that much larger exogenous variation (changes in prime interest rates, tax reform, unemployment, etc) could have created the observed impacts. Overall, a review of the literature on national levels shows little to no adverse effects in some areas, with evidence of a consequently constrained housing market in others. This review supports the author’s findings that cost offsets are important for mitigating impact, and the relative
consensus across the literature that inclusionary zoning’s impact is difficult to measure because it is so small compared to larger market forces driving housing markets. In their regression analysis, Mukhija et al (2010) find no substantial effects from inclusionary zoning, hypothesizing this may be to the presence of cost offsets and the relatively small impact they theorize inclusionary policies to have.

As referenced in the previous chapters, Hollingshead (2015) serves as a model for this thesis, particularly in its use of the Palmer decision as an exogenous shock to the market through which the impact of inclusionary zoning in California could be measured. Hollingshead (2009) concludes inclusionary zoning pre-Palmer exerted slight downward pressure on lower-quartile rent prices, theorizing that by delivering more designated affordable units to the market, market forces caused prices of naturally affordable housing to fall further. Additionally, Hollingshead (2009) finds no significant relationship between the presence of inclusionary zoning mandates and upper quartile rent prices. By reporting the relationship for only the highest and lowest rent quartiles, Hollingshead neglects the middle fifty percent of housing that would be hold the majority of the “naturally affordable” and “workforce housing” my research attempts to quantify. Additionally, for the reasons discussed in the Background chapter, this research focuses on quantity measures rather than the price measures used by Hollingshead (2015).
4. Conceptual Framework and Hypothesis

As discussed in the previous chapter, relevant literature focusing on the relationship between rental prices and inclusionary zoning has (?)been largely inconclusive, with weak support for the idea that inclusionary zoning does not have a significant impact on rental cost. In for-profit housing development, the rents of an apartment are a function of market rates for location and finish level, not a function of the cost of housing development. Most professional developers and operators will always charge the highest rents they can, continuously reviewing the market and their rents to maximize revenues and often using a Rental Management System (RMS) to automatically update prices as vacancy rates and market conditions change. Therefore, an analysis is more likely to observe a relationship between the quantity of new development and its cost, rather than the price (rents) of that project. As discussed in the Background chapter, rents for these luxury units typically only fall in periods of high vacancy, usually because of oversupply following the construction booms begun during periods of low vacancy and increasing rent.

As new luxury developments are delivered to the market, they compete for tenants with aging buildings. As these older buildings fall in comparative quality over time, they must either lower the positioning of their rents in the market or invest in capital expenditures to update the property and continue to compete in the luxury space. The delivery of new luxury housing thereby should have an impact on the quantity of housing available at affordable rents, due to its depressive effect on the rents of older and lower quality product.

The principle hypothesis of this thesis is that inclusionary zoning measures reduce the quantity of affordable housing supplied to the market. The more onerous the inclusionary policy and the fewer cost offsets provided, the more severe the observed effect should be. This hypothesis
is supported by the literature; inclusionary zoning measures are an added cost on development that should reduce the quantity of new luxury units delivered. Affordable housing is defined here where the cost of housing is below 30% of the Area Median Income. To estimate these effects, empirical study will control for market forces, such as job and wage growth, prevailing interest rates, and population growth to be stronger predictors of quantity than inclusionary zoning measures.

To measure the quantity of housing available at certain affordability levels requires household level data. However, as inclusionary zoning policy varies at the local level, the conceptual model will be conducted at the local level. While the true quantity of affordable housing would be preferred, measuring this value would require maintaining rent data for all housing. New housing starts are typically luxury housing, and therefore won’t be representative of the quantity of affordable housing, which changes as rents change and is composed of both designated affordable housing and market rate housing. As a result, the best way to get to a measure of quantity of affordable housing is to extrapolate an incidence from household data. This model, which will take advantage of variation in policy over time and across locals, is expressed conceptually below:

\[ \text{Rate of Affordable Units} = f(\text{Inclusionary Zoning Policy}, \text{Cost Offsets}, \text{Market Drivers}) \]

The groups of variables that can explain housing affordability are inclusionary zoning policy, cost offsets, and market drivers, as described above. In absence of an inclusionary policy, we would expect market forces to completely describe the housing market, with factors such as high interest rates driving up costs. An inclusionary policy can be quantified by the affordability rate (percent of development mandated affordable) and the threshold, or number of units at which the policy begins to apply to a development. There are a number of policies intended to mitigate
the taxing effects of inclusionary zoning mandates, such as density bonuses and expedited permit processing. Through the combination of these three groups of variables, it is hoped a strong causal relationship can be found.
5. Data and Empirical Strategy

5.1 Descriptive Statistics

Data used in this research is drawn from the American Community Survey (ACS) and utilizes both annual and five-year estimates. The IPUMS database was used to specify variables and download the datasets, which were then combined with summary-level descriptive statistics provided by the California State Data Center. The ACS is conducted by the US Census Bureau annually and covers a broad range of topics. For this analysis, source data was provided at the individual level, consolidated to the household level, and then collapsed to the city level after being cleaned and manipulated. At the household level, all non-renters were excluded from analysis, leaving 540,371 reporting households from 2006-2015. The annual breakdown by county code is shown below, where Los Angeles County is 370 and Orange County is 590.

<table>
<thead>
<tr>
<th>Year</th>
<th>County 370</th>
<th>County 590</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>9,637</td>
<td>1,879</td>
<td>11,516</td>
</tr>
<tr>
<td>2007</td>
<td>9,759</td>
<td>1,977</td>
<td>11,736</td>
</tr>
<tr>
<td>2008</td>
<td>10,118</td>
<td>2,024</td>
<td>12,142</td>
</tr>
<tr>
<td>2009</td>
<td>59,040</td>
<td>11,757</td>
<td>70,797</td>
</tr>
<tr>
<td>2010</td>
<td>61,028</td>
<td>12,093</td>
<td>73,121</td>
</tr>
<tr>
<td>2011</td>
<td>63,012</td>
<td>12,404</td>
<td>75,416</td>
</tr>
<tr>
<td>2012</td>
<td>63,153</td>
<td>9,569</td>
<td>72,722</td>
</tr>
<tr>
<td>2013</td>
<td>63,700</td>
<td>8,229</td>
<td>71,929</td>
</tr>
<tr>
<td>2014</td>
<td>64,410</td>
<td>6,805</td>
<td>71,215</td>
</tr>
<tr>
<td>2015</td>
<td>64,433</td>
<td>5,344</td>
<td>69,777</td>
</tr>
</tbody>
</table>

**Figure 1: American Community Survey Observations**

Theses household observations are broken out by city, shown below. The ultimate analysis is to be conducted at the city-level, with household data collapsed to that level. However, the observation counts shown below vary significantly to the shares expected by the populations of the jurisdictions. While this will not bias the results of the final analysis, collapsing to the city level will mask variance in the robustness of the underlying estimates applied. As a pooled regression approach is to be taken, and the interest is in the effect of the policy at a city level, no weighting system is applied in this analysis.\textsuperscript{13}

\begin{table}[h]
\centering
\begin{tabular}{l|rrr}
\hline
\textbf{city} & \textbf{Freq.} & \textbf{Percent} & \textbf{Cum.} \\
\hline
anaheim, ca & 13,538 & 2.51 & 2.51 \\
burbank, ca & 6,154 & 1.14 & 3.64 \\
costa mesa, ca & 6,488 & 1.20 & 4.84 \\
downey, ca & 5,355 & 0.99 & 5.84 \\
east los angeles, ca & 8,879 & 1.64 & 7.48 \\
el monte, ca & 4,787 & 0.89 & 8.36 \\
fullerton, ca & 5,351 & 0.99 & 9.36 \\
garden grove, ca & 5,798 & 1.07 & 10.43 \\
gleendale, ca & 17,231 & 3.19 & 13.62 \\
huntington beach, ca & 11,389 & 2.11 & 15.72 \\
inglewood, ca & 8,974 & 1.66 & 17.39 \\
irvine, ca & 8,894 & 1.65 & 19.03 \\
lancaster, ca & 4,430 & 0.82 & 19.85 \\
long beach, ca & 38,270 & 7.06 & 26.93 \\
los angeles, ca & 334,957 & 61.99 & 88.92 \\
norwalk, ca & 2,540 & 0.47 & 89.39 \\
orange, ca & 4,477 & 0.83 & 90.22 \\
palmdale, ca & 5,381 & 1.00 & 91.21 \\
pasadena, ca & 11,439 & 2.12 & 93.33 \\
pomona, ca & 7,143 & 1.32 & 94.65 \\
santa ana, ca & 16,146 & 2.99 & 97.64 \\
santa clarita, ca & 3,900 & 0.72 & 98.36 \\
torrance, ca & 6,085 & 1.13 & 99.49 \\
wes covina, ca & 2,765 & 0.51 & 100.00 \\
\hline
\textbf{Total} & 540,371 & & 100.00 \\
\end{tabular}
\caption{American Community Survey Observations by City}
\end{table}

\textsuperscript{13} For more on this, please see Gary Solon & Steven J. Haider & Jeffrey M. Wooldridge, 2015. "What Are We Weighting For?" Journal of Human Resources, University of Wisconsin Press, vol. 50(2), pages 301-316.
5.2 Empirical Strategy

As described in the Conceptual Framework chapter, the aim of this thesis is to understand the relationship between inclusionary zoning policies and the quantity of affordable rental housing supplied to the market. The renting residents of Los Angeles and Orange counties define the population of interest for the period between 2006 and 2015. Data is obtained from the American Community Survey using IPUMS, then combined with multiple additional datasets and modified to fit the conceptual model.

The critical methodological contribution of this thesis to the field of study is in the approach taken to identify a metric for quantity of affordable units. To measure the quantity of affordable housing supplied over time requires tracking housing prices on individual housing units. While construction and building permit numbers are tracked and rental price information is available on larger multi-family properties, such measures implicitly bias towards new and luxury housing. To identify the quantity of naturally affordable units, individual-level housing data was drawn from IPUMS using ACS data for the period 2000-2015 in the geography of interest. After importing local AMI data from annual ACS summary tables for California (VC85_HC01) and applying it to the individual-level data set, a dummy variable indicating whether each individual observation constituted an instance of affordable housing for that location and year could be created. The data was then consolidated to the local level. By creating a count of the individual-level responses where gross rental cost was less than or equal to AMI, summing at the local level, then dividing by the count of all observations at that local level, a variable measuring the rate of affordable housing for a locale was created (AffRate).

With the data now organized at the local level, the independent variables of interest were added. This data was gathered from 2006 survey results conducted by the Non-Profit Housing
Association of Northern California and published in Affordable by Choice: Trends in California Inclusionary Housing Programs, and then updated by contacting the jurisdictions within the area of interest.\textsuperscript{14} Inclusionary zoning’s cost as a tax is tied to the details of the mandate, so multiple inclusionary zoning measures must be included. The key elements of mandatory inclusionary zoning policies in Los Angeles and Orange counties are the unit threshold (IZthresh) and the set-aside rate (IZrate).\textsuperscript{15} Cost offsets are common and intended to mitigate the taxing effect of the policy, and also vary by jurisdiction, and therefore must be included. The most impactful and common forms of cost offsets are density bonuses (DBonus), to be given as a rate, and expedited permits and approvals (ExPermit), shown as a dummy variable. Additionally, most programs offer in-lieu fees, which if set too low would seriously undermine a mandatory inclusionary zoning program. A measure of these fees is also included (InLieu) as a dollar per square foot rate. The combination of the policy requirements, cost offsets, and in-lieu fees described in this paragraph is intended to approximate the burden of a specific inclusionary zoning program.

As discussed in the preceding literature review and conceptual model chapters, control variables describing market conditions are expected to have a more substantial impact than inclusionary zoning mandates on both the price of housing and the quantity of housing supplied. Therefore, the following control variables were brought in from annual ACS summary tables for the state of California: Median Household Income (AMI), Poverty Rate (PovRate), Population Change, for those 16 years and older (PopChange, created by subtracting the previous value of VC03_HC01 from the current value), Labor Force Participation Rate, for those 16 years and older

\textsuperscript{14} Non-Profit Housing Association of Northern California (2007), *Affordable by Choice: Trends in California Inclusionary Housing Programs*. San Francisco: Non-Profit Housing Association of Northern California. (http://docs.wixstatic.com/ugd/8d7a46_5541490761714f52adcc75195ed1767c.pdf)

(LFr{\text{ate}}, created by subtracting VC09\_HC03 from 1), Unemployment Rate (Unemp), Median Age (MedAge), and Educational Attainment, as represented by percent bachelor’s degree or higher (Edu). Additionally, as housing construction is negatively impacted by interest rates because property values fall in rising interest rate environments, a measure for interest rates is included (FedFunds) and pulled from Macrotrends’ website.

An idealized empirical model is as follows. The final specification model varies for reasons discussed in the Results chapter.

\[ \text{GrsAffRate} = \beta_0 + \beta_1(IZrate) + \beta_2(IZthresh) + \beta_3(DBonus) + \beta_4(ExPermit) + \beta_5(InLieu) + \beta_6(AMI) + \beta_7(PovRate) + \beta_8(PopChange) + \beta_9(LFrate) + \beta_{10}(Unemp) + \beta_{11}(MedAge) + \beta_{12}(Edu) + \beta_{13}(FedFunds) + \epsilon \]

Where the dependent variable is defined as:

\[ \text{GrsAffRate} = \frac{\sum_{i=1}^{n} \text{count(grossrent \leq (.30*AMI)/12)}}{n} \]

A pooled analysis approach is utilized in order to best address the small number of observations (24 cities over 10 years). This is an ideal application for pooled analysis given the size and structure of the panel data. The primary upside of pooled data is that is solves the “small N” problem typical with this type of panel data. It also allows simultaneous analysis of differences over time and across observations. The primary downside is that errors tend to be both serially correlated and correlated across cities, and are heteroskedastic.
However, a number of regressive methods have been developed to address this issue. Applying the current state of the art, my primary concern will be serial correlation within cities, therefore the basic form of my regression will be:

```
xtgls y x1 x2 x3, i(city) t(year) corr(ar1)
```

where the xt series of commands in STATA provide tools for analyzing cross-section time series data sets, such as the one analyzed here. The options “i()” and “t(”) set the variables corresponding to the unit and time measures. In the form selected above, estimation is enables even if there is AR(1) autocorrelation (within units), heteroscedasticity, and cross-sectional correlation. As stated above, this particular form is chosen to best address concerns over serial correlation within units.\footnote{Frederico Podestà, Recent Developments in Quantitative Comparative Methodology: The Case of Pooled Time Series Cross-Section Analysis, 2000, MS, DSS Papers SOC 3-02, Georgetown University, Washington, DC.}
6. Results

6.1 Descriptive Results

The results show a statistically significant and negative effect of mandating inclusionary zoning on rental housing affordability rates. Under the final specified model (see Chapter 6.2), jurisdictions with mandatory inclusionary policies experienced affordability rates 3 percentage points lower than that observed in when there was no mandatory inclusionary zoning on rental housing. This result is statistically significant at traditional levels and controls for unspecified variation in the city terms by using a cross-sectional time series approach. Further, these results are robust to multiple statistical approaches; a secondary analysis using a simple clustered errors option on a traditional pooled analysis approach found an even larger effect of the inclusionary zoning policy.

These results are consistent with the theoretical material and with the hypothesis of this thesis. The magnitude of this effect is consistent with the theoretical reasoning engaged in earlier chapters, which predicted market drivers would have stronger effects than inclusionary zoning policies. The size of the effect is not unprecedented. Hollingshead (2015) found that the Palmer decision was associated with a 3 percent rise in lowest-quartile rents. This research was unable to parse out the effects of the individual elements of an inclusionary zoning policy due to insufficient variation in practices observed. Consequently, the reported results show the effect of any inclusionary zoning policy on rental affordability rates and make no statements as to the effects of individual policy elements. Still, the results are significant and should be considered in assessing the effectiveness of inclusionary zoning as a tool for improving access to affordable housing.
Those who wish to dismiss these results may ask, “You see a decrease in affordability where there is an inclusionary zoning policy. Isn’t that exactly the reason to implement a policy, to address low levels of affordability?” Yes, you would expect to see just that – there is no reason for inclusionary zoning if affordability isn’t an issue. However, perhaps because the study is targeted to only Los Angeles and Orange counties, which together suffer an endemic affordability crisis, no differences in affordability was observed between areas with a policy and without, when not controlling for market drivers. This is addressed in more detail below.

6.2 Regression Results

The following results show the ultimate model specification, after removing variables with low explanatory power but high correlation with other variables of interest. Most notably, the measures of inclusionary zoning policy included in the ideal empirical model have been replaced with a single binary variable, indicating whether there is a mandatory policy in place at that observation, regardless of the specifics of the policy. Unfortunately, this was a necessity, as there was too little difference in implemented policies for the effects of individual measures to be estimates.
Cross-sectional time-series FGLS regression

Coefficients: generalized least squares
Panels: homoskedastic
Correlation: common AR(1) coefficient for all panels (0.3649)

Estimated covariances = 1
Number of obs = 240
Estimated autocorrelations = 1
Number of groups = 24
Estimated coefficients = 8
Time periods = 10
Wald chi2(7) = 690.38
Prob > chi2 = 0.0000

|                | Coef. | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|----------------|-------|-----------|------|-----|----------------------|
| grsaffrate     |       |           |      |     |                      |
| MandatoryIZ    | -.0299102 | .0131829 | -2.27 | 0.023 | -.0557481 | -.0040722 |
| AMI            | 6.19e-06 | 5.76e-07 | 10.74 | 0.000 | 5.06e-06 | 7.32e-06 |
| Unemp          | .003511 | .001665 | 2.11 | 0.035 | .0002476 | .006744 |
| povrate        | -.0061402 | .001542 | -3.98 | 0.000 | -.0091624 | -.0031179 |
| TotalPopChange | -4.69e-07 | 2.95e-07 | -1.59 | 0.112 | -1.05e-06 | 1.09e-07 |
| MedAge         | -.0046996 | .0016796 | -2.80 | 0.005 | -.0079916 | -.0014077 |
| FedFunds       | .0291003 | .0030741 | 9.47 | 0.000 | .0230751 | .0351255 |
| _cons          | .4716613 | .0944322 | 4.99 | 0.000 | .2865777 | .656745 |

Figure 3: Regression Results under Final Specification

One such excluded variable is Education, which was found to be highly correlated with the
variable of interest.

. corr Edu MandatoryIZ
(obs=240)

|          | Edu | MandatoryIZ
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Edu</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>MandatoryIZ</td>
<td>0.5535</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

Figure 4: Correlation of Education and Inclusionary Zoning Variables

These results are consistent with theoretical estimates and confirm the hypothesis;
 inclusionary zoning policies reduce the affordability of overall housing stock. When controlling
for factors known to drive housing production and affordability, such as neighborhood incomes,
unemployment, poverty rate, population change, median age, and interest rates, cities in LA and
Orange counties experienced a reduction in affordability rate of 2.99 percentage points when they
implemented inclusionary zoning. As shown below, these results are not showing a simple effect of the areas with worse affordability implement an inclusionary zoning policy. In fact, without controlling for time and other factors, areas in this study with a policy have higher measures of affordability.

Cross-sectional time-series FGLS regression

Coefficients: generalized least squares
Panels: homoskedastic
Correlation: common AR(1) coefficient for all panels (0.7167)

|                               | Coef. | Std. Err. | z     | P>|z|  | [95% Conf. Interval] |
|-------------------------------|-------|-----------|-------|------|----------------------|
| MandatoryIZ                  | .0470 | .0310     | 1.51  | 0.13 | -.0139195 - .1079364 |
| _cons                         | .7051 | .0156     | 45.17 | 0.00 | .6745663 - .7357645  |

*Figure 5: Correlation of Inclusionary Zoning Policy and Affordability Rate*

These results were found to be robust under multiple data methods, even when using a simple pooled analysis approach with clustered error terms, as shown below.
. reg grsaffrate MandatoryIZ AMI Unemp povrate TotalPopChange MedAge FedFunds, vce(cluster city)

Linear regression
Number of obs = 240
F(7, 23) = 75.36
Prob > F = 0.0000
R-squared = 0.8046
Root MSE = 0.05938

(Std. Err. adjusted for 24 clusters in city)

|                      | Coef.  | Std. Err. | t     | P>|t|  | [95% Conf. Interval] |
|----------------------|--------|-----------|-------|------|----------------------|
| grsaffrate           | -0.353728 | 0.0178012 | -1.99 | 0.059 | -0.0721973 to 0.0014517 |
| MandatoryIZ          | -5.41e-06  | 9.47e-07  | 5.71  | 0.000 | 3.45e-06 to 7.37e-06 |
| AMI                  | 0.040007   | 0.0021803 | 1.83  | 0.079 | -0.005095 to 0.008511 |
| Unemp                | -0.0078923 | 0.003095  | -2.55 | 0.018 | -0.0142947 to -0.0014899 |
| povrate              | -4.51e-07  | 4.29e-07  | -1.05 | 0.303 | -1.34e-06 to 4.35e-07 |
| TotalPopChange       | -0.043776  | 0.0029347 | -1.49 | 0.149 | -0.0104486 to 0.0016933 |
| MedAge               | 0.0294368  | 0.0039929 | 7.37  | 0.000 | 0.0211769 to 0.0376968 |
| FedFunds             | 0.5242164  | 0.1834595 | 2.86  | 0.009 | 0.1447016 to 0.9037313 |
| _cons                |         |           |       |      |                      |

Figure 6: Results under Simple Pooled Analysis with Clustered Errors

6.3 Limitations and Suggestions for Future Research

As described above, the ultimate empirical form of the model precludes the specific policy measures specified in the theoretical model. Insufficient variation in underlying policies prevented effective analysis of the effects of the differences that did exist in policy specification. By looking at inclusionary zoning policies in a larger geographic region, it may be possible to generate a sample with sufficient variation for a statistical analysis. Policies such as density bonuses and in-lieu fees are certainly thought to mitigate the negative effects of inclusionary zoning, but quantifying this relationship could be valuable for policymakers. Anecdotally, several developers I have discussed this topic with have suggested set asides around 15% to be tolerable, but 20% would kill deals. Further research into how to set an ideal set-aside percentage – high enough to gain significant numbers of affordable units but no so high as to kill projects – could therefore be of tremendous value as well.
7. Discussion

7.1 Policy Recommendation

The results described in previous chapters, when combined with other empirical research on the effects of inclusionary zoning on rental pricing, suggest an interesting picture. Hollingshead (2015) demonstrated inclusionary zoning produces enough low-income units to suppress prices on bottom-quartile market-rate rents, creating a positive secondary effect for renters in the market. However, this benefit comes at a cost. As this research has now demonstrated, the overall stock of affordable rental units in the market drops in response to the restricted supply caused by a mandatory inclusionary zoning policy. In those areas of Los Angeles and Orange counties included in this study, the effect was found to be a three percentage point drop in affordability rates. These results apply to an aggregate of all households, regardless of participation in any rental assistance or public housing program.

The findings in this research provide evidence against the argument that inclusionary zoning has no discernable effect on rental prices. As California jurisdictions consider implementing new inclusionary zoning policies, policymakers must be aware of the trade-offs that come from programs which tax only new supply. While I do not argue that inclusionary zoning should be completely ignored as a tool, consideration of its negative effects should not be overlooked. Additionally, I recommend more seriously considering efforts to reduce barriers to new development, and to provide new affordable housing through property tax credits on all housing, rather than specifically targeting new developments.

In the 2017 budget, Gov. Brown argued against increasing funding to affordable housing because it was too expensive. His reasoning? There needs to be a structural change to reduce the
cost of building in California. “What we can do is cut the red tape, cut the delays, cut whatever expenses we can afford to do without to make housing more affordable and therefore increase the stock and therefore hopefully bring down the costs,” said Brown.\(^{17}\) Typical projects spend 2-3 years in permitting and approvals before breaking ground, much longer if there is any opposition or legal challenge. Streamlining the approval process reduces time and cost, and should allow people to build new homes for less. A positive step was SB35, passed this year, which is intended to streamline housing approvals in communities not meeting their housing needs, reducing costs to developers and speeding the construction process. However, many hurdles still exist, including burdensome state regulations, such as the California Environmental Quality Act. While it sounds good on its face, CEQA is notoriously used by opponents to specific projects to block development for years because legal challenge can be brought through the CEQA process with little to no environmental justification.

To promote affordable housing for all, Los Angeles and Orange counties should reevaluate and streamline their approvals processes and support state-wide efforts to amend CEQA. Current programs, such as density bonuses and enhanced zoning for Accessory Dwelling Units, are steps in the right direction, but can be strengthened. Such programs that will improve the delivery of housing units to the market should be expanded where possible.

Additionally, Los Angeles’ Permanent Supportive Housing Loan Program (Prop HHH) should be considered as a model for directly provided affordable housing to extremely low income households. In 2016, Los Angeles voters overwhelmingly passed Proposition HHH, aimed at

providing permanent housing for some of the 30,000 homeless in the city through a $0.348 PSF property tax. While the housing created is combined with mental and physical services, substance-abuse treatment, and education and job training, the tax revenues create a loan program to fund the “brick and mortar” components. This program aims to benefit the very worst off and is funded by a very moderate tax on all real property, rather than creating another barrier to new development. This model, of a small incremental tax spread broadly and serving the worst-off first, should be replicated when considering new programs, although a rate rather than per-foot structure would be more equitable.

7.2 Conclusion

This thesis set out to answer the question, “What is the effect of mandatory inclusionary zoning policies on the supply of affordable rental housing (natural and designated) in LA and Orange counties?” When these empirical results are combined with Hollingshead’s (2015) research, an answer emerges. Once an inclusionary zoning policy is enacted, the overall supply is constricted but supply of low-income units is increased. Bottom-quartile market rents are driven down by the new low-income supply. However, middle and top of market rents are driven up because virtually all new market-rate supply is luxury and the overall supply of rental housing is constrained. The combined effect is a reduction in the percentage of units available at affordable rents to the average household, despite a benefit to those renters in the bottom quartile of the market. This is a more nuanced picture than those promoted by inclusionary zoning advocates, and one which must be carefully considered by policymakers. Alternatively, housing affordability could be addressed by reducing barriers to new development and directly providing housing for the neediest citizens.
Bibliography


California Assembly Bill 1505, Sess. of 2017 (Cali. 2017).


http://www.dof.ca.gov/Reports/Demographic_Reports/American_Community_Survey/.


