

An Examination of the Impact of Rent Control on Mobile Home Prices in California

By

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Abstract

This study examines the impact of rent control of mobile home parks in seven counties of California between 1983 and 2003. We assembled an extensive and timely data set and, thus, were able to test more carefully specified econometric models than had been employed in prior studies of California mobile-home rent control. We find that the nature of the rent control regime differentially impacts mobile home prices: the imposition of rigid rent control, rent control without vacancy decontrol, leads to higher growth rates in resale prices. While a flexible regime, or rent control with vacancy decontrol, results in lower growth rates in resale prices. This is consistent with economic theory, suggesting that the imposition of rigid rent control will lead to the capitalization of future rent savings when a coach is sold. That is, the buyer will not only pay for the coach but also for the net present value of the expected savings associated with the future legally constrained pad rent obligations to the landlord.

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1. Introduction

This study uses a unique micro-level mobile home transactions data set to analyze the impact of mobile home rent control in California. In so doing, we hope to advance our understanding of the impact of price controls.

The social and economic impacts as well as the legal implications of price controls in the rental housing market have been debated extensively among economists and legal scholars. There appears to be widespread agreement on a number of points. Most economists agree that “a ceiling on rents reduces the quantity and quality of housing available” (Alston, Kearn, and Vaughan, 1992).¹ While some renters benefit from lower rents, there are also costs (Olsen, 1972).² Severe rent controls can cause undersupply in the apartment rental markets, and increase the search costs for tenants (Arnott and Igarashi, 2000). Below-market prices, if enforced, create opportunities for non-price rationing. Potential renters are obliged to invest time and effort chasing down access to the limited supply. These resource expenditures do not accrue to any sellers and cannot be converted to product and thus become a “deadweight” efficiency loss.

Also, maintenance of the existing housing stock and investment in new stock are expected to decline. In fact, abandonment of housing stock by owners has been observed. Housing conversions and demolitions have also been attributed to rent controls, an outcome further reducing the housing stock. Additional efficiency losses come from renters failing to adjust their housing consumption even though their circumstances change so they can hold on to their rent controlled units. (See Gyourko and Linneman, 1988, and Glaeser and Luttmer, 2003, for a thorough discussion of such effects for the case of New York city.) In addition, higher-income households are likely have an advantage in tracking valuable information on available units. Thus, equity gains from rent controls have seldom been realized by those most in need such benefit, suggesting that rent control has not been a policy useful for lower-income households

¹ Alston, Kearn, and Vaughan (1992) reported that from their survey of a stratified random sample of 1,350 economists employed in the United States, more than three-quarters of the respondents agreed with the above statement.

² One seminal study of rent control in New York City estimated that the costs to property owners are two times the benefits to renters (Olsen, 1972).

that seek affordable housing (Quigley, 2002). For many reasons, then, rent controls preclude land and housing markets from doing what they are supposed to do, namely allocate scarce resources to their highest and best uses in light of ever changing wants, opportunities and constraints. Some existing studies found that a well-designed rent control regime could improve the unrestricted equilibrium of an imperfect market (Arnott, 1995). Rent control is preferred when the market distortion is the unavailability of insurance against a sharp, unanticipated rent rise. However, economists disagree on the net social effect of rent controls, for example, whether rent controls might affect increased homelessness by reducing the supply of rental units (Tucker, 1989, Quigley, 1990, HUD, 1991, Early and Olsen, 1998).

Rent control policies have caught the attention of legal scholars and have been extensively litigated. Legal scholars have debated whether some rent control regulations have violated the Fifth Amendment's Takings Clause. In *Yee v. City of Escondido*, Cal. (90-1947), 503 U.S. 519 (1992), the Supreme Court affirmed a Superior Court decision rejecting the argument that the ordinance effected a physical taking by depriving park owners of all use and occupancy of their property and granting to their tenants, and their tenants' successors, the right to physically permanently occupy and use the property. The Supreme Court ruled that the argument that rent control ordinances benefit current but not future property owners has "nothing to do with whether it causes a physical taking." Since then, some legal scholars have nevertheless argued that certain rent controls constitute a regulatory taking because the regulation has unfairly singled out some property owners to bear a burden that should be borne by the public at-large. (See Rubinfeld, 1992, and Radford, 2004, for a discussion.)

A unique aspect of the mobile home industry is the separate ownership of the coach and the pad where the coach is located; i.e., the mobile homeowner owns only the coach unit and rents a pad in a mobile home park on which she parks her (not-so-mobile) home. If the rent of the pad is constrained to be below market rents, coach owners are hypothesized to be able to sell the coach for more than it would be worth without rent control, thereby capitalizing the rent savings arising

from rent control. The framework of separate ownership of coach unit and pad provides a unique opportunity to explicitly test the economic impact of rent control policy.

Several studies by Hirsch (1988), Hirsch et al (1988) and Hirsch and Rufolo (1999) have analyzed capitalization of the effects of rent control on coach unit values. Using straightforward hedonic modeling techniques and relatively small samples, the authors demonstrated that the savings from pad rent controls are capitalized.

In this study, we propose an extended economic model using a large sample of about 200,000 mobile home transaction records from January 1983 to May 2003 from seven counties in California.³ The coach transaction records include information on each coach's quality (brand, length, and width), age, address, original sale price, last sale price, last sale date, etc.

The purpose of this study is twofold. First, we intend to provide a more explicit and comprehensive measure of the economic impacts of rent controls through an analysis of micro transactions data. Second, we seek to provide evidence on the extent to which mobile home rent control constitutes a regulatory taking.

The remainder of this paper is organized as follows: Section two summarizes the unique characteristics of the mobile home market and rent controls in such markets. Section three describes our methodology for measuring rent control capitalization. Section four discusses the data; Section five presents our empirical results. The last section offers concluding remarks.

2. The Mobile Home Industry

In 2003, almost 9 million of the nation's 121 million housing units were mobile homes. This was 7.4 percent of the housing stock, up from 6.5 percent of the housing stock in 1987. Of the more than 338 thousand mobile homes added to the U.S. housing stock in 1999, more than 10 percent were added in the western states. As the number of Americans living in mobile homes increases, more attention is being paid to mobile home parks, their management and associated

³ The data are maintained by the California Department of Housing and Community Development (HCD).

public policies. Among the issues of great interest are the effects of various types of mobile home rent control.

The imposition of rent controls in many California jurisdictions has been shown to explain declining shipments of mobile homes to California (Hirsch and Rufolo, 1999). More up-to-date time series transactions data for California also show that from 1983-2003 (through the month of May), the number of mobile homes subject to rent controls increased. Figures 1a through 1c show the transaction data in our sample by various mobile home descriptors including Total Traded Square Feet, Total Traded Value (constant dollars), and the Number of Transactions.

Rent control policies and by-laws vary in scope and severity. Flexible rent control regimes allow vacancy decontrol while more rigid regimes permit rent increases tied to one of a variety of cost-of-living indices. Rent control regulations in many cities have gone through cycles of control and decontrol, in some cases resulting in various vintages of the stock being grandfathered. A visible result is that some cities have neighborhoods with well-kept free-market rental housing adjacent to poorly maintained rent controlled housing.

Rent control systems are most well known for having been imposed on traditional multi-family rental housing units where the landlord owns the land and the building and rents individual units to tenants using formal or informal leasing arrangements. Legal systems have evolved to define the property rights of landlords and tenants. Rent controlled systems often “piggy-back” on these systems as security of tenure is deemed critical if landlords are permitted to increase rents when a unit is vacated.⁴

In contrast, in mobile home parks, the site (“pad”) is rented to the tenant who either acquires the mobile home from a prior tenant or buys a new mobile home which is then assembled on-site. The curious distinction from the more common rent control of multi-family apartment units is that in a mobile home park the landlord owns the land (the pad) and the tenant owns the improvements (the coach). If there is no vacancy decontrol (ability on the part of the landlord to

⁴ In more rigid rent control systems, controls are tied to the unit rather than the tenant.

adjust the pad rent to the market rent when the coach is sold), the net present value of the anticipated future rent savings should be capitalized into the sales price of the coach if it stays in place. And usually it does as mobile homes are seldom moved once they are located on a pad. This unique aspect of rent control for mobile home parks has been the subject of some empirical analysis. Rent control systems for mobile home parks provide an opportunity to investigate the economic impact of the rent control policy on the tenants of mobile parks (i.e., the mobile coach owners).

Rapidly rising housing and land prices in California explain rising pad rents in many of the state's mobile home parks. As a consequence, renters in many jurisdictions responded by launching efforts to have rent controls enacted into law. In 2003, ninety seven California cities and eight counties had some sort of mobile home rent control.

In a series of papers published in the late 1980s, Hirsch and his colleagues (Hirsch, 1988, and Hirsch and Hirsch 1988) examined the impacts of rent controls on mobile homes in California. As alluded to previously, their analysis rests on the insight that ownership of mobile home living space is divided between the owner of the coach and the owner of the land, which is then leased to coach owners. Therefore, a coach atop a rent-controlled pad can be expected to sell at a premium. Hirsch et al's studies contain estimates of these values. Basing their analysis on a relatively small sample of observed transactions from the mid-1980s, they estimated that sales prices were boosted by 32 percent because of rent controls, other things equal.

An updated analysis by Hirsch and Rufolo (1999) focused on a single mobile home park in Oceanside, California. A hedonic regression based on a sample of 90 mobile home sales over the period 1986-1992 found that, other things equal, rent controls explain a price premium of eight percent.

More recently, Quigley (2002) presented an economic analysis of mobile home rent control based on a single mobile home park in San Rafael, California. The study documented the arms-length sales of 40 mobile homes in that park during a three-year period. The study estimated

the average value of the rent control premium varied from \$16 to \$160,000. Price premiums for coaches enjoying rent control benefits in this study averaged an impressive 366 percent.

3. The Model

This section lays out the methodology adopted to model the capitalization of rent control. The approach to measuring housing price appreciation has advanced as a consequence of work by Bailey, Muth and Nourse (1963), Case and Shiller (1989), Case and Quigley (1992) and Harding, Rosenthal and Sirmans (2005) among others. In this paper, we employ repeat sales price indexes in the mobile home market in California to examine the impact of variation in rent control policies among jurisdictions, while controlling the socio-economics of the neighborhoods in question and of the physical attributes of the coaches themselves.

As discussed in previous sections, due to the separate ownership of the mobile home coach and the pad where the coach parks, coach owners in a jurisdiction with rigid rent control can capitalize the anticipated savings from controlled rents when they sell their units. Our model extends the work by Bailey, Muth and Nourse (1963) and Case and Shiller (1989) by decomposing the mobile home repeated sale house price differential into mobile home property value appreciation and the capitalization of the mobile home park rent control premium.⁵

Consider a mobile home coach which is observed to have been purchased and sold in periods t and $t + \tau$, respectively. The purchase price is

$$P_t = A \prod_j x_{j,t}^{\alpha_j} e^{y_t \beta} e^{z_t \delta} e^{\gamma_t}, \quad (1)$$

where A is the parameter to capture the common factors' effect on all the units in the study; $x_{j,t}$ ($j = 1, \dots, q$) and y_t are a set of property's hedonic characteristics observed at time t ; z_t is a vector of binary regulatory features indicating different rent control regimes; α , β and δ

⁵ Our decomposition process is similar to the model proposed by Harding, Rosenthal and Sirmans (2005) in which they modify the repeated sales house price index model by decomposing the housing price appreciation into the components of capital depreciation and impact of housing maintenances.

are shadow prices for hedonic characteristics, and regulatory features respectively; γ_t is a vector of parameter for price index capturing aggregate price appreciation.

Let the price vary over time, from equation (1) the selling price at time $t + \tau$ will be

$$P_{t+\tau} = A \prod_j x_{j,t+\tau}^{\alpha_j} e^{y_{t+\tau}' \beta} e^{z_{t+\tau}' \delta} e^{\gamma_{t+\tau}}. \quad (2)$$

From equations (1) and (2), the price ratio and the log price ratio, respectively, between $t + \tau$ and t can be expressed as follows:

$$\frac{P_{t+\tau}}{P_t} = \prod_j \left(\frac{x_{j,t+\tau}}{x_{j,t}} \right)^{\alpha_j} e^{(y_{t+\tau} - y_t)' \beta} e^{(z_{t+\tau} - z_t)' \delta} e^{(\gamma_{t+\tau} - \gamma_t)}, \quad (3)$$

and

$$\ln \left(\frac{P_{t+\tau}}{P_t} \right) = \sum_j \alpha_j \left(\ln(x_{j,t+\tau}) - \ln(x_{j,t}) \right) + (y_{t+\tau} - y_t)' \beta + (z_{t+\tau} - z_t)' \delta + (\gamma_{t+\tau} - \gamma_t). \quad (4)$$

If we assume the hedonic characteristics and regulatory attributes remain constant between the two transactions, i.e. $x_{j,t+\tau} = x_{j,t}$, $y_{t+\tau} = y_t$, and $z_{t+\tau} = z_t$, then equation (4) can be reduced to

$$P_{t+\tau} = P_t e^{(\gamma_{t+\tau} - \gamma_t)}, \quad (5)$$

or the price change reflexes only the appreciation of market value of a constant quality property. This is exactly the repeat house price index model developed by Bailey, Muth and Nourse (1963) and Case and Shiller (1989).

Suppose the binary regulatory attributes between t and $t + \tau$ change from z to z^* , as a consequence of the adoption of a rent control ordinance during the time between the two transactions. The transacted price growth can be decomposed into constant quality property price appreciation and the impact of change in regulatory attributes.

$$P_{t+\tau} = P_t e^{(\gamma_{t+\tau} - \gamma_t)} e^{(z^* - z)' \delta}. \quad (6)$$

Let's assume the property price follows a log normal distribution⁶. We can test the above specifications by taking logarithms and rearranging equations (5) and (6), such that,

$$\ln\left(\frac{P_{t+\tau}}{P_t}\right) = \gamma_{t+\tau} - \gamma_t + \varepsilon(\tau), \quad (7)$$

and

$$\ln\left(\frac{P_{t+\tau}}{P_t}\right) = \gamma_{t+\tau} - \gamma_t + (z^* - z)' \delta + \nu(\tau), \quad (8)$$

respectively, where $\varepsilon(\tau)$ and $\nu(\tau)$ are random error terms following a normal distribution with a diffusion variance which increases with the time span, τ , between the two transactions.

For the case of mobile homes, provided all the other characteristics except for the rent control policy are time-invariant, the problem of selecting the proper specification of functional form or how qualitative and quantitative characteristics determine housing price growth has been eliminated. This elimination enhances the reliability of the estimates for the price index, γ .

For a sample of mobile homes that are transacted at various time periods, we obtain

$$\ln\left(\frac{P_{t+\tau}}{P_t}\right) = D' \gamma + (RC_{t+\tau} - RC_t)' \delta + \nu(\tau), \quad (9)$$

where D is a vector of indicator variables taking values of -1, 0, or 1, determined by both purchase and sale of each property⁷; γ is price index vector; RC is a vector of indicator variables for various rent control regimes,⁸ and the modified repeated sales house price index model expressed in equation (9) allows us to decompose the capitalization of any rent control premium from property value appreciation.

Yet, Redfearn (2005) has pointed out an additional source of significant bias in aggregate indexes is the ignorance of local dynamics. Case and Quigley (1992) acknowledged that it is

⁶ The same assumption was implied by Bailey, Muth and Nourse (1963), Case and Shiller (1989), and Case and Quigley (1992).

⁷ The indicator variable takes value of -1 if the first transaction of the property occurs in period t ; and takes value of 1 if the second transaction of the property occurs in period $t + \tau$; and takes value of 0 for all the other periods.

⁸ 1 indicates the property is under rent control; 0 means no rent control policy adopted.

appropriate to control statistically for the varying characteristics of properties in inferring price trends. Clapham et al. (2004) compared the stability of the repeat sales index and the hedonic index and found that character-based hedonic indexes appear to be substantially more stable than repeat-sales indexes. Hence we can modify equation (9) such that

$$\begin{aligned} \ln\left(\frac{P_{t+\tau}}{P_t}\right) &= D'\gamma + \sum_j \alpha_j (\ln(x_{j,t+\tau}) - \ln(x_{j,t})) + (y_{t+\tau} - y_t)' \beta + (RC_{t+\tau} - RC_t)' \delta + \mu(\tau) \\ &= D'\gamma + Z'\theta + (RC_{t+\tau} - RC_t)' \delta + \mu(\tau), \end{aligned} \tag{10}$$

where θ is a vector of parameters which contains both α and β ; Z (contains x and y) is a vector of control variables capturing the location effect (measured by county), as well as hedonic effects (coach structure such as single-, double-, or triple-width, size, and neighborhood quality, etc.). This additional vector measures the proportional effects of location and the coach's amenities on the price growth rate.

4. The Data

In this research, twenty years of transactions data for mobile homes in seven counties of California (Los Angeles, Orange, Riverside, San Bernardino, San Diego, Santa Clara and Ventura) were made available to us. After geo-coding and matching with census tracts, there were 201,228 records from the period beginning of January 1983 and ending in May 2003. As we wished to create hybrid repeat-sale indexes, our focus is on sales of coaches for which there are two transactions, the first purchase and one resale, thus records for single sales were removed from the data set⁹. Other records were eliminated because of incomplete city or mobile home park (Park ID) information. Outliers were also removed.¹⁰ These modifications left a 20-year population of 137,221 sales in the data set.

⁹ For those properties with more than two transactions, only one resale record is included in the analysis.

¹⁰ Records with incomplete geographic information and the top and bottom 1 percent of records based on the variables Original Sales Price (Constant 1996 dollar), Resale Price (Constant 1996 dollar), Size and Average Annual Growth

Each record in the original data set is a mobile home transaction and includes the county, city, address, mobile home park name and ID, the original sale price for the new structure and resale price, the dates of sale (year, month, and day), and measures of other attributes of the unit such as model year, manufacturer, width, length, and type (single, double, or triple) and so on. These data were combined with census data by census tract, including median household income, changes in median household income, vacancy rate, proportion of the elderly (≥ 65 years old), unemployment rate, and proportion of households with public assistance income, etc. We assume the census tract descriptors apply to the population living in mobile home parks. Finally, city-specific mobile home park rent control information was incorporated in the merged data set, including an indicator of the nature of the rent control regime.¹¹ Table 1 defines each of the variables included in the data set.

There are 201 municipalities in the seven counties included in this study, among which 49 cities have a rent control ordinance. As many as 48,664 transactions in the data set (35.5 percent) were actually in jurisdictions where there was rent control. Among those, around half were under rigid rent control. From Figures 1a through 1c, we can see that the share of transactions as measured by square footage, value and number has increased significantly over the twenty-year period under study. Table 2 reveals in the right-hand column that the share of rent controlled units among the total mobile home transactions in the seven counties grew from almost thirteen percent in the early 1980's to more than forty percent in 2003; moreover, the growth of those under rigid rent control outpaces the growth of transactions of units under flexible rent control since the middle 1990s. The change in the share of the square footage traded and the value traded attributable to rent-controlled units is of the same order. Table 3 presents the annual growth rates in rent-controlled units among the transactions as measured by square footage, value and number.

Rate were removed from the data set. We also explored the impact of focusing on properties where $0.5 < (\text{Constant Resale Price}/\text{Constant Original Sales Price}) < 3.0$. We found that the results were robust to the imposition of this constraint. See Table 1 for descriptions of the variables.

¹¹ For cities with rent control, dummy variables were including starting in the quarter in which rent control was implemented. We also included a dummy variable that indicates whether or not there is vacancy decontrol. No vacancy decontrol reflects a more rigid rent control regime.

The growth rates were 13.02, 13.19 and 13.17 percent, respectively. Clearly, rent control policies in the mobile home marketplace in California are taking on increasing importance.

Table 4 provides descriptive statistics for the continuous covariates for the complete data set as well as for each county. The original sale price varies from an average of \$36,940 (San Bernardino) to \$46,410 (Santa Clara); while the average resale price varies from \$22,085 (San Bernardino) to \$54,441 (Santa Clara). The average original sale price and resale price of the seven counties are \$40,775 and \$34,118 respectively. Mobile homes are less likely to keep up with rapid residential land market appreciation. Declines in the values of mobile homes are more common than for “stick-built” houses because the land component is often not part of the selling price.¹²

Census tract variables including Median Household Income, Proportion of Households with Public Assistance Income, and Proportion of Persons \geq 65 Years Old were collected and also reported in Table 4. Other census tract-level variables, including Changes in Median Household Income, Vacancy Rate, and Unemployment Rate, were collected but were ultimately not of significance in the analysis so their summary statistics are not reported here.

Riverside county had the lowest median household income (\$33,149) accompanied by the highest elderly population (24.4 percent). Santa Clara county was at the other extreme with the highest median household income (\$52,492) and was tied with two other counties for the second lowest proportion of elderly population (11.4 percent). Perhaps surprisingly, Los Angeles county had the lowest proportion of elderly at 10.3 percent. San Bernardino and Riverside counties had the highest proportion of households benefiting from public assistance (9.0 and 8.6 percent, respectively) while Ventura and Orange counties had the lowest (5.0 and 5.2 percent, respectively).

We ultimately used the census information to segment the data set. Specifically, high- (or low-) income is defined by whether the census tract median household income is above (or

¹² A more suitable comparable for mobile home sales would be sales of stick-built houses on leased land.

below) the median census tract household income in the corresponding county. High- (or low-) elderly population proportion is defined by whether the census tract older population proportion is above (or below) the median census tract elderly population proportion in the corresponding county.

The smallest mobile homes are in San Bernardino and Los Angeles counties as measured by Unit's Size (1,093 and 1,094 square feet) while the largest are in Orange county (1,199 square feet). Ventura and San Diego counties have the oldest units (20.85 and 20.75 years, respectively) while Riverside county has the youngest (16.14 years).

Table 5 provides descriptive statistics for the sample's categorical covariates. Double-width mobile homes are the most common as indicated by a market share of almost 70 percent for the type "Double". The second biggest share is for single-width or the "Single" category at a market share of 26 percent; triple-width or the "Triple" category represent the luxury high-end mobile homes and have a five percent share of the market. The market share of double-width in Orange county is about 15 percentage points higher than in Los Angeles, while the market share of single-width is about 15 percentage points lower perhaps reflecting stage of the evolution of the mobile home market as well as the role of mobile homes as a housing choice when the homes were originally sold and the mobile home parks developed.

As noted earlier, a number of qualitative ("dummy") variables were created which are critical to the analysis. First, communities are identified in which rent control of mobile home parks was present. Second, the policy is classified as rigid (by-laws which do not permit vacancy decontrol) or flexible (by-laws which permit vacancy decontrol), depending on whether or not vacancy decontrol is permitted. Then transactions within these jurisdictions were identified accordingly. Third, the first transaction after the adoption of a rent control policy is also indicated. The results of these classifications for the aggregate data set also appear in Table 5.

The prevalence of rent control ordinances varies dramatically among the seven counties. While in the aggregate, less than five percent of the transactions in Orange county were in

rent-controlled parks, 82.7 percent of the transactions in Ventura county were in rent-controlled parks. As noted earlier, there was significant variation in these percentages between 1983 and 2003 with an increasing number and share of mobile home units being regulated by rent control policies over time. Of the 35.5 percent of mobile home transactions in our data set that are within rent controlled jurisdictions, roughly half of them are in jurisdictions with flexible rent control regimes and the rest are in jurisdictions with rigid rent control regimes.¹³

5. Empirical Results

We had a much larger and more comprehensive sample available to us than was employed in Hirsch (1988), Hirsch et al (1988, 1999) or Quigley (2002). As noted, we focused on 137,221 observations collected from over twenty years of mobile home transactions between 1983 and the early part of 2003. The ultimate transaction data base included only repeat- or multiple-sales along with descriptive information about the coach. Each sale was geo-coded permitting the census tract variables including Median Household Income (constant 1996 dollar), Proportion of Households with Public Assistance Income and Proportion of Persons \geq 65 Years Old to be appended to each record. The first two are proxies for local amenity values as well as demand, while the third is a proxy for one of the components of demand for mobile home units -- as many older households choose mobile homes as a cost-effective housing choice in retirement.

Our working hypothesis was that because rigid rent control policies allow coach owners to pass on future pad rent savings to subsequent owners of the coach, prices of coaches in these communities will increase more rapidly or decrease less rapidly than the prices of coaches in communities without rent control or flexible rent control. To be sure, this is actually a net effect. Buyers value protections from rent increases but also may be wary of owning property in cities

¹³ Rent control regimes may become less rigid or more rigid through time as policies evolve due to the changing economic and political environment. We were able to identify regimes which are currently rigid (no vacancy decontrol permitted) or flexible (vacancy decontrol permitted). In order to ascertain whether today's regime accurately reflected the nature of the regime since 1983, we surveyed every city in our data set (201). We received 55 responses in total with 20 of them from cities with rent control in place. The results of the survey supported the approach taken. We inferred that the results of the survey could be extrapolated to the full sample.

with governments that have shown themselves to be ready to place limits on property rights. This suggests that any weak form of rent control could be associated with especially ambiguous expectations. It is not clear which effect would dominate.

Thus, if rent control or the rigidity of the rent control regime influences the rate of change of coach prices, the relevant estimated coefficient will be positive and significant. Moreover, the biggest beneficiary is the first generation of mobile home owners when the rent control policy is/was adopted. For the standard case, the following coach owners are not able to realize a comparable benefit because they have paid for most of the premium for rent control upfront. Nevertheless, in cases when future appreciation had been underestimated, there would be additional rents to be further capitalized in the later transactions.

Table 6 presents the results of GLS estimation of equations (9) and (10).¹⁴ In model (1), mobile homes values are positively influenced if rigid rent control policies are adopted but those will decrease when flexible rent control policies are adopted. This set of relationships still holds when the proportional effects of other hedonic factors have been considered in model (2). Riverside and San Bernardino have the lowest growth rates, while Ventura outperforms all the other counties. The larger luxury units experience higher appreciation than smaller ones. The coaches in the neighborhoods with a higher proportion of households with public assistance suffer from lower growth rates. For rent control policies, the first generation mobile home owners under rent control benefit from the adoption of rigid rent control ordinances (rent control without vacancy decontrol), but they experience a net loss, *ceteris paribus*, from flexible rent control (rent control with vacancy decontrol), as suggested may be possible in our theoretical discussion.

¹⁴ We adopt GLS estimation approach to address the problem of heterogeneity due to the diffusion process of the error terms specified in equations (9) and (10). Following Case and Shiller (1989) and Deng, Quigley and Van Order (2000), we first estimate equations (9) and (10) by OLS. In the second stage, we estimate a diffusion process of the variance by regressing the square term of residuals, ε^2 , collected from the first stage OLS regression on a quadratic function of time span between the two sales, such that $\varepsilon(\tau)^2 = \beta_1\tau + \beta_2\tau^2 + \omega$, where τ is the duration between original sale and resale (measured in quarters), and ω is a normally distributed error term. In the third stage we re-estimate the mobile home price index model using a GLS estimation approach weighted by the square root of the estimated diffusion variance, $\hat{\varepsilon}(\tau)$, obtained from the second stage.

Our results also show that for the following generations of tenants, rigid rent control policy is no longer a significant factor in determining the resale price, while a flexible rent control regime may continue contributing to lower resale price.

Because rigid rent control practically freezes real rents paid, in a market where demand increases in the long run such as in the market for mobile homes, the longer this restriction is in force, the bigger would be the price gap, between the controlled units and the uncontrolled units. Model (3) replaces the simple dummy variable “adoption of rent control without vacancy decontrol” by the interactive variable “adoption of rent control without vacancy decontrol \times number of years under rent control at time of transaction”. The interactive variable is significant and keeps the same sign as its simple dummy counterpart in model (2). It shows that the adoption of rigid rent control will push up the mobile home value by 1.5 percent per year till the first transaction after the introduction of the policy. Also, because of different rent control adoption schedules, San Diego and Santa Clara have different signs for their dummy variables in this model compared to model (2).

Figure 2a provides the plot of dependent variable, Log (resale price/original price) or Log-Ratio, for different counties. Santa Clara has the highest growth rate and the lowest variance; Riverside has the lowest growth rate with the greatest variance. Hence, it is inappropriate to treat the seven counties equally at the aggregate level.

Similarly, Figure 2b and 2c give the plots of Log-Ratio for different structure groups (single, double, and triple), and for different rent control groups. Due to the difference among the subgroups a proportional model as in Equation (10) is adopted.

From a policy perspective it might be valuable to know which income-age group can benefit the most from a rent control policy, and also, who might suffer the most. Figure 3a and 3b present the plots of Log-Ratio by different median household income census tracts and different proportion of elderly population census tracts. The differences between higher and lower income communities, as well as older and younger communities are visible. Hence, we refine the full

sample and re-estimate the index with proportional location and hedonic factors for each income/age group, in order to estimate rent control's impact under different scenarios.

The re-estimated results for different median household income census tract groups are presented in Table 7a. Adoption of rigid rent control leads to higher increase in resale price for coaches in wealthier communities, but homeowners in poorer communities suffer less from the adoption of flexible rent control. Moreover, the future homeowners in wealthier neighborhoods can still enjoy the benefit from rigid rent control to a lesser extent.

Table 7b provides the estimates for census tracts with higher and lower proportions of elderly population. Mobile home owners in neighborhoods with younger populations benefit from the adoption of rigid rent control ordinances more than in the neighborhoods with elderly populations, while the latter suffer less from new flexible rent control policies. Clearly, younger mobile home owners have a longer anticipated benefit period. The following generations of mobile home owners in older neighborhoods are relatively better off from both rigid and flexible rent control ordinances and slightly better off under the former.

In Table 7c, we show the results for further refined subsamples by both median household income and proportion of elderly population at the census tract level. When we consider income and age at the same time, age is a higher order factor than income: both younger communities, with higher or lower income, enjoy greater benefit from the adoption of rigid rent control than the older communities. Homeowners in younger communities with higher median household income are the biggest beneficiaries, while the ones in older communities with lower median household income experience the lowest benefits. For the newly adopted flexible rent control policies, homeowners in older communities with higher median household income might be the only beneficiaries, and all the rest will suffer, especially the ones in younger communities with higher median income. The future homeowners in the former community will continue benefiting from rigid rent control but to a lesser extent.

Finally, Figure 4b presents the simulated comparison of indexes between units in the jurisdictions without rent control and units in hypothetical jurisdictions which adopted rigid rent control in the beginning of 1993. The price index of the latter diverges from the former soon after the adoption of the policy. In Tables 9a, b, c and d, we report results for an average mobile home in Los Angeles, we find that if the unit was under a flexible rent control regime before the original purchase, its real growth rate in price would be 1.7 percentage points less than comparable units in a market without rent control or units under a rigid rent control regime. In contrast with an unchanged rent control policy environment, the adoption of rent control between the first and second transactions leads to a greater and more significant change in prices. More rigid rent control leads to a growth rate of 13.6 percentage points more than the units in a market without rent control, or an increase in coach value of \$8,081. In contrast, flexible rent control results in a growth rate 8.8 percentage points lower than the coaches in a market without rent control, or a loss in value of \$1,088.

6. Conclusions

Mobile homes are usually owned by households that pay a periodic rent for use of the land in a mobile home park (a pad) on which the coach is located. Because mobile homes tend not to be mobile but rather fixed on the pad on which they are initially located, and since the pads are rented, economic theory suggests that the imposition of rent control will lead to the capitalization of future rent savings when a coach is sold. That is, the buyer will not only pay for the coach but also for the net present value of the expected savings associated with the constrained future pad rent obligations to the landlord.

Our results support the hypothesis, based on a more extensive and timely data set than had been employed in similar prior studies in California. Results from our extensive analysis suggest that higher income groups receive a relatively larger first time rigid rent control premium (adoption of rigid rent control increases the coach value by 18.6 percent for higher income groups

and 12.5 percent for lower income groups, respectively), but also have to face greater losses from the adoption of flexible rent control (coach value decrease by 11 percent for higher income groups and 5 percent for lower income groups). Younger owners on average can get about a 24.8 percent premium for adoption of rigid rent control while elderly owners on average benefit from an 8.6 percent premium which is 18 percentage points lower than the former. On the other hand, the elderly owners are able to gain from the adoption of flexible rent control policies through a 6.6 percent increase in their coach value, while the younger owners suffer a 3.4 percent decrease. When we combine the two factors of income and age, higher income younger owners are the biggest winners from the adoption of rigid rent control which brings them a roughly 34 percent increase in coach value. In contrast, lower income elderly owners on average benefit the least from rigid rent control with a 7 percent increase in coach value. Higher income elderly owners also benefit from rigid rent control with a 16 percent increase in coach values.

We hope to have contributed to the rent control discussion by estimating the size and incidence of its impacts as well as how they vary with the strictness of the controls. This is a controversial policy area and we hope that our estimated effects based on a much larger sample than had heretofore been available as well as the use of more rigorous and detailed methods enhance the quality of the debate.

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Table 1. Definitions of Variables

ADDRESS	Address
CITY	Located city
COUNTY	Located county
PARKNAME	Mobile home park name
PARKID	Mobile home park ID
MDLYR	Model Year
MFG	Manufacturer
TRADE	Trade
W1/L1	W1/L1 single wide/length
W2/L2	W1W2/L1L2 double wide/length
W3/L3	W1W2W3/L1L2L3 triple wide/length
LEGAL	Legal owner
SOLD	Sold date (year, month, day)
ORIG	Original sale price (current dollar)
CONORIG	Original sale price (constant 1996 dollar)
RESALE	Resale price (current dollar)
CONRESALE	Resale price (constant 1996 dollar)
TYPE	Type of the unit (single, double, triple)
SIZE	Total size of the unit (square footage)
WELFARE	Proportion of households with public assistance income, census tract
MDHHY	Median household income (current dollar) census tract
OLD	Proportion of persons ≥ 65 years old, census tract
RENT CONTROL	Dummy variable (1: with RC; 0: without RC)
DECON	Dummy variable (1: RC with vacancy decontrol)
NODEC	Dummy variable (1: RC without vacancy decontrol)

Table 2a. Time Varying Mobile Home Transaction Statistics

Year	Total units traded (square footage, in thousands)						
	All	Rent control group	Rent control with vacancy decontrol	Rent control without vacancy decontrol	Percentage of rent control group (%)	Percentage of rent control with vacancy decontrol group (%)	Percentage of rent control without vacancy decontrol group (%)
1983	3780.61	549.43	235.73	313.69	14.53	6.24	8.30
1984	4692.13	793.32	403.75	389.57	16.91	8.60	8.30
1985	5338.81	1017.03	537.97	479.05	19.05	10.08	8.97
1986	5660.14	1169.70	659.36	510.34	20.67	11.65	9.02
1987	6159.30	1327.07	755.21	571.87	21.55	12.26	9.28
1988	6908.11	1708.47	955.21	753.26	24.73	13.83	10.90
1989	7668.03	2259.03	1360.25	898.78	29.46	17.74	11.72
1990	6747.48	2230.17	1353.02	877.15	33.05	20.05	13.00
1991	5545.80	1980.36	1212.42	767.93	35.71	21.86	13.85
1992	5588.80	2027.33	1204.14	823.18	36.27	21.55	14.73
1993	6533.61	2840.45	1554.55	1285.91	43.47	23.79	19.68
1994	7749.34	3650.92	1948.21	1702.72	47.11	25.14	21.97
1995	8438.82	4036.33	2013.67	2022.66	47.83	23.86	23.97
1996	7859.52	3427.39	1484.17	1943.22	43.61	18.88	24.72
1997	8421.09	3610.09	1557.90	2052.20	42.87	18.50	24.37
1998	9880.72	4042.02	1668.37	2373.65	40.91	16.89	24.02
1999	10559.00	4098.66	1846.78	2251.88	38.82	17.49	21.33
2000	10742.12	4444.57	1856.43	2588.13	41.38	17.28	24.09
2001	11350.12	4675.10	2134.15	2540.96	41.19	18.80	22.39
2002	11713.24	4629.11	1959.71	2669.40	39.52	16.73	22.79
2003*	3330.66	1339.89	645.71	694.19	40.23	19.39	20.84

* First five months of year 2003.

Table 2b. Time Varying Mobile Home Transaction Statistics (Con.)

Year	Total traded value (constant 1996 dollar, in millions)						
	All	Rent control group	Rent control with vacancy decontrol	Rent control without vacancy decontrol	Percentage of rent control group (%)	Percentage of rent control with vacancy decontrol group (%)	Percentage of rent control without vacancy decontrol group (%)
1983	149.15	20.47	8.25	12.22	13.73	5.53	8.19
1984	187.08	30.60	14.57	16.03	16.36	7.79	8.57
1985	214.95	38.27	18.81	19.47	17.81	8.75	9.06
1986	228.32	44.81	23.35	21.46	19.63	10.23	9.40
1987	248.29	51.68	27.23	24.45	20.82	10.97	9.85
1988	282.15	65.51	33.84	31.67	23.22	11.99	11.22
1989	316.37	87.19	48.03	39.16	27.56	15.18	12.38
1990	263.64	81.85	46.54	35.30	31.05	17.65	13.39
1991	187.68	62.05	35.87	26.18	33.06	19.11	13.95
1992	156.79	52.20	29.36	22.84	33.30	18.73	14.57
1993	141.68	60.83	31.11	29.73	42.94	21.96	20.98
1994	143.31	70.03	32.69	37.34	48.87	22.81	26.06
1995	146.08	71.54	30.04	41.50	48.97	20.56	28.41
1996	144.17	65.65	24.06	41.59	45.54	16.69	28.85
1997	172.45	80.86	29.87	50.99	46.89	17.32	29.57
1998	226.68	98.28	33.82	64.46	43.36	14.92	28.44
1999	264.58	105.92	41.79	64.13	40.03	15.79	24.24
2000	330.46	148.97	46.57	102.40	45.08	14.09	30.99
2001	358.56	153.78	56.01	97.77	42.89	15.62	27.27
2002	402.18	166.20	58.98	107.22	41.32	14.67	26.66
2003*	117.17	48.09	20.51	27.58	41.04	17.51	23.54

* First five months of year 2003.

Table 2c. Time Varying Mobile Home Transaction Statistics (Con.)

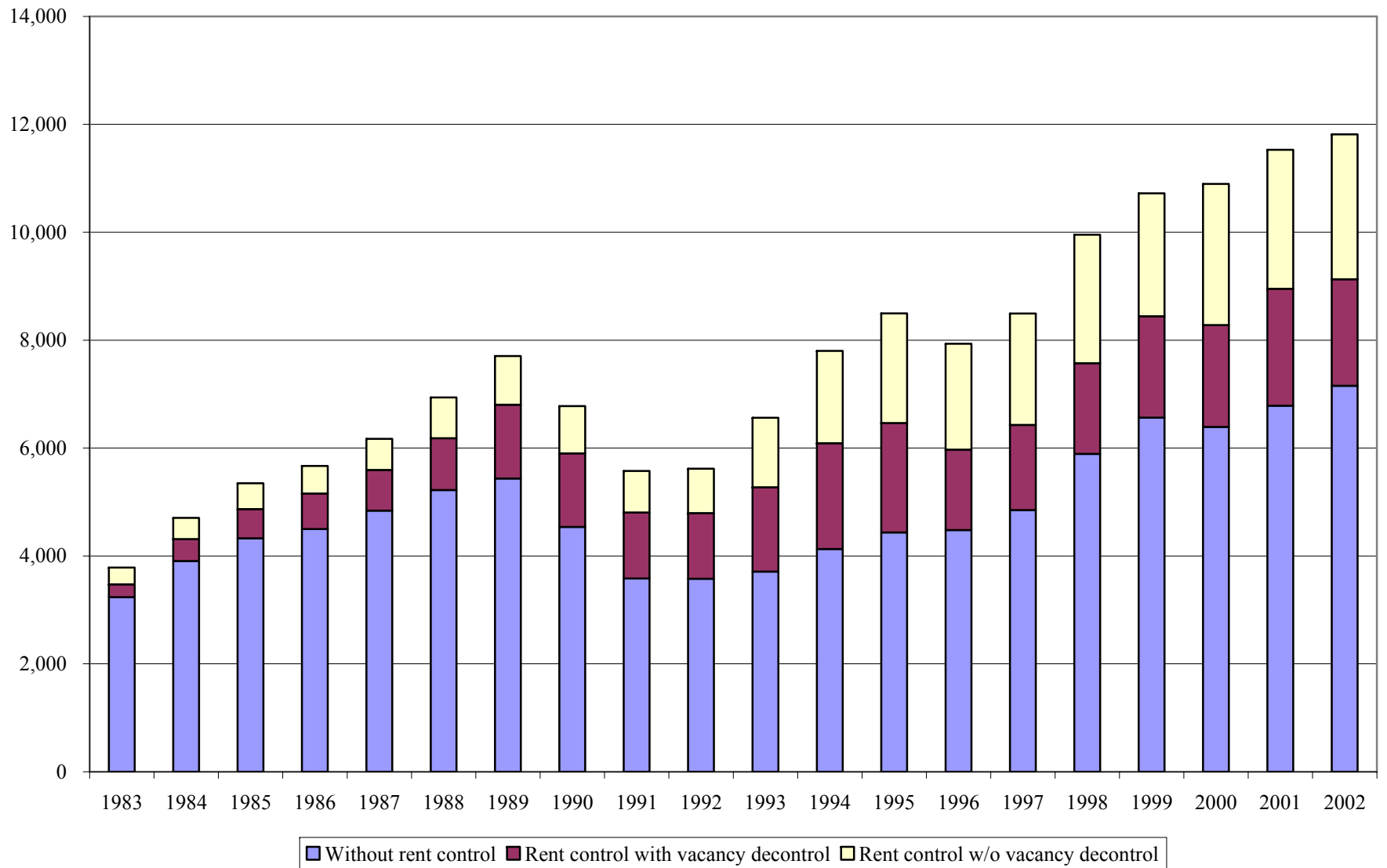
Year	Number of units transacted						
	All	Rent control group	Rent control with vacancy decontrol	Rent control without vacancy decontrol	Percentage of rent control group (%)	Percentage of rent control with vacancy decontrol group (%)	Percentage of rent control without vacancy decontrol group (%)
1983	3452	455	198	257	13.18	5.74	7.44
1984	4311	671	351	320	15.56	8.14	7.42
1985	4883	848	458	390	17.37	9.38	7.99
1986	5167	974	568	406	18.85	10.99	7.86
1987	5619	1128	652	476	20.07	11.60	8.47
1988	6199	1460	828	632	23.55	13.36	10.20
1989	6763	1918	1197	721	28.36	17.70	10.66
1990	6050	1929	1192	737	31.88	19.70	12.18
1991	5057	1760	1081	679	34.80	21.38	13.43
1992	5150	1862	1113	749	36.16	21.61	14.54
1993	5929	2562	1419	1143	43.21	23.93	19.28
1994	6918	3221	1738	1483	46.56	25.12	21.44
1995	7517	3558	1801	1757	47.33	23.96	23.37
1996	6974	3016	1329	1687	43.25	19.06	24.19
1997	7481	3190	1412	1778	42.64	18.87	23.77
1998	8702	3583	1509	2074	41.17	17.34	23.83
1999	9195	3584	1663	1921	38.98	18.09	20.89
2000	9225	3802	1657	2145	41.21	17.96	23.25
2001	9815	4036	1889	2147	41.12	19.25	21.87
2002	10013	3974	1732	2242	39.69	17.30	22.39
2003*	2801	1133	554	579	40.45	19.78	20.67

* First five months of year 2003.

Table 3. Annual Growth Rates (1984-2002)

Year	Total units traded (square footage)				Total traded value (constant 1996 dollar)				Number of units transacted			
	All	Rent control group	Rent control with vacancy decontrol	Rent control without vacancy decontrol	All	Rent control group	Rent control with vacancy decontrol	Rent control without vacancy decontrol	All	Rent control group	Rent control with vacancy decontrol	Rent control without vacancy decontrol
1984	24.11%	44.39%	71.27%	24.19%	25.43%	49.46%	76.55%	31.17%	24.88%	47.47%	77.27%	24.51%
1985	13.78%	28.20%	33.25%	22.97%	14.89%	25.09%	29.07%	21.47%	13.27%	26.38%	30.48%	21.88%
1986	6.02%	15.01%	22.56%	6.53%	6.22%	17.08%	24.15%	10.25%	5.82%	14.86%	24.02%	4.10%
1987	8.82%	13.45%	14.54%	12.06%	8.75%	15.34%	16.62%	13.95%	8.75%	15.81%	14.79%	17.24%
1988	12.16%	28.74%	26.48%	31.72%	13.64%	26.75%	24.29%	29.50%	10.32%	29.43%	26.99%	32.77%
1989	11.00%	32.23%	42.40%	19.32%	12.13%	33.10%	41.92%	23.66%	9.10%	31.37%	44.57%	14.08%
1990	-12.01%	-1.28%	-0.53%	-2.41%	-16.67%	-6.13%	-3.09%	-9.85%	-10.54%	0.57%	-0.42%	2.22%
1991	-17.81%	-11.20%	-10.39%	-12.45%	-28.81%	-24.19%	-22.93%	-25.84%	-16.41%	-8.76%	-9.31%	-7.87%
1992	0.78%	2.37%	-0.68%	7.20%	-16.46%	-15.87%	-18.15%	-12.74%	1.84%	5.80%	2.96%	10.31%
1993	16.91%	40.11%	29.10%	56.21%	-9.64%	16.53%	5.94%	30.13%	15.13%	37.59%	27.49%	52.60%
1994	18.61%	28.53%	25.32%	32.41%	1.15%	15.13%	5.10%	25.61%	16.68%	25.72%	22.48%	29.75%
1995	8.90%	10.56%	3.36%	18.79%	1.93%	2.15%	-8.12%	11.14%	8.66%	10.46%	3.62%	18.48%
1996	-6.86%	-15.09%	-26.30%	-3.93%	-1.31%	-8.23%	-19.90%	0.22%	-7.22%	-15.23%	-26.21%	-3.98%
1997	7.15%	5.33%	4.97%	5.61%	19.61%	23.17%	24.15%	22.60%	7.27%	5.77%	6.25%	5.39%
1998	17.33%	11.96%	7.09%	15.66%	31.45%	21.54%	13.19%	26.43%	16.32%	12.32%	6.87%	16.65%
1999	6.86%	1.40%	10.69%	-5.13%	16.72%	7.77%	23.57%	-0.52%	5.67%	0.03%	10.21%	-7.38%
2000	1.73%	8.44%	0.52%	14.93%	24.90%	40.64%	11.44%	59.67%	0.33%	6.08%	-0.36%	11.66%
2001	5.66%	5.19%	14.96%	-1.82%	8.51%	3.23%	20.28%	-4.52%	6.40%	6.15%	14.00%	0.09%
2002	3.20%	-0.98%	-8.17%	5.05%	12.16%	8.07%	5.30%	9.66%	2.02%	-1.54%	-8.31%	4.42%
<i>Average annual growth rate</i>	<i>6.65%</i>	<i>13.02%</i>	<i>13.71%</i>	<i>13.00%</i>	<i>6.56%</i>	<i>13.19%</i>	<i>13.13%</i>	<i>13.79%</i>	<i>6.22%</i>	<i>13.17%</i>	<i>14.07%</i>	<i>13.00%</i>

**Figure 1a. Total Traded Square Footage
(in thousands)**



**Figure 1b. Total Traded Value (constant \$, base=1996)
(in millions)**

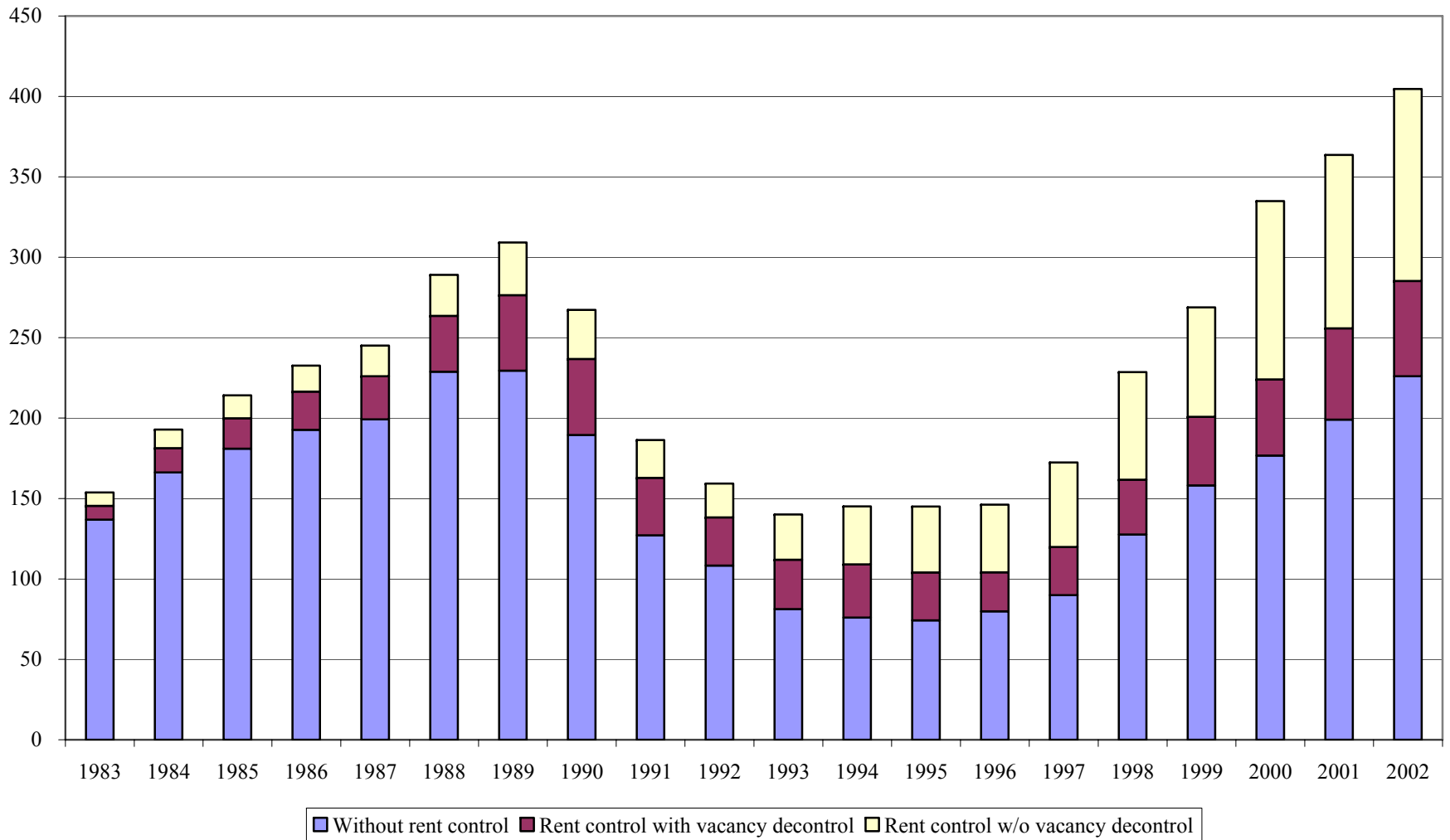


Figure 1c. Number of Transactions

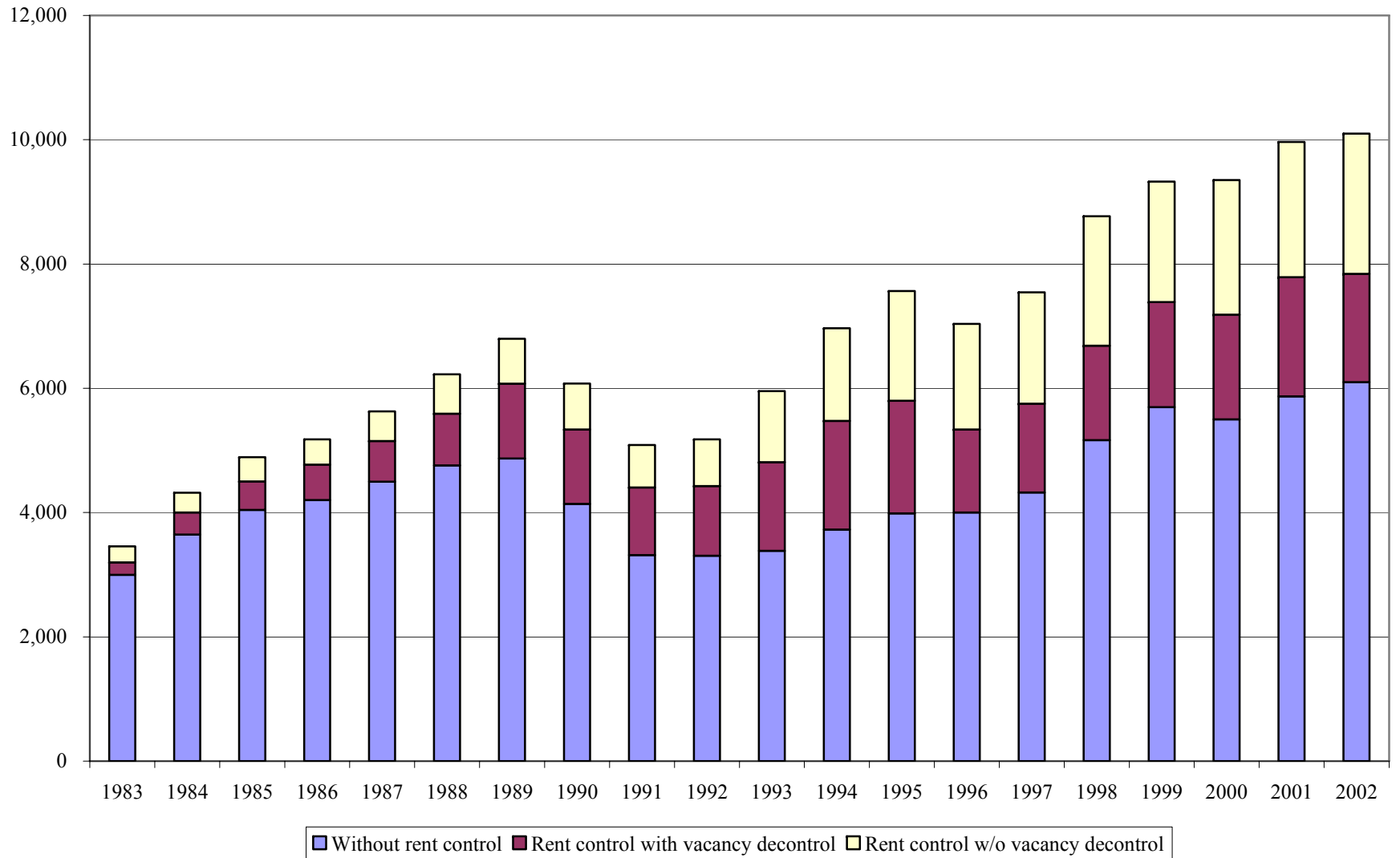


Table 4. Descriptive Statistics – means and standard deviations of continuous covariates

	All	Los Angeles	Orange	Riverside	San Bernardino	San Diego	Santa Clara	Ventura
Original price (constant 1996 dollar)	40,775 (21150)	40,696 (22183)	45,362 (21313)	39,691 (20029)	36,940 (18324)	38,102 (19407)	46,410 (25154)	38,699 (18691)
Resale price (constant 1996 dollar)	34,118 (26201)	33,207 (24331)	38,982 (26981)	28,567 (25116)	22,085 (17834)	30,925 (22767)	54,441 (31546)	42,687 (28392)
Median household income (constant 1996 dollar)	43,274 (13524)	46,923 (14011)	47,193 (12135)	33,149 (9862)	36,650 (11097)	39,991 (10462)	52,492 (15100)	48,194 (11262)
Proportion of households with public assistance income	0.067 (0.047)	0.070 (0.046)	0.052 (0.039)	0.086 (0.040)	0.090 (0.053)	0.059 (0.045)	0.057 (0.044)	0.050 (0.033)
Proportion of persons \geq 65 years old	0.132 (0.094)	0.103 (0.055)	0.117 (0.088)	0.244 (0.160)	0.115 (0.067)	0.151 (0.083)	0.114 (0.079)	0.122 (0.052)
Unit's size (sq. ft.)	1,127 (396)	1,094 (411)	1,199 (370)	1,160 (422)	1,093 (383)	1,103 (389)	1,158 (406)	1,113 (376)
Unit's age	19.23 (9.15)	19.10 (9.39)	19.28 (9.15)	16.01 (8.51)	19.09 (9.24)	20.75 (9.07)	18.82 (8.55)	20.85 (8.61)
Sample size	137,221	31,404	23,934	12,912	20,827	28,551	13,423	6,170

Note:
Standard deviations are in parenthesis.

Table 5. Descriptive Statistics – frequencies of categorical covariates

	All	Los Angeles	Orange	Riverside	San Bernardino	San Diego	Santa Clara	Ventura
Single	35,787 (26.1)	9,157 (29.2)	3,532 (14.8)	3,513 (27.2)	6,741 (32.4)	7,820 (27.4)	3,325 (24.8)	1,699 (27.5)
Double	94,110 (68.6)	20,394 (64.9)	18,997 (79.4)	8,338 (64.6)	13,265 (63.7)	19,457 (68.1)	9,412 (70.1)	4,247 (68.8)
Triple	7,324 (5.3)	1,853 (5.9)	1,405 (5.9)	1,061 (8.2)	821 (3.9)	1,274 (4.5)	686 (5.1)	224 (3.6)
Rent Control	48,664 (35.5)	8,828 (28.1)	1,092 (4.6)	7,865 (60.9)	8,959 (43.0)	10,871 (38.1)	5,948 (44.3)	5,101 (82.7)
Rent control with vacancy decontrol	24,341 (17.7)	7,035 (22.4)	1 (0.0)	5,720 (44.3)	3,401 (16.3)	4,745 (16.6)	252 (1.9)	3,187 (51.7)
Rent control without vacancy decontrol	24,323 (17.7)	1,793 (5.7)	1,091 (4.6)	2,145 (16.6)	5,558 (26.7)	6,126 (21.5)	5,696 (42.4)	1,914 (31.0)
Adoption of rent control with vacancy decontrol	20,980 (15.3)	5,926 (18.9)	1 (0.0)	4,862 (37.7)	2,833 (13.6)	4,399 (15.4)	228 (1.7)	2,731 (44.3)
Adoption of rent control without vacancy decontrol	21,723 (15.8)	1,415 (4.5)	1,041 (4.3)	1,942 (15.0)	5,148 (24.7)	5,445 (19.1)	5,063 (37.7)	1,669 (27.1)
Sample size	137,221	31,404	23,934	12,912	20,827	28,551	13,423	6,170

Note:

Percentages to corresponding full or county samples are in parenthesis.

Figure 2. Logarithm of Price Growth Rate by Sub-Groups

These figures present the box plot of the logarithm of price growth rates by various sub-groups. The boxes contain the middle 50% of the data. The upper edges of the boxes indicate the 75th percentile of the data set, and the lower edges indicate the 25th percentile. The lines in the boxes indicate the median value of the data. The ends of the vertical lines indicate the minimum and maximum data values. The logarithm of price growth rate is defined as: $\ln\left(\frac{P_{t+\tau}}{P_t}\right)$, where $\ln(\cdot)$ is natural logarithm function, $P_{t+\tau}$ is the resale price after τ periods since the original sale at t , P_t is the original sales price at t .

Figure 2a. Logarithm of Price Growth Rate by County

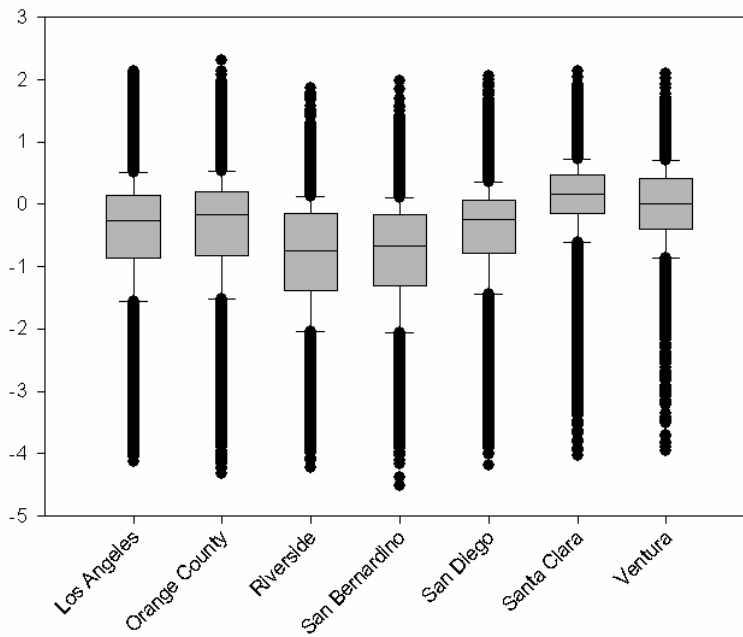


Figure 2b. Logarithm of Price Growth Rate by Coach Structure

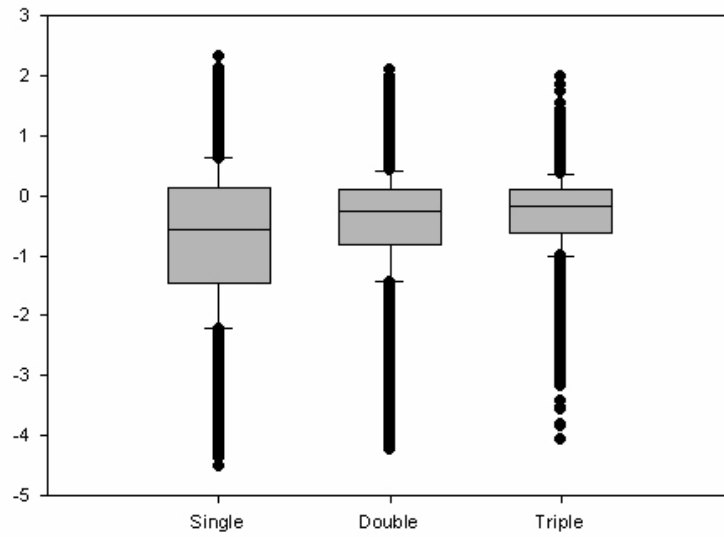


Figure 2c. Logarithm of Price Growth Rate by Rent Control Regime

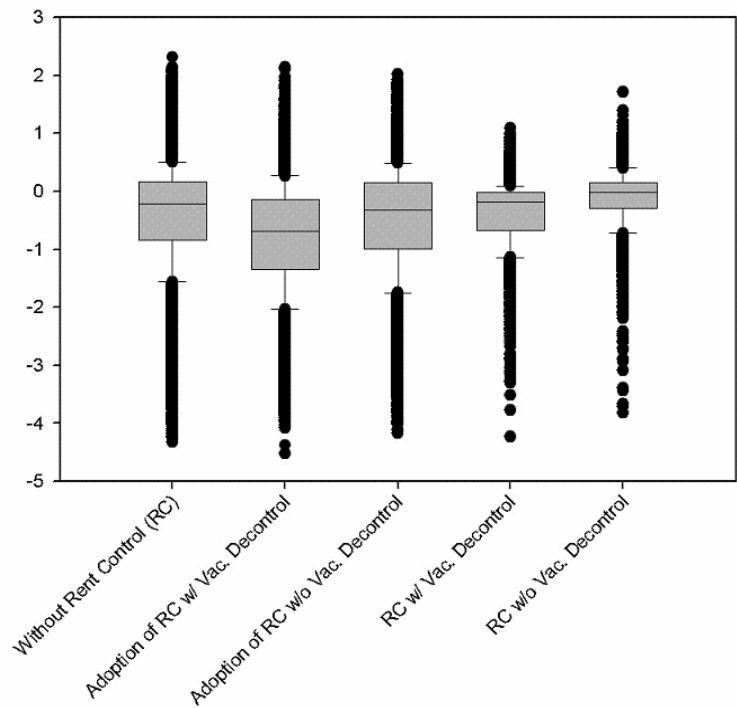


Table 6. GLS Estimates for Rent Control Impact on Mobile Home Price

The table reports rent control impacts on mobile home prices. We estimate the rent control impact by decomposing the capitalization of rent control premium from a repeated-sales mobile home price index model specified in equations (9) and (10) using a three-stage GLS estimation approach. In the first stage, we use OLS to estimate the following mobile home price index model which decomposes the rent control premium capitalization from the mobile home price appreciation: $\ln\left(\frac{P_{t+\tau}}{P_t}\right) = D'\gamma + Z'\theta + (RC_{t+\tau} - RC_t)'\delta + \mu(\tau)$, where $\ln(\cdot)$ is

natural logarithm function, $P_{t+\tau}$ is the resale price after τ periods since the original sale at t , P_t is the original sales price at t , D is a repeated-sales transaction vector composed of -1, 0 and 1; RC is a vector of indicator variables to capture the rent control premium capitalization; Z is a vector of hedonic characteristics capturing the location effect (measured by county), and coach structure characteristics, such as single, double, or triple-width, size, and neighborhood quality, etc., and μ is the normally distributed error term with a diffusion variance varying by the time span between two transactions. In the second stage, we estimate a diffusion process of the mobile home price index by regressing the square term of residuals, ε^2 , collected from the first stage OLS regression on a quadratic function of time span between the two sales, such that, $\varepsilon(\tau)^2 = \beta_1\tau + \beta_2\tau^2 + \omega$, where τ is the duration between original sale and resale (measured in quarters), and ω is a normally distributed error term. In the third stage we re-estimate the mobile home price index model using a GLS estimation approach weighted by the square root of the estimated diffusion variance, $\hat{\varepsilon}(\tau)$, obtained from the second stage. For readability, the estimated mobile home price indices are not reported in the table.

	Impact of Rent Control (1)	Impact of Rent Control together with Other Effects	
		(2)	(3)
Orange County		-0.04 (-8.79)	-0.04 (-8.38)
Riverside		-0.28 (-45.92)	-0.27 (-45.91)
San Bernardino		-0.30 (-55.88)	-0.29 (-55.03)
San Diego		0.31 (50.24)	-0.03 (-6.47)
Santa Clara		-0.03 (-6.17)	0.33 (53.87)
Ventura		0.37 (42.13)	0.36 (41.59)
Double		0.19 (30.34)	0.19 (30.39)
Triple		0.26 (21.25)	0.27 (21.46)
Size		1.63E-05 (2.47)	1.67E-05 (2.54)
		-1.39 (-39.57)	-1.34 (-38.18)
Under rent control without vacancy decontrol		0.01 (1.44)	0.01 (1.10)
Under rent control with vacancy decontrol		-0.02 (-1.85)	-0.02 (-1.88)
Adoption of rent control without vacancy decontrol	0.15 (28.77)	0.12 (23.22)	
Adoption of rent control without vacancy decontrol × number of months years under rent control			0.015 (30.06)
Adoption of rent control with vacancy decontrol	-0.11 (-20.70)	-0.09 (-16.57)	-0.08 (-15.76)
R square	0.412	0.496	0.498
Sample size	137,221	137,221	137,221

Figure 3. Logarithm of Price Growth Rate by Income and Age Sub-Groups

These figures present the box plot of the logarithm of price growth rates by various sub-groups. The boxes contain the middle 50 percent of the data. The upper edges of the boxes indicate the 75th percentile of the data set, and the lower edges indicate the 25th percentile. The lines in the boxes indicate the median value of the data. The ends of the vertical lines indicate the minimum and maximum data values. The logarithm of price growth rate is defined as: $\ln\left(\frac{P_{t+\tau}}{P_t}\right)$, where $\ln(\cdot)$ is natural logarithm function, $P_{t+\tau}$ is the resale price after τ periods since the original sale at t , P_t is the original sales price at t .

Figure 3a. Logarithm of Price Growth Rate by Income Group

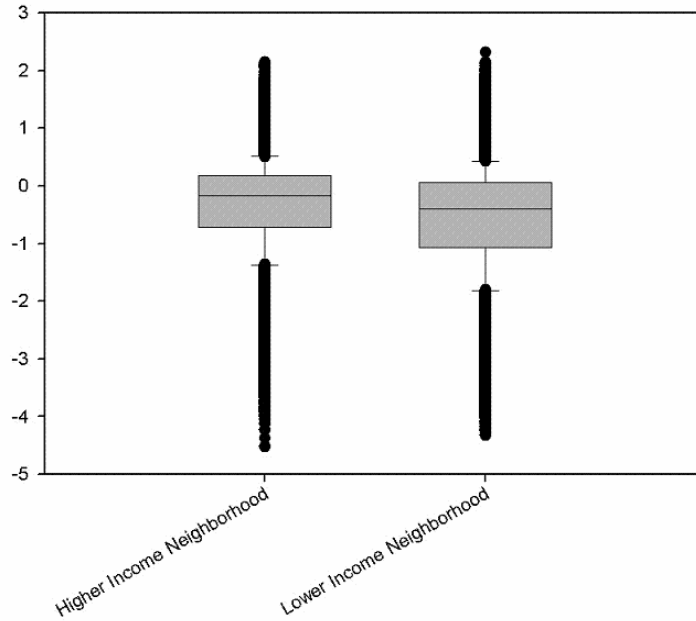


Figure 3b. Logarithm of Price Growth Rate by Age Group

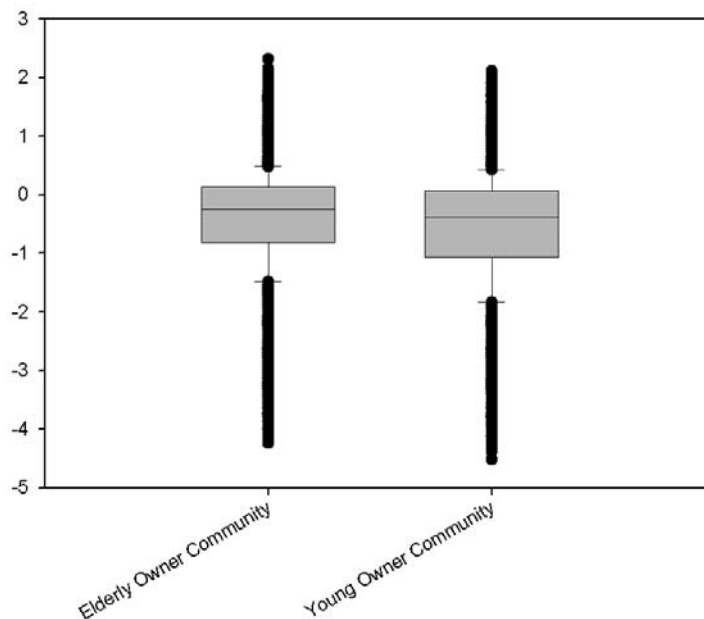


Table 7. GLS Estimates for Logarithm of Price Growth Rate, by Subgroups

The table reports rent control impacts on mobile home prices. We estimate the rent control impact by decomposing the capitalization of rent control premium from a repeated-sales mobile home price index model specified in equations (9) and (10) using a three-stage GLS estimation approach. In the first stage, we use OLS to estimate the following mobile home price index model which decomposes the rent control premium capitalization from the mobile home price appreciation:

$$\ln\left(\frac{P_{t+\tau}}{P_t}\right) = D'\gamma + Z'\theta + (RC_{t+\tau} - RC_t)'\delta + \mu(\tau),$$

where $\ln(\cdot)$ is natural logarithm function, $P_{t+\tau}$ is the resale price after τ

periods since the original sale at t , P_t is the original sales price at t , D is a repeated-sales transaction vector composed of -1, 0 and 1; RC is a vector of indicator variables to capture the rent control premium capitalization; Z is a vector of hedonic characteristics capturing the location effect (measured by county), and coach structure characteristics, such as single, double, or triple-width, size, and neighborhood quality, etc., and μ is the normally distributed error term with a diffusion variance varying by the time span between two transactions. In the second stage, we estimate a diffusion process of the mobile home price index by regressing the square term of residuals, ε^2 , collected from the first stage OLS regression on a quadratic function of time span between the two sales, such that, $\varepsilon(\tau)^2 = \beta_1\tau + \beta_2\tau^2 + \omega$, where τ is the duration between original sale and resale (measured in quarters), and ω is a normally distributed error term. In the third stage we re-estimate the mobile home price index model using a GLS estimation approach weighted by the square root of the estimated diffusion variance, $\hat{\varepsilon}(\tau)$, obtained from the second stage. For readability, the estimated mobile home price indices are not reported in the table.

Table 7a. GLS Estimates for Logarithm of Price Growth Rate, by Census Tract Household Income

	Higher Median Household Income	Lower Median Household Income
Orange County	0.04 (4.49)	-0.07 (-9.53)
Riverside	-0.17 (-18.21)	-0.34 (-39.15)
San Bernardino	-0.23 (-29.81)	-0.35 (-44.49)
San Diego	0.17 (13.57)	0.36 (42.96)
Santa Clara	-0.061 (-9.10)	-0.004 (-0.58)
Ventura	0.37 (22.29)	0.37 (33.58)
Double	0.17 (16.65)	0.20 (24.68)
Triple	0.25 (13.41)	0.27 (15.55)
Size	-1.22E-05 (-1.23)	4.10E-05 (4.46)
Proportion of households with public assistance income	-2.10 (-26.47)	-1.00 (-22.94)
Under rent control without vacancy decontrol	0.070 (4.90)	-0.014 (-1.04)
Under rent control with vacancy decontrol	-0.02 (-1.95)	0.01 (0.44)
Adoption of rent control without vacancy decontrol	0.16 (18.40)	0.12 (18.21)
Adoption of rent control with vacancy decontrol	-0.11 (-14.12)	-0.05 (-7.40)
R square	0.44	0.54
Sample size	52,921	84,300

Table 7b. GLS Estimates for Logarithm of Price Growth Rate, by Census Tract Proportion of Elderly Population

	Higher Proportion of Elderly Population	Lower Proportion of Elderly Population
Orange County	-0.05 (-6.50)	-0.03 (-4.75)
Riverside	-0.36 (-40.69)	-0.21 (-25.65)
San Bernardino	-0.41 (-54.09)	-0.19 (-25.75)
San Diego	0.32 (36.98)	0.31 (33.88)
Santa Clara	-0.08 (-11.78)	0.03 (3.94)
Ventura	0.33 (26.63)	0.41 (33.51)
Double	0.17 (18.40)	0.21 (24.56)
Triple	0.23 (13.26)	0.26 (14.78)
Size	4.99E-05 (5.21)	-2.63E-05 (-2.96)
Proportion of households with public assistance income	-1.13 (-19.42)	-1.21 (-27.02)
Under rent control without vacancy decontrol	0.06 (4.29)	-0.03 (-2.51)
Under rent control with vacancy decontrol	0.02 (1.73)	-0.03 (-2.54)
Adoption of rent control without vacancy decontrol	0.08 (11.50)	0.21 (24.80)
Adoption of rent control with vacancy decontrol	-0.02 (-2.90)	-0.14 (-17.16)
R square	0.48	0.52
Sample size	69,547	67,674

Table 7c. GLS Estimates for Logarithm of Price Growth Rate, by Census Tract Median Household Income and Proportion of Elderly Population

	High Income & High Proportion of Elderly	High Income & Low Proportion of Elderly	Low Income & High Proportion of Elderly	Low Income & Low Proportion of Elderly
Orange County	0.08 (6.96)	0.01 (1.01)	-0.02 (-1.98)	-0.10 (-10.25)
Riverside	-0.21 (-9.93)	-0.11 (-10.58)	-0.32 (-27.73)	-0.35 (-27.11)
San Bernardino	-0.47 (-33.53)	-0.11 (-11.69)	-0.35 (-32.54)	-0.34 (-27.66)
San Diego	0.33 (15.24)	0.15 (9.68)	0.40 (34.83)	0.31 (24.44)
Santa Clara	-0.10 (-9.92)	-0.02 (-1.91)	0.01 (0.78)	0.01 (1.14)
Ventura	0.34 (10.94)	0.40 (20.03)	0.42 (28.25)	0.33 (18.97)
Double	0.16 (9.70)	0.17 (13.29)	0.19 (16.54)	0.22 (18.68)
Triple	0.26 (9.18)	0.18 (7.68)	0.26 (11.60)	0.25 (9.51)
Size	-1.58E-05 (-1.01)	-1.24E-05 (-0.99)	4.04E-05 (3.19)	2.85E-05 (2.12)
Proportion of households with public assistance income	-0.99 (-6.62)	-2.09 (-22.27)	-0.88 (-12.72)	-0.97 (-16.14)
Under rent control without vacancy decontrol	0.15 (6.64)	-0.01 (-0.34)	-0.04 (-1.98)	0.02 (1.11)
Under rent control with vacancy decontrol	-0.011 (-0.43)	-0.003 (-0.20)	0.022 (1.30)	0.009 (0.57)
Adoption of rent control without vacancy decontrol	0.11 (8.49)	0.26 (19.93)	0.06 (7.82)	0.22 (19.23)
Adoption of rent control with vacancy decontrol	0.031 (2.53)	-0.148 (-14.08)	-0.03 (-2.89)	-0.07 (-6.06)
R square	0.41	0.49	0.53	0.55
Sample size	24,826	28,095	44,721	39,579

Table 8. Repeat Sale Price Index (1983=100)

Quarter	Index	Quarter	Index
1983-1	100.00	1993-2	52.75
1983-2	110.70	1993-3	50.64
1983-3	115.93	1993-4	44.60
1983-4	116.74	1994-1	47.65
1984-1	105.00	1994-2	42.06
1984-2	116.80	1994-3	40.84
1984-3	118.28	1994-4	39.79
1984-4	119.37	1995-1	43.23
1985-1	100.65	1995-2	37.77
1985-2	115.81	1995-3	37.31
1985-3	118.67	1995-4	37.47
1985-4	116.06	1996-1	41.33
1986-1	97.77	1996-2	35.19
1986-2	115.64	1996-3	36.88
1986-3	117.35	1996-4	35.23
1986-4	116.39	1997-1	44.32
1987-1	100.26	1997-2	34.84
1987-2	113.32	1997-3	36.62
1987-3	115.11	1997-4	39.27
1987-4	111.95	1998-1	48.01
1988-1	101.38	1998-2	40.16
1988-2	111.78	1998-3	41.21
1988-3	114.57	1998-4	41.63
1988-4	113.21	1999-1	48.82
1989-1	96.10	1999-2	43.78
1989-2	110.82	1999-3	42.99
1989-3	114.37	1999-4	44.06
1989-4	111.61	2000-1	50.04
1990-1	93.16	2000-2	46.18
1990-2	108.98	2000-3	49.03
1990-3	107.49	2000-4	51.35
1990-4	99.47	2001-1	52.00
1991-1	80.86	2001-2	50.78
1991-2	89.73	2001-3	52.30
1991-3	88.68	2001-4	51.92
1991-4	80.06	2002-1	51.85
1992-1	71.82	2002-2	52.18
1992-2	72.18	2002-3	55.11
1992-3	67.98	2002-4	55.70
1992-4	61.27	2003-1	52.07
1993-1	54.38	2003-2	56.63

Figure 4a. Full Sample Index

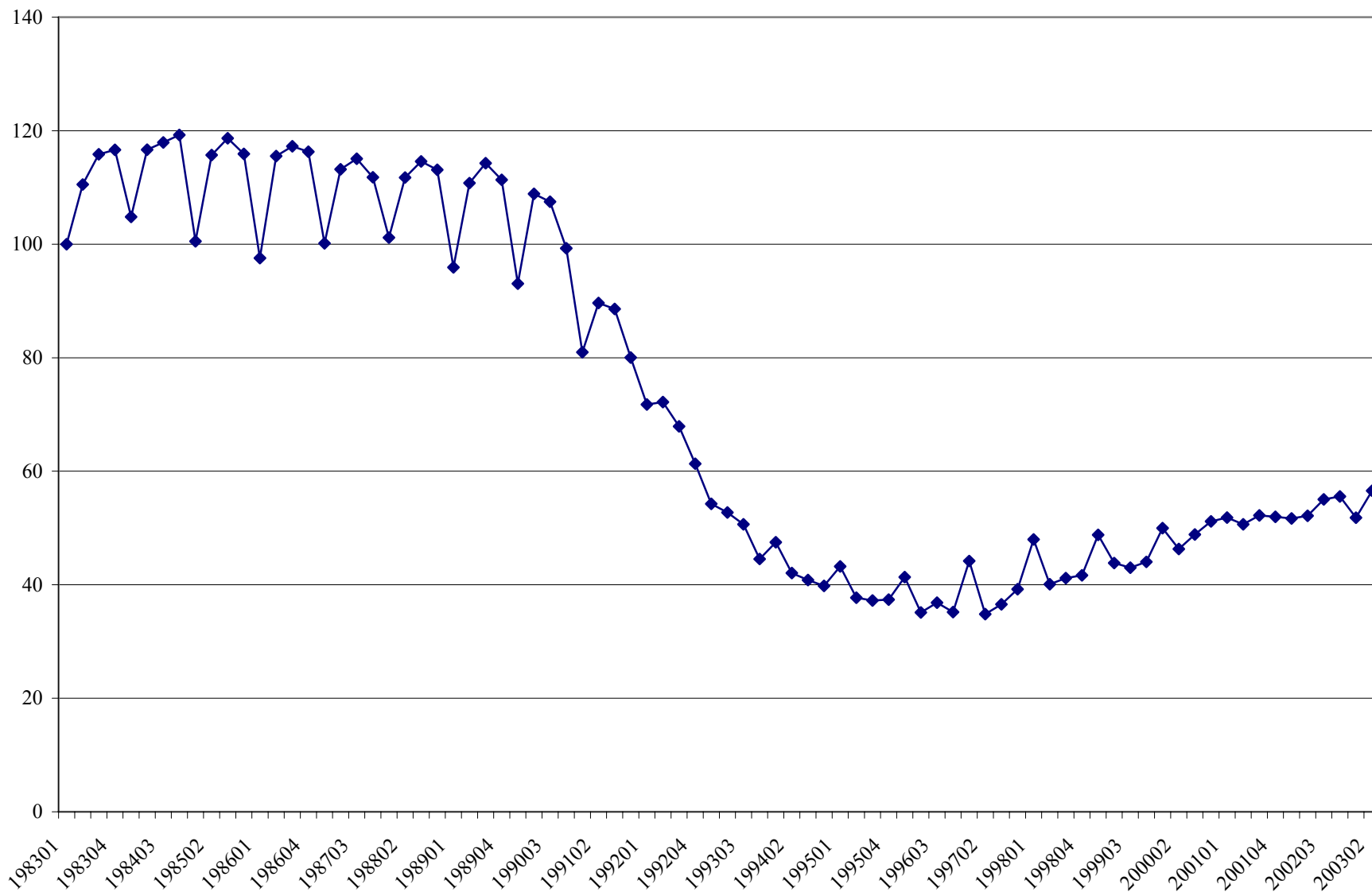


Figure 4b. Comparison in Indexes: No Rent Control vs. Change in Rent Control Policy (Adoption of Rent Control without Decontrol)

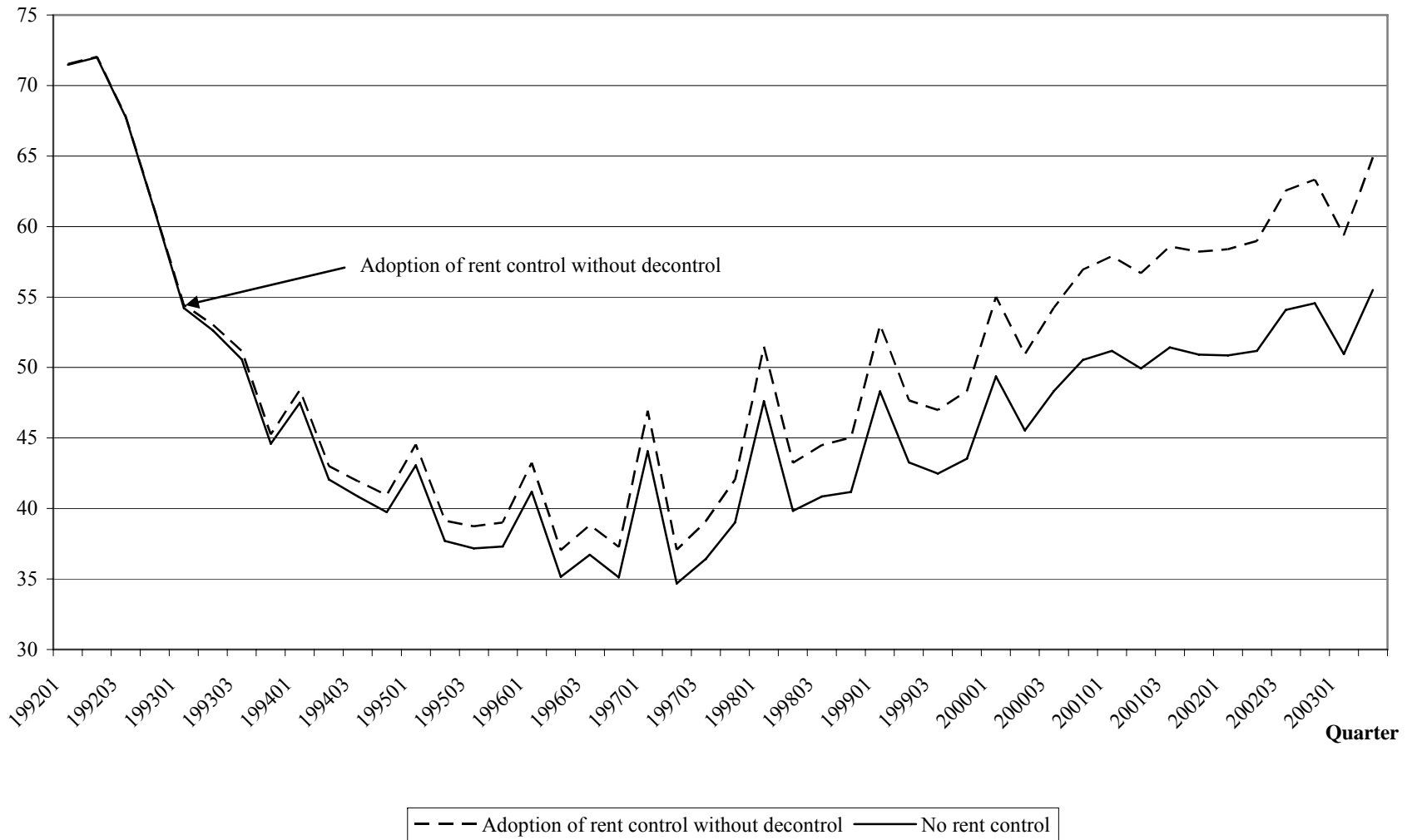


Table 9. Resale Price Comparison for an Average 19 years old Structure in Los Angeles

The following Tables present the estimated resale prices for the average 19 years old mobile home units in each subgroup in Los Angeles County, under different rent control regimes. The average unit is defined as the one with average structure (double, triple), in census tract with average proportion of households with public assistance income, etc. By using the average units' characteristics and the parameters estimated in Table 7, we can simulate the resale prices as presented here.

Table 9a. Resale Price Comparison for an Average 19 years old Structure in Los Angeles

Resale price comparison for an average 19 years old structure	Rent Control Regime				
	No rent control	Under rent control without vacancy decontrol	Under rent control with vacancy decontrol	Adoption of rent control without vacancy decontrol	Adoption of rent control with vacancy decontrol
Resale price	\$43,263	\$43,263	\$42,588	\$48,824	\$39,656
Price increase	\$2,519	\$2,519	\$1,845	\$8,081	-\$1,088
Growth rate (percentage)	6.18	6.18	4.53	19.83	-2.67
Growth out from rent control (percentage)	-	0	-1.66	13.65	-8.85

Table 9b. Resale Price Comparison for an Average 19 years old Structure in Los Angeles, Different Income Communities

Resale price comparison for an average 19 years old structure	High Median Household Income					Low Median Household Income				
	No rent control	Under rent control without vacancy decontrol	Under rent control with vacancy decontrol	Adoption of rent control without vacancy decontrol	Adoption of rent control with vacancy decontrol	No rent control	Under rent control without vacancy decontrol	Under rent control with vacancy decontrol	Adoption of rent control without vacancy decontrol	Adoption of rent control with vacancy decontrol
Resale price	\$43,500	\$46,760	\$42,427	\$51,538	\$38,731	\$38,237	\$38,237	\$38,418	\$42,664	\$36,406
Price increase	\$366	\$3,625	-\$707	\$8,403	-\$4,403	\$2,744	\$2,744	\$2,926	\$7,172	\$914
Growth rate (percentage)	0.85	8.40	-1.64	19.48	-10.21	7.73	7.73	8.24	20.21	2.57
Growth out from rent control (percentage)	-	7.56	-2.49	18.63	-11.05	-	0	0.51	12.47	-5.16

Table 9c. Resale Price Comparison for an Average 19 years old Structure in Los Angeles, Different Age Communities

Resale price comparison for an average 19 years old structure	High Proportion of Elderly Population					Low Proportion of Elderly Population				
	No rent control	Under rent control without vacancy decontrol	Under rent control with vacancy decontrol	Adoption of rent control without vacancy decontrol	Adoption of rent control with vacancy decontrol	No rent control	Under rent control without vacancy decontrol	Under rent control with vacancy decontrol	Adoption of rent control without vacancy decontrol	Adoption of rent control with vacancy decontrol
Resale price	\$47,383	\$50,199	\$48,503	\$51,030	\$46,435	\$39,892	\$38,574	\$38,796	\$49,560	\$34,617
Price increase	\$4,903	\$7,720	\$6,024	\$8,550	\$3,956	\$938	-\$381	-\$159	\$10,605	-\$4,338
Growth rate (percentage)	11.54	18.17	14.18	20.13	9.31	2.41	-0.98	-0.41	27.22	-11.14
Growth out from rent control (percentage)	-	6.63	2.64	8.59	-2.23	-	-3.38	-2.82	24.82	-13.54

Table 9d. Resale Price Comparison for an Average 19 years old Structure in Los Angeles, Different Income and Age Communities

Resale price comparison for an average 19 years old structure	High Income & High Proportion of Elderly					High Income & Low Proportion of Elderly				
	No rent control	Under rent control without vacancy decontrol	Under rent control with vacancy decontrol	Adoption of rent control without vacancy decontrol	Adoption of rent control with vacancy decontrol	No rent control	Under rent control without vacancy decontrol	Under rent control with vacancy decontrol	Adoption of rent control without vacancy decontrol	Adoption of rent control with vacancy decontrol
Resale price	\$47,132	\$54,326	\$47,132	\$52,407	\$48,534	\$41,229	\$41,229	\$41,229	\$55,365	\$34,640
Price increase	\$3,069	\$10,263	\$3,069	\$8,344	\$4,471	-\$799	-\$799	-\$799	\$13,337	-\$7,388
Growth rate (percentage)	6.97	23.29	6.97	18.94	10.15	-1.90	-1.90	-1.90	31.73	-17.58
Growth out from rent control (percentage)	-	16.33	0	11.97	3.18	-	0	0	33.63	-15.68

Resale price comparison for an average 19 years old structure	Low Income & High Proportion of Elderly					Low Income & Low Proportion of Elderly				
	No rent control	Under rent control without vacancy decontrol	Under rent control with vacancy decontrol	Adoption of rent control without vacancy decontrol	Adoption of rent control with vacancy decontrol	No rent control	Under rent control without vacancy decontrol	Under rent control with vacancy decontrol	Adoption of rent control without vacancy decontrol	Adoption of rent control with vacancy decontrol
Resale price	\$41,807	\$40,373	\$41,807	\$44,425	\$40,751	\$35,746	\$35,746	\$35,746	\$43,491	\$33,459
Price increase	\$3,743	\$2,309	\$3,743	\$6,362	\$2,687	\$2,180	\$2,180	\$2,180	\$9,924	-\$107
Growth rate (percentage)	9.83	6.07	9.83	16.71	7.06	6.49	6.49	6.49	29.57	-0.32
Growth out from rent control (percentage)	-	-3.77	0	6.88	-2.77	-	0	0	23.07	-6.81

Figure 5. Simulation Results: Resale Price Comparison for Los Angeles County

The following figures present the estimated resale prices for the average 19 years old mobile home units in each subgroup in Los Angeles County, under different rent control regimes. The average unit is defined as the one with average structure (double, triple), in census tract with average proportion of households with public assistance income, etc.

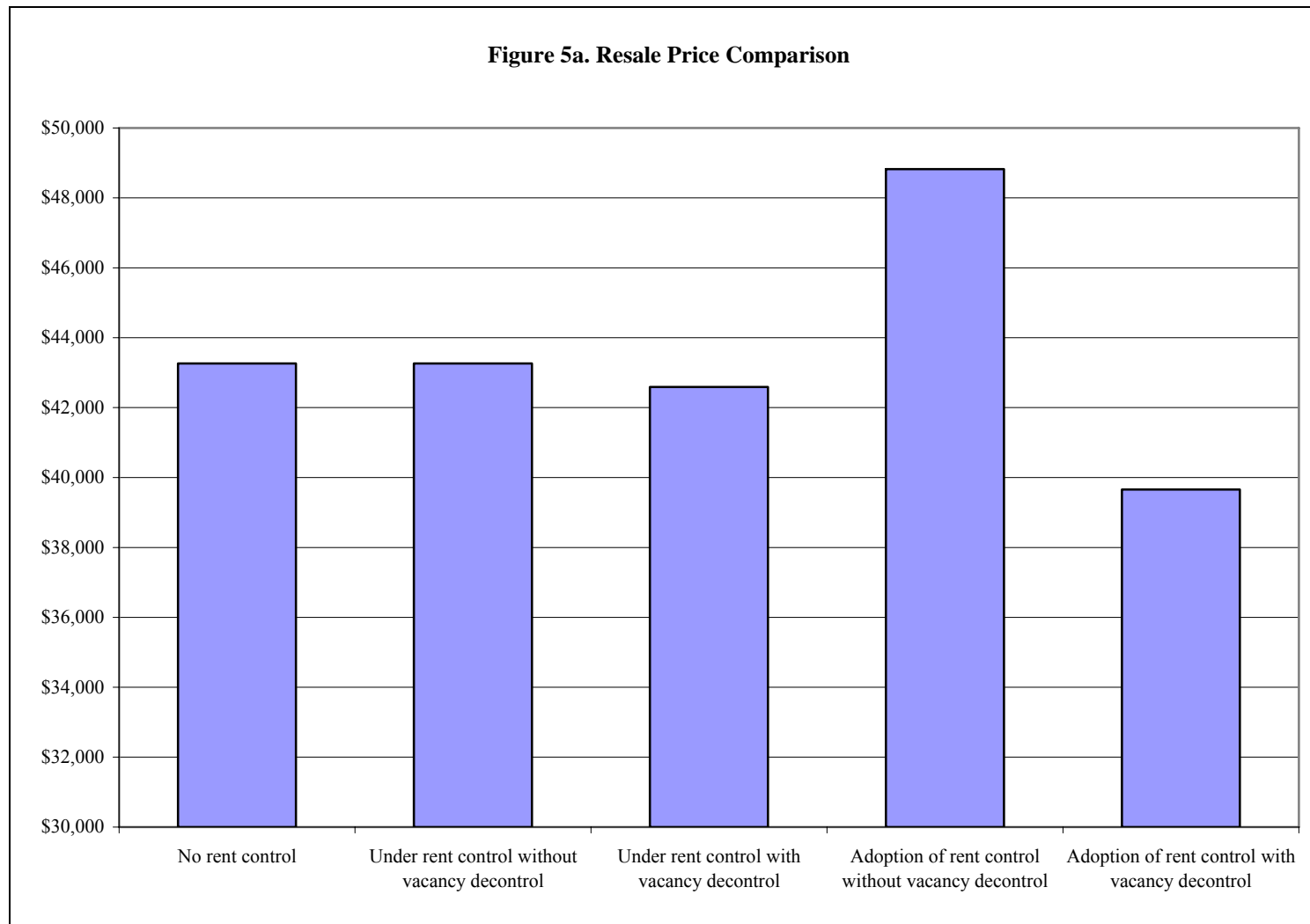


Figure 5b. Resale Price Comparison-Median Household Income

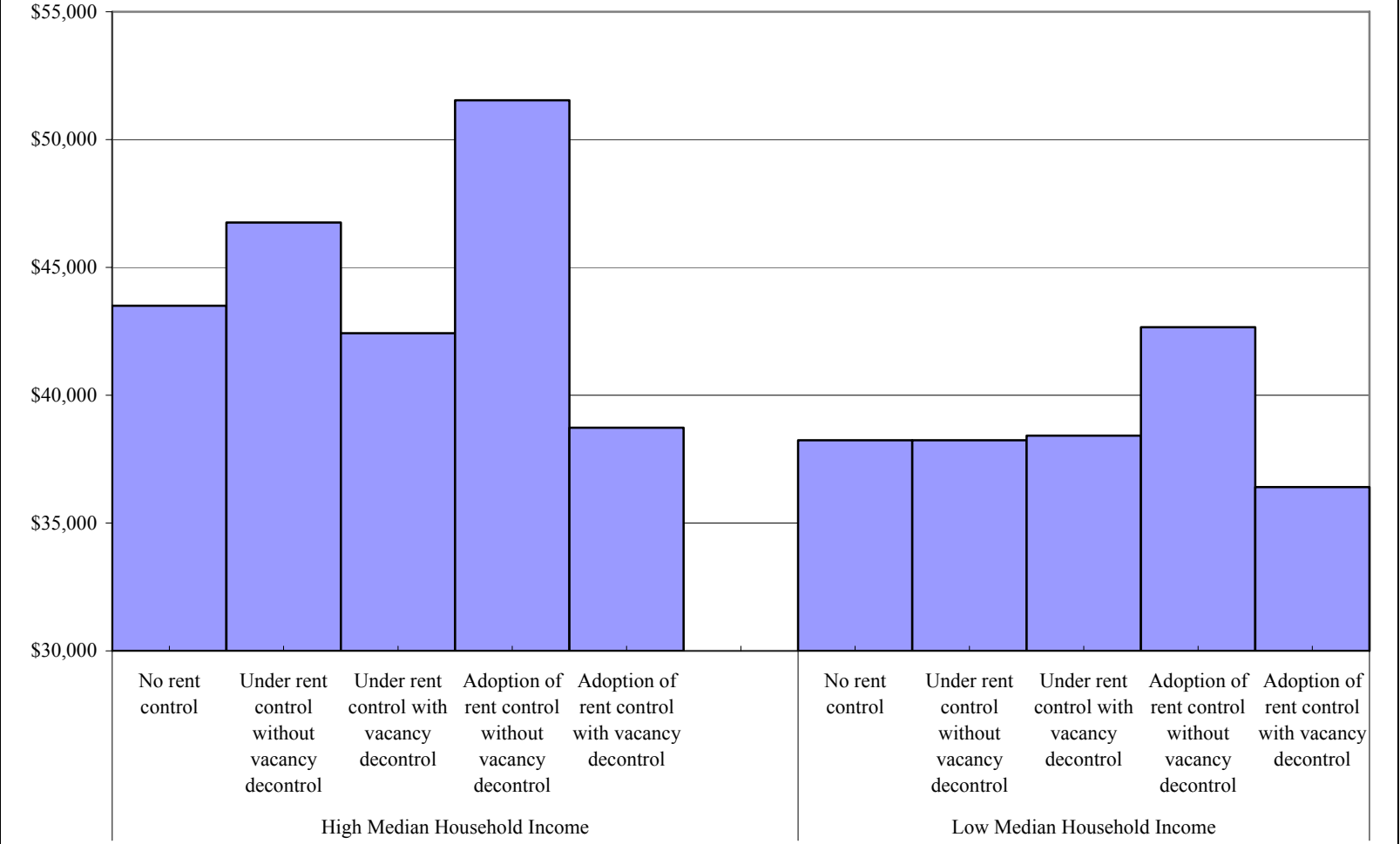


Figure 5c. Resale Price Comparison-Age Community

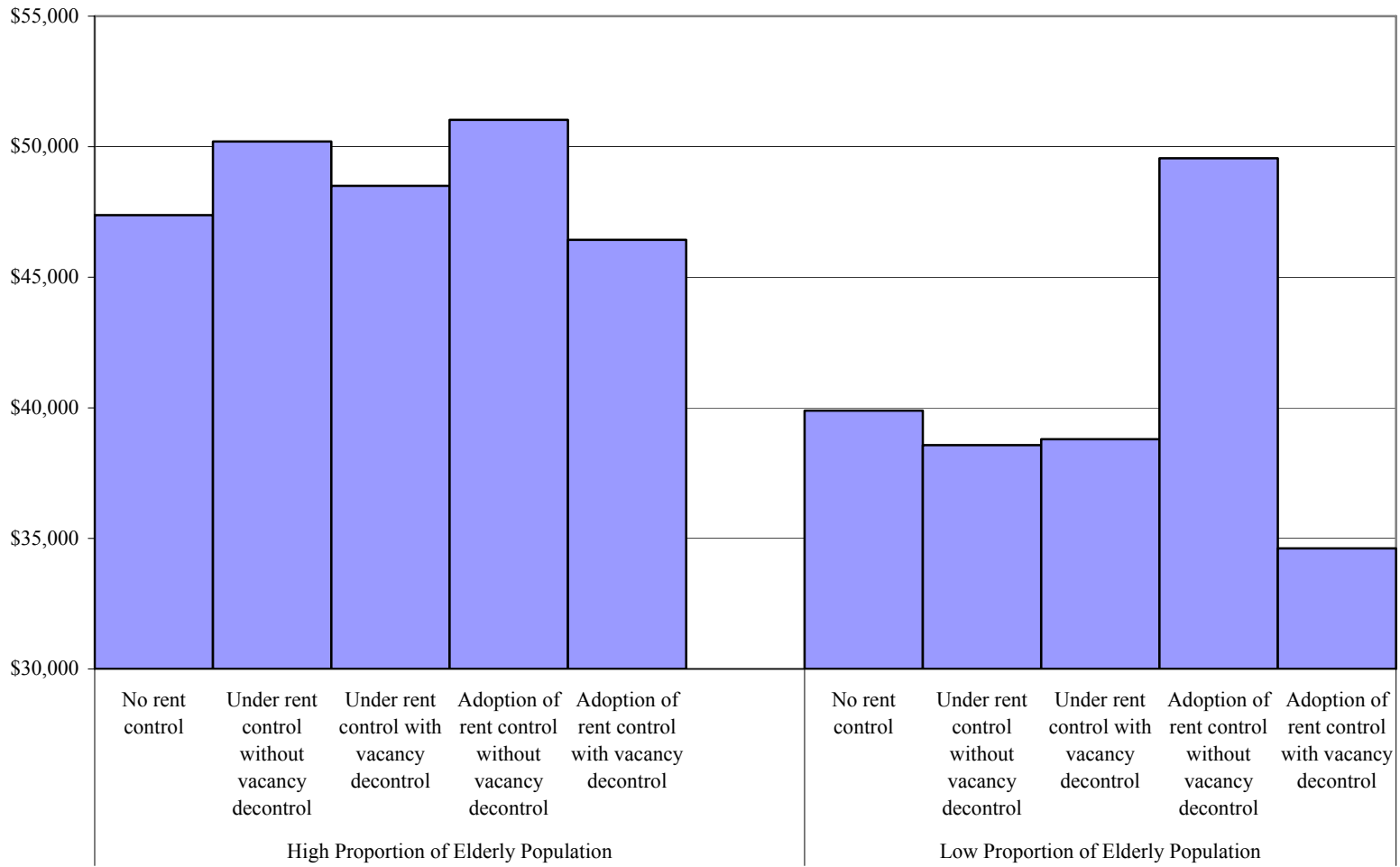


Figure 5d. Resale Price Comparison-Median Household Income and Elderly Proportion

