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An Examination of San Francisco Bay Area Communities*

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I. ANATOMY OF THE PROBLEM

The San Francisco Bay Area holds the dubious distinction of having the highest housing prices of any metropolis in the United States. The Median Sales price of a new home in the Bay Area now stands at $114,000. Over the past ten years, the price of new Bay Area homes have risen 269 percent.[1]

Why? Like many growing metropolitan regions, the Bay Area has faced considerable demand pressure from growing households, and industries. The so-called baby-boom generation has now reached prime house-buying age. Changing culture and social values have dramatically increased the formation of households as more individuals seek separate residences. Employment growth and increased immigration to California and the Bay Area have further accelerated household growth. The demand for housing is strong in the Bay Area; but it only partially explains rapid housing price inflation and high prices. The other key ingredient is insufficient supply.

The San Francisco Bay Area is caught in a very serious dilemma. Unlike other high growth sunbelt regions, the Bay Area is in short supply of developable land. Extensive land development since World War II, increasing use of growth management controls, more restrictive land use and environmental regulations, and the "go-slow" development posture created by the passage of Propositions 4 and 13 have significantly affected land conversion in the region. Despite the enormous supply of vacant land, much of it cannot be developed. Most vacant land is undevelopable due to its rugged topography or its sensitive environmental character. Other vacant lands that could be developed are restricted from use by local land use controls. A 1975 inventory of land use recorded that of the region's 4.5 million acres, only 350,000 acres were vacant and "developable."[2]

A recent survey of local land use policies in the Bay Area identified the important role that local land-use controls play in limiting development.[3] The suburban land squeeze is not the exclusive result of immutable natural constraints. It is the outcome of the restrictive land use and development regulations imposed by many of the region's 100 local governments. A new mood has emerged in the suburbs; land use controls now place severe limits on where, when and how the region can develop. Continued suburban land conversion is now viewed as undesirable, and efforts to limit residential development are well organized and effective. Several particular trends evident in local Bay Area Communities are very alarming:

Residential Densities are Falling

If future development were to occur at current density levels, and if land use policies in effect in 1975 remained unchanged, the region could accommodate a population of over nine million. In reality, however, development densities for new residential construction are substantially lower than historical density levels, and recent evidence suggests that they are continuing their decline. In 1975, given the existing local development policies, the Association of Bay Area Governments (ABAG) estimated that the supply of land available for residential development would not be sufficient to meet projected housing demand beyond 1990.[4] In other words, the supply of developable land in 1975 could not accommodate a projected 1990 regional population of just under six million.

The Rise of Local Growth Controls

The pro-growth attitude of most Bay Area communities in past decades has been replaced by a slow-growth posture, brought on by rising fiscal worries generated by Proposition 13. Cities that once relished being regional growth centers now view growth with much skepticism. With the new fiscal calculus of Proposition 13, single-family development usually generates higher public sector costs than revenues. This fact, in conjunction with a greater recognition of the environmental impacts of development, has led many communities to reduce the amount of land available for residential development. Coupled with the lack of developable land in older Bay Area cities, development opportunities are becoming scarce, and some builders are leapfrogging out to exurban agricultural areas.

Jobs, But No Housing

With Proposition 13, most communities have altered their approach to land use planning and zoning. Caught in a fiscal squeeze, many towns have stepped up efforts to increase their tax base by attracting more commercial, office, and light industrial development. While attempting to attract economic development, most communities have not concomitantly adjusted their zoning to provide housing for additional employees. Table 1 shows the employment and housing potential of cities in Santa Clara County's "Silicon Valley." The extreme inbalance of potential employment growth relative to housing illustrates the serious housing pressures of this Bay Area subregion. Consequently, new employees, particularly those migrating to the region, find it extremely difficult to acquire affordable housing. In many parts of the region, the ratio of residentially developable land to industrially and commercially developable land is out of balance.

(Table 1 here)

Increased Development Fees and Charges

In addition to limiting development of fiscally "unprofitable" housing, most Bay Area communities have dramatically increased the fees and charges they levy on developers. A recent ABAG study found that total development fees for single family homes range from $800 to nearly $6,000 per unit.[5] The median per unit fee is $2,800. The ABAG study reveals that the twenty-two high fee charging communities are located in the developing suburban reaches of the Bay Area, where most developers are paying total development fees of between $2,900 and $6,000.

Looking Out For Number One: Cities Against Cities and Counties

While local governments in the Bay Area have always pursued their own interests, recently intergovernmental competition and cutthroat behavior have grown to alarming proportions. Competition is no longer a tug-of-war between cities to see who can attract the most development. The game is now more of a pushing-match to see who can push the most fiscally and environmentally costly growth off on to other communities. These community pushing matches have enormous implications for the regions' long term development and are becoming very serious, as more and more communities begin to play them. In the past, as long as the number of communities attempting to push growth off onto their neighbors was small, the regional

Table 1

The Imbalance Between Jobs and Housing Potential in Santa Clara County

City	Job Expansion Based on Local Zoning	Housing Unit Expansion Based on Local Zoning
Palo Alto	3,000	1,300
Mountain View	18,620	3,600
Sunnyvale	12,350	1,680
Santa Clara	23,940	2,826
Cupertino	5,120	4,890
Los Altos	0	238
Los Altos Hills	0	322
Milpitas	29,700	3,648
San Jose	123,475	45,786
Campbell	500	200
Los Gatos	350	395
Saratoga	270	2,271
Monte Sereno	0	35
Morgan Hill	21,700	6,475
Gilroy	7,000	4,875
TOTAL	246,005	78,541

Source: Santa Clara County Manufacturing Group, _Vacant Land in Santa Clara County: Implications for Job Growth and Housing in the 1980s_. Feb. 1980.

impact of such policies was minimal, since other towns could absorb the growth without much difficulty. With most towns trying to export undesirable growth, few communities remain in the wings, to pick up this pushed-off growth.

Falling residential densities, growth controls, job growth at the expense of housing development, and the "combative" attitude of communities are causing a severe shortage of residentially developable land. Land conversion is becoming more difficult, and if present trends continue, development costs will escalate. Ultimately, considerable land price inflation will result.

If the current local land use and development control policies remain unchanged, their inflationary impact on land and housing costs, will place exteme burdens on low and moderate income households, and will ultimately slow the region's rate of economic growth and affect its economic structure.[6]. Higher land and housing costs will push-up wage rates, as workers are forced to pay higher housing costs. Also, higher land costs will directly translate into higher rents, and building costs. These higher wage and building costs will reduce the Bay Area's attractiveness to business and industry. Firms will bypass the region for other low-cost areas, and existing firms may move elsewhere or choose other locations for expansion.

This paper examines the effects local land-use policies have on housing prices. The next section outlines the ways that land-use controls can influence housing prices. Section III describes the empirical models used to make the assessment and presents the results. Section IV, looks more closely at specific portions of the Bay Area. Finally, Section V offers conclusions about the effects of land-use controls in the San Francisco Bay Area.

II. MAKING THE CONNECTION BETWEEN LOCAL LAND USE POLICIES AND HOUSING COSTS

The Effects of Land Use Regulations

Communities use a variety of measures to control residential development. Traditionally, community-wide land use plans, zoning and subdivision ordinances and building codes have been used to regulate development. As more sophisticated regulations were developed, communities augmented traditional programs with impact assessment procedures, multiple permit systems, growth management timing ordinances, impact fees and taxes, and urban limit line designations. Not only have these additions made the regulatory process more complex, they have introduced numerous effects which lead directly or indirectly to housing-cost inflation.

Local land use controls directly affect the cost of new housing construction in several ways. By restricting the supply of developable land through the use of open space acquisition and agricultural zoning or by limiting the extension of public facilities, local land use controls increase the price of residentially developable land; higher land prices increase the prices of new housing units.

Estimates of the effect of zoning and land use control on housing prices are available, and reasonably approximate the impact of land supply constraints. Using housing price and land use data for suburban Boston communities, Stull tested the relationship between land use control and housing price. After controlling for accessibility, housing stock characteristics and the quality of public services, Stull found that housing prices were lower in communities with greater proportions of vacant land.[7] An analysis of suburban communities in Alameda and Contra Costa Counties California, found that housing prices were inversely related to the supply of vacant land available for development.[8]

In addition to reducing the supply of residentially developable land, restrictive zoning lowers residential density. These large minimum lot size requirements increase the floor price of residential lots.[9] While large lot zoning reduces the per acre price of raw land, the reduction in price is often offset by higher land requirements. These regulations add significant costs to land development.

Another direct way land use regulations affect new housing costs is by shifting public service costs of development on to new projects. Traditionally, communities have shouldered the public service costs of new residential development. Recently, communities have imposed substantial fees and taxes, and land and infrastructure dedication requirements on new development. These increased fees, charges and dedication requirements add costs to new residential construction.

Restrictions on the supply of developable land, required lower density housing development and increased fees and charges appear to have directly contributed to the region's rapid inflation of new housing. In addition to these direct new construction cost effects there are other more complex and difficult to trace <u>indirect</u> effects that may have enormous effects on the price of new and existing housing.

Communities with limited development opportunities may unwittingly be conferring substantial monopoly power on developers and owners of existing units. Because the supply of new units is so constrained, developers fortunate enough to build housing may be able to charge prices higher than would be the case with greater competition. Likewise, the owners of existing units may be able to reap quasi-rents if the supply of units in the market is restrained. These indirect effects can have substantial inflationary influences on the prices of new and existing units.

The combined play of the direct new construction costs and the more complex indirect effects on new and existing housing prices, may considerably affect the price of Bay Area Housing. The next section of this paper outlines two models for assessing the impacts of these "direct" and "indirect" effects.

III. EMPIRICAL MODELS AND VARIABLES

To determine the extent to which local land use policies affect the prices of new and existing single-family housing units in the San Francisco Bay Area, we developed two models of price determination. Following the earlier work of Lafferty and Frech[10], Stull[11] Reuter[12] and Crecine *et. al.*,[13] the principal methods of analysis were multiple regression techniques.

The first model, attempts to explain the role of land supply, zoning density, and development fees and charges in shaping new house price construction. Independent variables, which directly measure the extent to which past and present local land use policies affect single-family land availability, minimum lot size, and fees and charges were used. Since new housing prices are also determined by other physical and community characteristics, other independent variables are unit size, a measure of community accessibility, and community income.

Model I was estimated as a linear function:

$$\text{Average Price of New Housing} = a0 + b_1{*}NSQFT + b_2{*}ACCESS + b_3{*}FEES + b_4{*}DENSITY + b_5{*}MEDINC + b_6{*}ACRES$$

where: NSQFT is the average size in square feet of new housing in city i for year j

ACCESS is a measure of the accessibility to employment for city i

FEES is the sum of all planning, development and hook-up fees in city i for year j

DENSITY is the zoned density of undeveloped residential acreage in city i for year j

MEDINC is the median household income in city i for year j

ACRES is the number of undeveloped acres in city i for year j

Model II is an attempt to isolate the indirect effects of land use controls on housing markets by determining the components of the prices of all units, both new and used. To capture the responsiveness of housing prices to changes in supply, we included the number of new units constructed in the previous year as an independent variable contributing to the average price of all housing in a particular community. As in the previous model, variables hypothesized to affect the prices of all housing units were included; as before, the model structure is linear:

$$\text{Average Price of All Housing} = a0 + b_1{*}ASQFT + b_2{*}AGE + b_3{*}TXRTE + b_4{*}CHHU + b_5{*}ACCESS + b_6{*}MEDINC + b_7{*}VAC(-1)$$

where: ASQFT is the average size in square feet of all housing in city i for year j

AGE is the median age of all housing in years in city i for year j

TXRTE is the local property tax rate in city i for year j

CHHU is the change in housing units for city i from the previous year

VAC(-1) is the vacancy rate for city i from the previous year

and where ACCESS and MEDINC are as defined above.

In both Models I and II, the sample price observations cover a two and one-half year period; from January, 1977 to June, 1979. The sample of communities used to calibrate both models is extremely diverse and includes many older, almost completely developed bay plain cities such as Berkeley, San Pablo and San Mateo as well as the more rapidly growing suburban centers like Novato, Antioch, and Vacaville. The sample includes upper income (Hillsborough, Atherton, Mill Valley), middle income (Concord, Fremont, Albany) and working class (San Bruno, Richmond, San Pablo) towns. Appendix A lists the communities which formed the observation sets for Models I and II.

We should note that the observations vary over time as well as space. Accordingly, each coefficient includes a pure cross-sectional component and a time-series component. Before pooling the data and testing the models across the 1977-79 period, we carefully estimated each model separately over each observation year (1977, 1978, and 1979). Only after determining the stability of the coefficients within each observation year did we undertake the pooling. Year by year comparisons of variable correlation coefficients are included in Appendix B.

Dependent Variable

Past efforts at estimating econometric models of the price effects of development controls have proven to be problematic because of poor quality, or insufficient data. Accordingly, special care was taken to construct reliable indicators. In addition, efforts were made to reconcile data from different sources -- a step which resulted in our eliminating several Santa Clara County municipalities from the sample set.

For both models Society of Real Estate Appraisers (SREA) transaction data were used to develop the dependent variables. The SREA obtains detailed information about the transactions of house sales. Transaction Data for the Nine-County Bay Area were obtained from the SREA, and organized by individual community. The price data were divided into new and existing sales categories. For every community with at least 50 observations per calendar year, average sales prices for new and existing units were generated. These data serve as the dependent variables in models I and II. Prices are scaled in thousands. The various independent variables include:

1) Size (ASQFT and NSQFT)
The larger the size the higher the price of both new and existing units. For both new and existing units, size is measured in hundreds of square feet. It is the average community size of units. Data are from the SREA transaction file.

2) Age
Older housing is often of less quality than newer units and therefore commands a lower price. Used only in model II, age is measured in years. It is the community's average age of units. Data are from the SREA.

3) Access
Better access should boost the price of a community's new and existing housing units. Since travel patterns in the Bay Area are not strongly monocentric, an index of each community's travel patterns is believed to be a better measure of access. This variable is a general measure of community accessibility to employment centers. It is the inverse of each community's average trip length of all work trips originating or ending in the community. The index was developed from the Metropolitan Transportation Commission's 1978 Travel Demand Study.[14]

5) Income (MEDINC)
The higher the social and economic status of a community, the higher should be its new and existing housing prices. This variable measures the estimated median household income of each sample community. 1970 Census estimates of median household income were updated using 1979 and 1980 income estimates prepared by Urban Decision systems.[15] Income estimates are reported in thousands of dollars.

5) Fees
Higher fees and charges should, in high demand housing markets like the Bay Area, translate into higher new house prices. This variable is the value of mean fees and charges levied by communities. Data are from the 1980 Association of Bay Area Government (ABAG) Survey and a previous survey by Stuart Gabriel et. al.[16]

6) Density
The lower the density the higher the average residential cost. New housing prices should rise with falling density. This measures the average residential development density proposed by each community for the remaining portion of undeveloped residential land. These data were obtained from ABAG.[17]

7) Acres
The more developable land available, the lower should be land prices. Lower land costs should yield lower new house prices. This variable measures the number of acres remaining for development in each community. It is estimated for each year. The Base date came from ABAG,[18] To determine acreage in subsequent years, the number of residential built units times average gross residential densities was computed and subtracted from the previous year's supply of land.

8) Tax Rate (TXRTE)
High tax rates should be capitalized into the price of existing housing units. The higher the taxes the lower the price. Because of the time lag in tax capitalization effects, tax rates are not likely to affect the prices of new units. This variable measures the average dollar tax levy per $100 of assessed value. The data were compiled by the Center for Real Estate and Urban Economics.[19]

9) Changes in Housing Supply (CHHU)
The more new units constructed in the previous year, the lower should be the price of units. This variable measures the absolute change in housing (all types) constructed during the previous year for each community. The data are from the State Department of Finance.[20]

10) Vacancy Rate (VAC-1)
Lower vacancy rates indicate a "tight" market. Other things being equal, the lower the vacancy rate, the higher the price of all housing units. This variable is the percent of housing units vacant in each sample community, lagged one year. The data are from the State Department of Finance.[21]

Model Results

Table 2 presents the coefficient estimates for Model I -- a test of the inflationary cost effects attributable to developable land supply constraints, low density zoning, and excessive fees and charges. The model was estimated using ordinary least squares. Considering that the observations consist of city-wide averages, the overall fit is quite good. All of the variable coefficients are of the expected signs, however the coefficients for community accessibility and fees are not significantly different from zero at the .05 confidence level of a two-tailed t-test. While the lack of significance of accessibility and fees are disappointing, we note that fees are a relatively small component of the price of a new home (on the order of two to four percent), and that accessibility, as measured, is similar for many cities.

(Table 2 here)

The results indicate that new house prices are higher in communities with low density development policies, and limited supplies of developable land. Coefficients for size and income indicate that new housing prices are higher for larger houses in high income areas. Model I suggests that other things being equal, new house prices in a community will be nearly $1,300 higher for each one unit reduction in the density of residential development. Similarly for each one acre reduction of remaining developable land, new housing prices will increase by $3.80 per unit. Each additional square foot of unit size will add $70.00 to the price of new units. Finally, each one dollar increase in median household income adds almost $3.00 to the price of new units.

The results of Model II, the All Housing Price Model, are presented in Table 3. Note that the coefficient values for change in housing units, vacancy rate and access all have the expected signs but are not significant at the .10 level. The remaining variables are all significant at the .05 level, and with the exception of age, have the expected sign. The positive sign on age is probably due to the fact that because San Francisco, Oakland and San Jose (the region's central cities) are not included in the sample, the age of the sample is fairly young, and of generally good quality. The insignificance of the coefficient for the change in housing supply is disappointing. Its failure to be significant may be due to the fact that demand pressures in growing communities push up housing prices.

TABLE 2

Model I: Estimates of the Price Effects of Local Land Use Policies on the Prices of New Housing (Nine-County San Francisco Bay Area: 1977-1979)

Dependent Variable: Average Sales Price of New Single Family Homes/1000

Independent Variable	Coefficient	t-statistic
NSQFT/100	6.97	(7.42)
ACCESS*100	1.27	(.82)
FEES/100	4.58	(1.54)
DENSITY	-1.30	(-1.93)
MEDINC/1000	2.68	(6.02)
ACRES/100	-.38	(-2.0)
Constant	-87.7	(-3.63)
R2	.63	
Number of Observations	97	

(Table 3 here)

To summarize, the models seem to indicate that local land use policies play a major role in affecting the price of new housing units. If land use policies constrain the amount of units constructed in suburban area, they may ultimately affect the prices of all housing units in the restrictive community. Of all direct land use regulations examined, density appears to exert the most substantial inflationary effect, followed by land availability and fees. While the results are based on data from the San Francisco Bay Area, they support general theoretical findings that land use controls affect the price of housing.[22] However, since price effects depend on demand factors as well, studies in other metropolitan areas are needed before the results can be generalized beyond the Bay Area.

IV. AREA ANALYSIS

In clustering all Bay Area cities into a single sample, we implicitly assume that all Bay Area cities are part of one large metropolitan area housing market, differentiated solely by the characteristics captured in the model variables. This is an obviously unnecessary and counterproductive simplification. In fact, the Bay Area is composed of numerous housing submarkets, differentiated by dimensions of space, quality of life, access to services -- dimensions largely ignored in Models I and II. By failing to adequately differentiate city types we may ultimately obfuscate the very relationships we are seeking to clarify. For example, the price effects of a vacant land shortage are very different in Redwood City, an

TABLE 3

Model II: Estimates of the Price Effects of Local Land Use Policies on the Prices of All Housing (Nine-County San Francisco Bay Area: 1977-1979)

Dependent Variable: Average Sales Price of All Single Family Homes/1000

Independent Variable	Coefficient	t-statistic
ASQFT/100	8.66	(15.76)
AGE	.43	(2.58)
TXRTE	-3.52	(-8.08)
CHHU/1000	-.66	(-.56)
ACCESS*100	.78	(1.12)
MEDINC/1000	1.31	(6.59)
VAC(-1)	.45	(.91)
Constant	-58.61	(-7.19)
R2	.88	
Number of Observations	188	

urban and largely built-out community, than in Santa Rosa, a growing community. Similarly high development fees may be unimportant in urban areas where the level of new construction is low, but significant in fast growing suburban cities.

To investigate how major differences in community "type" would affect the model coefficients presented above, we classified the 93 cities in the San Francisco Bay Area into four classifications based on dimensions of density, location, and recent growth experience. The categories are:

Urban Stable Cities

Urban Growing Cities

Suburban Stable Cities

Suburban Growing Cities

To distinguish stable from growing cities we looked at population growth rates during the 1976-1980 period. Where this rate was in excess of five percent, the city was termed "growing." The distinction between urban and suburban was made largely on the basis of residential density: those communities with 1975 net residential densities in excess of seven units per acre were termed urban, those with less than seven were put in the suburban category.

The four groupings, listed in Appendix A, are relatively consistent. For example, the set of urban-stable communities include almost all of the region's oldest cities, as well as those with a large percentage of their housing stocks consisting of rental units. At the other extreme, the 39 cities termed suburban-growing offer housing which is predominantly single-family in character. Moreover, 58 percent of the region's 1976-1980 housing stock growth occurred in those 39 cities. If unincorporated areas are included, the share of regional growth which occurred in suburban-growing cities was fifty-one percent.

Table 4, which profiles the means of the model variables by community type provides some interesting insights. For example, average home prices together with median household income estimates are highest in the set of exclusive suburban-stable communities. As expected, housing in urban communities is somewhat older and smaller on average, than housing in suburban cities. The access measure is higher in urban cities than in suburban ones, however the spread is not that great -- one indication of the multi-nucleated character of the San Francisco Bay Area. As expected, there is a sharp split in the variable measuring housing supply between stable and growing communities. Turning to the three development policy indicators, we note that fees are substantially higher in suburban communities than in urban ones. This is primarily due to the higher sewer and water hook-up fees which are charged in suburban areas --fees necessary to finance expanding infrastructure. In an effort to preserve their exclusivity, many of the suburban-stable communities of Marin and San Mateo Counties have zoned their remaining supplies of vacant land below two dwelling units per acre. Some suburban-growing communities have also zoned for large lot sizes, although not to the extent of their more stable counterparts. When coupled with estimates of vacant land reserves, we conclude that many of the suburban-stable communities are not unable to grow, but that they <u>prefer</u> not to grow, and use land use policy toward such ends.

(Table 4 here)

Model Results

Because of an insufficient number of new housing starts, we were unable to test Model I (the New Housing Price Model) for any of the city subsamples except the set of suburban-growing cities. Instead, dummy variables were used to denote which city classification a particular observation fit into. Table 5 summarizes the model results for the initial specification (over the entire sample), a second specification including the city-type dummy variables, and a run based solely on the set of suburban-growing observations.

(Table 5 here)

Differentiating between city types improves the overall explantory power of the general model only slightly. Note that when "city-type" dummy variables are included in the specification, the coefficients of two of the three land-use control measures, zoned density and available acreage, become insignificant. At the same time however, the coefficient for fees becomes significant. Relative to price levels in suburban-growing communities, housing prices in the other three city types are consistently higher, even after factors such as unit size, income, and access have been accounted for. Moreover, the relative size of the constant term has not been reduced through the addition of city-type dummy variables.

TABLE 4
Variable Means by Community Type

Variable	Community Type				
	Urban Stable	Urban Growing	Suburban Stable	Suburban Growing	Entire Sample
Average Home Price (000)	87.94	83.79	117.73	87.2	91.05
Sqft (00)	14.24	13.94	16.60	16.08	15.47
Age	24.36	21.75	16.60	10.19	15.11
Txrte	8.60	7.97	8.34	9.10	8.66
Medinc (000)	24.38	25.79	31.22	24.72	24.98
Chhu	85.90	374.00	43.90	476.40	302.80
Access	82.19	67.96	63.70	57.10	64.30
Vac(-1)	3.51	3.18	3.47	5.50	4.50
Fees (000)	1.36	1.32	2.18	2.31	1.85
Density	12.45	11.62	1.90	3.18	5.70
Acres (00)	3.77	5.97	17.60	25.94	17.70
Observations	33	24	30	89	188

TABLE 5
Model I: Estimates of the Price Effects of Local Land Use Policies on the Prices of New Housing
Comparison by City Type

Dependent Variable: Average Sales Price of New Single Family Homes/1000

Independent Variable	Full Sample	Full Sample with Dummy Variables	Suburban Growing
NSQFT/100	6.97	7.48	6.87
FEES/1000	4.58*	5.31	3.05*
ACCESS*100	1.27*	-.68*	.41*
MEDINC/1000	2.67	1.96	1.40
DENSITY	-1.30	-1.02*	-1.34
ACRES/100	-.38	-.12*	-.15*
D(Urban-Stable)		34.89	
D(Urban-Grow)		23.82*	
D(Suburban-Stable)		40.68	
Constant	-87.70	-89.50	-64.03
R2	.63	.68	.72
Number of Observations	97	97	55

Notes: * indicates coefficient is insignificant at the .10 confidence interval

D() indicates dummy variable denoting community type

How do we interpret these results? First, it seems obvious that new home prices are systematically higher in stable communities than in growing cities. One reason for the observed differences could be higher land prices in the more urban and stable communities--an effect not wholly captured by the access or acreage variables. A second reason might be that consumers place a premium on living in more established areas, a premium not solely based on access to work. A third explanation, one we seem inclined to favor, is that because the general level of new home construction is lower in the set of stable communities, (see Table 4) the level of price competition is comparably lower. Accordingly developers who do gain access to buildable lots in the set of "stable" communities are in a position to set higher prices.

Calibrating the model solely with observations from suburban-growing communities yields more predictable results. Fees decrease in significance, primarily because many suburban communities continue to subsidize new construction by keeping planning and utility hook-up fees fairly low. Likewise because vacant land supplies are not yet a constraint on construction in many of the cities we have identified as suburban-growing, the coefficient for acreage is small and insignificant. Note however that the coefficient for zoned density is significant, and of a magnitude consistent with the model run on the entire Bay Area sample. This finding confirms expectations that allowable density levels, as set by local governments are crucial to a determination of developer profits, and these price levels. Finally, we note that median household income as a determinant of new home prices is less in the set of growing-suburban communities than in the entire sample, a finding consistent with our expectation that the Bay Area's more affordable housing is provided in suburban areas. In summary we note that land-use controls do directly affect the prices of new housing, but that there are sharp differences in the magnitudes of those effects across different housing submarkets.

Table 6 presents the All Housing Price Model (Model II) results for the four community classifications. Again we note that the number of observations are too few to guarantee reliable results except in the case of suburban-growing cities. Nonetheless, we think the model results provide an interesting look into the anatomy of the Bay Area housing market. Looking first at size, age, tax rate and income, we note that with the exception of the urban-stable communities, all the coefficents are of the expected sign. The coefficients for housing unit age and tax rate are insignificant for the set of urban-stable cities, and the age coefficient is also insignificant for the set of suburban-growing communities; a finding we attribute to the relative homogeneity of housing in the region's new suburbs. Note that income is most important in determining housing prices in the more exclusive suburban-stable communities, and less important in the more open set of suburban-growing cities. In fact, other attributes so dominate the suburban-stable model that the coefficient for square footage, generally agreed to be the best predictor of housing price, was insignificant. Reflecting the high value of property in the suburban-stable communities, the coefficient for tax rates is strongly negative.

(Table 6 here)

Access was found to be a generally insignificant explainer of housing prices in three of the four groupings, and as expected, the coefficients

TABLE 6
Model II: Estimates of the Price Effects of Local Land Use Policies on the Prices of All Housing
Comparison by City Type

Dependent Variable: Average Sales Price of All Single Family Homes/1000

Independent Variables	Full Sample	Full Sample w/ Dummy Variables	Urban Stable	Urban Growing	Suburban Stable	Suburban Growing
ASQFT/1000	8.66	9.24	9.32	5.58	2.82*	7.47
AGE	.43	.11*	-.32*	.54	1.53	.22*
TXRTE	-3.52	-3.47	-.83*	-1.34	-3.25	-2.78
CHHU/1000	-.66*	-.22*	-.21*	.84	-29.45*	-11.77
VAC(-1)	.45*	.67*	.24*	1.85*	5.6*	.97
ACCESS*100	.78*	.22*	2.07*	.18*	-8.25	1.69*
MEDINC/1000	1.31	1.20	4.49	3.16	5.55	1.46
D(U-S)		13.43				
D(U-G)		9.27				
D(S-S)		13.64				
Constant	-58.61	-63.67	-155.98	-84.24	-27.66*	-55.51
R2	.88	.88	.87	.90	.92	.91
Number of Observations	188	188	33	24	30	89

Notes: * indicates coefficient is insignificant at the .10 confidence interval

D() indicates dummy variable denoting community type for housing stock changes were significant for the two growing samples, but insignificant in the stable communities. Interestingly, changes in supply are positively correlated with housing prices in the set of urban-growing communities (an unexpected result), but negatively correlated with prices in the set of suburban-growing communities -- the expected result. One possible explanation for this result is that the demand for housing in the set of urban-growing communities is so strong that suppliers of new units set their prices very high. This hypothesis is somewhat supported by the low vacancy rates in urban-growing markets. Finally, we note that in all but the suburban-stable markets, vacancy rates do not seem to be performing as adequate signals of the match between supply and demand.

V. Concluding Comments

While it is widely agreed that land use regulations contribute to housing price inflation, little supporting empirical evidence is available. The results of this paper illustrate that density controls and land availability directly and systematically affect the price of new housing units. However, our research also indicates that the direct cost effects are not as great as some critics of land use controls allege. For example, according to econometric estimates of new housing prices, the combined effect of increasing development densities by one unit per acre, reducing development fees by 50 percent, and doubling supplies of vacant land -- all drastic steps, would be to lower the sales price of a new home by $6,000. This estimate amounts to roughly six percent of the average price of a new Bay Area home in 1979. New home prices in growing suburban communities are less sensitive to development fees and vacant land supplies, but considerably more sensitive to restrictions placed on residential densities.

Suburban builders report that planning and development fees are added to the price of new housing on a one-to-one basis. In other words, for every one-dollar increase in fees, the list price of a new home increases by one-dollar. However, we note that land costs are more important to builders, and accordingly density limits become critically important in determining project selling prices and profit. To the extent that builders can distribute higher land costs, as well as infrastructure costs, over a greater number of constructed units, higher single-family housing densities are crucial for holding down selling prices while maintaining profit levels.

The importance of the suburban housing market in acting as a relief valve for Bay Area housing demand is implied by Table 6. Although changes in supply do not greatly affect housing prices in the region as a whole, the flow of new units onto the market is a crucial determinant of housing prices in expanding suburban markets. For example, a 500 unit increase in the flow of new homes into a suburban market would imply a decline in all suburban home prices of nearly $6000. Thus policies which greatly restrict new construction and/or densities in active suburban communities are found to be inflationary. A logical extension of this finding is that if local governments in the San Francisco Bay Area are committed to reducing housing costs, they should consider loosening density restriction or other controls which inhibit the flow of new housing onto the market.

It is important to be careful in drawing rigorous conclusions from the results of partially specified econometric models, particularly when the observation set consists of city averages instead of well-defined economic agents. Nonetheless, the results presented here are surprising for their consistency, and their agreement with expectations. They suggest that the housing price effects of pursuing restrictive growth policies in expanding urban areas, far from being small and localized, are significant and widespread.

FOOTNOTES

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APPENDIX A

Model Sample by Community Type

Urban Stable	Suburban Stable	Suburban Growing	Urban Growing
Alameda	Livermore	Newark	Albany
Berkeley	Belvedere	Pleasanton	San Leandro
Piedmont	Tiburon	Union City	Belmont
Richmond	Corte Madera	Concord	Brisbane
San Pablo	Fairfax	Hercules	Foster City
Sausalito	Mill Valley	Martinez	Redwood City
Burlingame	Ross	Larkspur	San Carlos
Menlo Park	San Anselmo	Woodside	San Mateo
Millbrae	San Rafael	Portola Valley	S. San Francisco
San Bruno	Atherton	Campbell	Mt. View
Palo Alto	Los Altos	Cupertino	Santa Clara
El Cerrito	Pinole	Los Alto Hills	Sunnyvale
Daly City	Pacifica .	Los Gatos	Hayward
		Milpitas	
		Monte Sereno	
		Fairfield	
		Antioch	
		Pittsburg	
		Moraga	
		Pleasant Hill	
		Clayton	
		Novato	
		Morgan Hill	
		Benecia	
		Vacaville	
		Vallejo	
		Santa Rosa	
		Petaluma	
		Sonoma	
		Walnut Creek	
		Napa	
		Gilroy	
		Saratoga	
		Suisun City	
		Sebastopol	
		Fremont	
		Cotati	
		Rohnert Park	

APPENDIX B

Sample Correlation Coefficients by Year

A) Correlation Coefficients with APRICE

	1977	1978	1979	Full Sample
ASQFT	.92	.89	.92	.87
MEDINC	.82	.82	.78	.79
ACCESS	.34	.29	.30	.41
CHHU	-.32	-.19	-.28	-.09
TXRTE	--	--	--	-.37
VAC(-1)	-.15	-.28	-.26	-.22
AGE	.25	.12	.13	.16
Observations	85	86	71	188

B) Correlation Coefficients with NPRICE

	1977	1978	1979	Full Sample
NSQFT	.83	.79	.60	.69
MEDINC	.79	.64	.51	.61
FEES	-.34	-.27	.01	.002
ACRES	-.24	-.16	-.15	-.16
DENSITY	.02	-.23	-.19	-.20
ACCESS	.41	-.25	-.16	-.09
Observations	26	37	34	97