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THE EFFECTS OF LAND-USE CONTROLS
ON HOUSING PRICES

BY

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# GRADUATE SCHOOL OF BUSINESS ADMINISTRATION

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By

Lawrence Katz

and

Kenneth T. Rosen
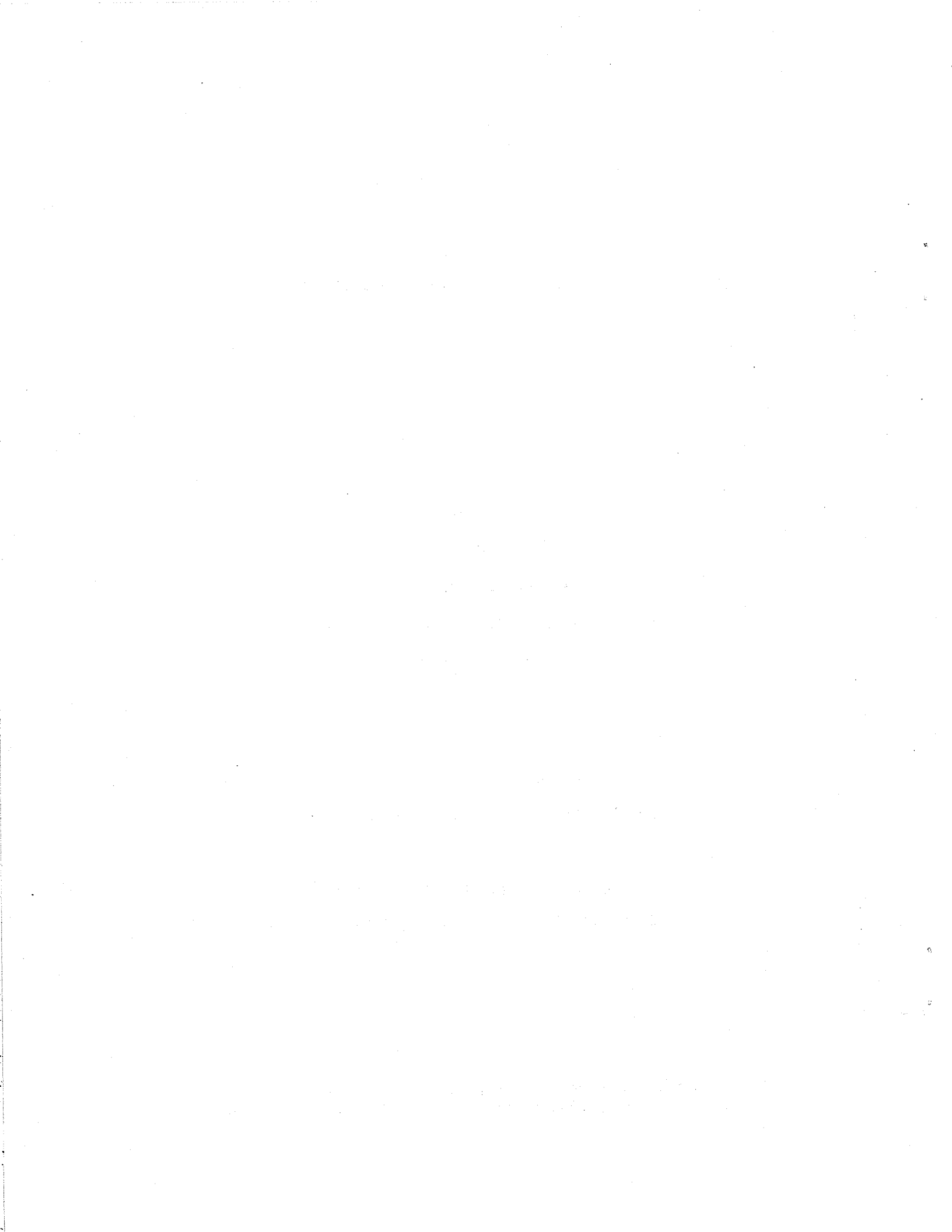
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# INTRODUCTION

In recent years, a dramatic increase in government regulation of the housing industry has occurred. During the late 1960's and early 1970's, many communities became increasingly dissatisfied with the deleterious effects upon the natural environment and overall quality of life of rapid, unregulated suburban growth. This increased awareness of the environmental, social, and economic impacts of new residential development led to a widespread proliferation of land use and environmental regulations. While this growth of regulation has proceeded at all levels of government, the bulk of control over residential development remains in the hands of local governments. The increase in land use control means the home building industry has to work within a much more complex and often costly regulatory framework.

Local governments use a wide variety of procedures to control the location, timing, character, and amount of residential development. Traditionally, communities have relied upon zoning and subdivision ordinances, building codes, and community-wide land use plans as the major tools for the regulation of new development. In more recent years, more sophisticated and complex regulatory procedures have been developed and widely utilized at the municipal level. In many communities, traditional land use controls have been augmented by environmental and fiscal impact procedures, urban growth management systems, utility conn-

ection moratoria, multiple permit systems, and/or overall growth limitations.

The traditional, asserted purpose of land-use controls is to promote the health, safety, and general welfare of residents of a community. Increasingly stringent land-use regulations and growth controls have been justified in terms of improved environmental quality and the maintenance of "community character." Yet, there is a growing recognition that in many communities land-use regulations serve to maintain housing costs at a level high enough to prevent moderate or low income families from finding housing at prices they can afford. Critics have renounced the justifications for restrictive land-use controls as merely methods for the exclusion of low and moderate income households (Babcock and Bosselman, 1973) and the promotion of the immediate economic self-interest of the existing homeowners in the city implementing growth control (Ellickson, 1977). The overall impact of the new trend in land use regulation appears to have been to increase the cost of new housing production and subsequently to increase the price of all housing.

Land-use and environmental regulations can have important impacts on almost every component of housing costs. Regulations that restrict the supply of developable land, impose a minimum lot size, or restrain the permissable level of residential development density can greatly increase raw land costs. Regulations concerning improvements, the provision of amenities, and subdivision design can add significant costs to lot preparation and land development. The costs of structural material and labor can

be increased by building codes and other regulations that designate

minimum house size or require major changes in house design. Substantial

carrying costs can be imposed by administrative delays and by the often

lengthly interval required to gain development approval. Regulatory

compliance can also lead to various types of administrative, engineering,

and planning costs. Dowall (1979) suggests that land-use controls may

also have an inflationary impact by creating barriers to entry which

facilitate monopoly power in the housing industry. Dowell and especially

Frieden (1979) also note that development restrictions may lead developers

to reorient their projects to higher-income customers as cost increases

force them to build more expensive dwelling units.

The major portion of this paper examines the impacts on housing

costs of the most important types of land-use, environmental, and con-

struction regulations - zoning, subdivision controls, growth management

techniques, building codes, and environmental regulations - by reviewing

the literature and presenting some simple theoretical models. A

final section of this paper presents some initial empirical results

of the authors' research on the impact of local land-use regulations

on land and housing costs in California.

## ZONING

In order to analyze the effects of zoning, it is first necessary to state precisely what zoning is expected to do. Zoning operates by allocating neighborhoods to particular land uses and has several asserted purposes. Historically, the primary purpose of zoning has been to separate "incompatible" land uses for the purpose of mitigating the negative effects supposedly associated with certain types of land use. In economic terms, zoning that prevents these negative neighborhood effects can be called externality zoning since it operates to reduce the negative externalities which would have occurred in an unregulated market. A second asserted purpose is that of the protection or enhancement of property values; this has often been the rationale for highly restrictive zoning techniques. Zoning practices have also been justified as functioning to preserve neighborhood character so as to maintain a "rural atmosphere" or protect open space. This technique often works to maintain homogeneity within a community and to exclude those that the residents feel are economically undesirable. The final major justification of zoning practices is that of fiscal zoning, the use of zoning to protect the fiscal concerns of the community as a whole. Fiscal zoning attempts to exclude development which is perceived as a fiscal loss and to only allow development that brings in enough revenue to at least cover the costs it imposes on the municipal government. In practice, fiscal zoning usually means the exclusion of multifamily dwelling units and of moderate and low income housing.

Critics of traditional zoning assert that zoning is merely a mechanism for the geographic segregation of low and moderate income families. Thus,

in many areas of the country land-use controls can be viewed as having
the effect of maintaining housing costs at a level high enough to
prevent anyone with a lower income than a community's existing residents
from finding housing they can afford in that municipality. In fact, the
recent expansion of land use restrictions have in part made it difficult
for a good proportion of existing residents to afford to live in their
own house—assuming they had to buy it at present prices.

Zoning ordinances may impact housing costs in several ways. Probably,
zoning's most important impact is on raw (or unimproved) land costs. Density
controls and zoning's allocation of land into various uses can serve to
restrict the supply of developable land and thereby increase land prices.
Minimum lot size regulations often increase the land cost per dwelling unit.
Architectural standards and minimum floor area requirements that are often
included in zoning ordinances may work to increase administrative, land
development, and actual construction costs. Also, various review procedures
serve to increase direct administrative costs, while various delays can
increase financing costs as well as other holding costs.

Zoning's impact on raw land costs depends on whether zoning actually
modifies the allocation of land to alternative uses. If zoning does induce
significant changes in the amount of land allocated to various uses, then
the prices of land in overallocated categories should be depressed relative
to prices in the unzoned market, and prices in the underallocated categories
will be elevated relative to those in the unzoned market. Ohls , Weisberg,

and White (1974) have shown that zoning regulations which restrict the supply of land available for residential development below that which would be normally exchanged in the market operate to increase the costs of residental land. Figure 1 illustrates the effect, in a two sector land market, of a zoning ordinance that restricts the supply of housing below that which the unimpeded market would allocate. The total supply of land in the market is given by SS. In the unzoned competitive market, equilibrium occurs where the total demand for land by both of the user groups equals the total land supply. At this point, the price of land in each user group is the same: $P_1 = P_2$. Housing dwellers consume $Q_1$ land and other users consume $Q_2$ land. Now assume a zoning ordinance is enacted which limits the supply of land available for housing to S'S', a fact which would leave the remaining supply S"S" for other uses. If S'S' is greater than $Q_1$, then zoning has no effect on land price. But if S'S' is less than $Q_1$, zoning operates to create two separate submarkets for land (Ohls, Weisberg, White, 1974). In this case, the restriction of supply will increase the price of land for housing to $P_1'$ and reduce the quantity of land used for housing to $Q_1'$. The increased supply of land for other uses will reduce the price of land for other uses to $P_2'$ and increase the quantity of land to $Q_2'$. The key factor in determining the price effect of a restriction or the supply of residential land is the price elasticity of demand for residential land. The more inelastic the demand is, the larger the price increase will be. Overall, the effect of a supply re- striction on the price of residentially developable land depends on the amount of land removed from the available supply, the permanence of the

Figure 1

Other Uses
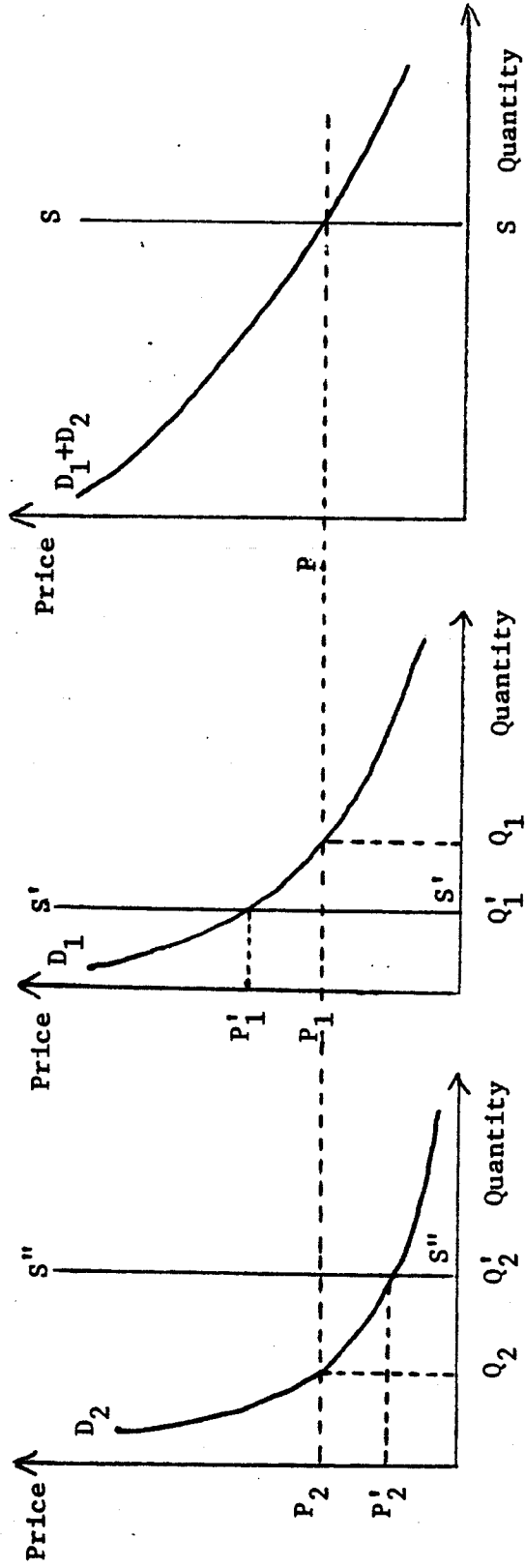
restriction, and the price elasticity of demand, a factor which is related to the opportunity for escaping the restrictions by developing substitute housing in other areas. Communities concerned with maintaining environmental quality or fiscal position often limit the supply of residentially zoned land as described above. Theoretical work by Stull (1974) has demonstrated that communities which direct land out of residential and into employment generating use may increase residential land prices as the supply of residential land is reduced and as increased employment raises the demand for residential land.

Figure 2 illustrates the impact of restrictive zoning regulations on the new housing market. The restriction of residentially zoned land which, as illustrated in Figure 1, serves to increase the price of residential land, minimum lot size and floor area requirements, architectural controls, and increased delays and administrative work caused by zoning ordinances all work to increase the costs per unit of building new housing. Graphically, this implies an upward shift of the supply curve from SS to S'S'. Also, the restriction of residentially zoned land means the supply curve becomes vertical earlier, and the need to require costly variances and re-zonings to develop in certain areas means the supply curve also starts getting steeper at a lower Q. For a given set of zoning regulations, the effect on the price of new housing will depend mainly on the price elasticity of demand for new housing. As seen in Figure 2, for a fairly inelastic demand curve, such as $D_1 D_1$, zoning restrictions will cause a large price increase, while for a fairly elastic demand curve, such as $D_2 D_2$, the price increase will not be so large.

Figure 2
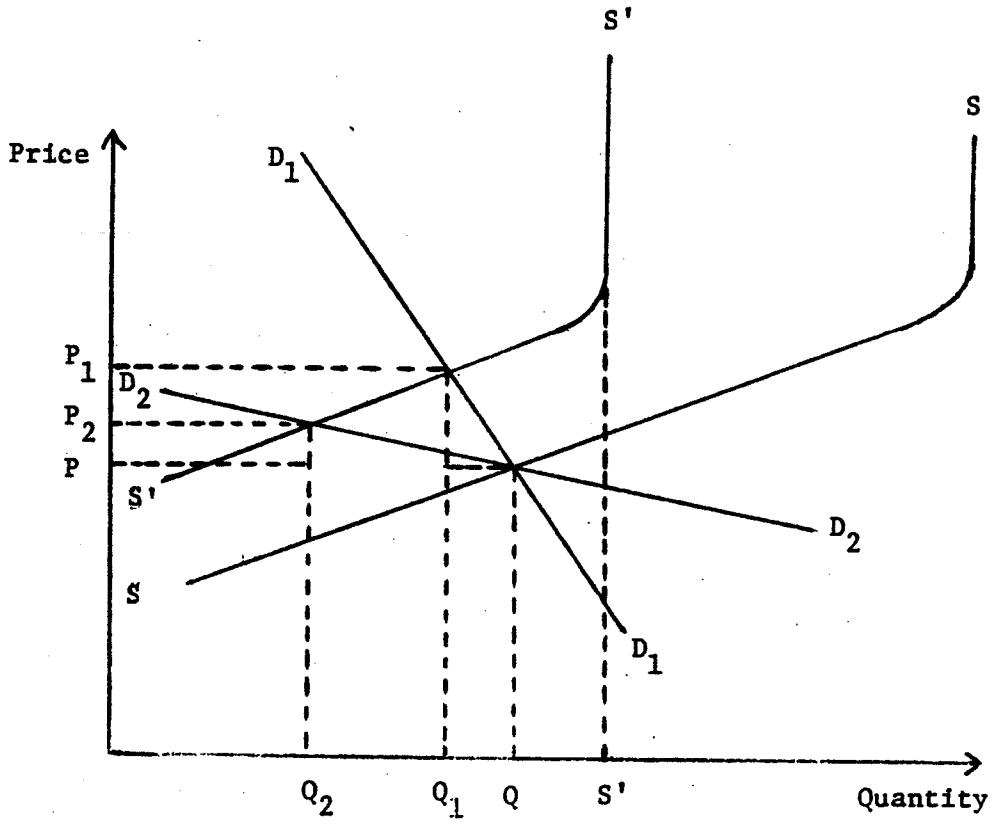
There have been several empirical studies on the effects of zoning on housing values. Crecine, Davis, and Jackson (1967) attempted to test directly for the effect on single family residential property values of those neighboring land uses which are typically separated by zoning because of their assumed negative impact on single family residential use. This study uses data on single-family parcels from various census tracts in Pittsburgh, Pa. In this study, "zoning externalities" which should be related to alternative land uses were proxied by the percentage of land in each neighborhood devoted to uses expected to have negative or positive effects on the price of single-family dwellings. The results of this study suprisingly showed that a parcel's land use environment did not appear to affect its value; Reuter (1973) did a similar study of the Pittsburgh area and discovered the same results. The authors concluded from their studies that neighborhood externalities were not operationally important features of a typical urban land market and that zoning has little effect on property values. Stull (1975) criticized Crecine et al.'s choice of dependent variable and omission of structural characteristics. T. Crone (1980) has noted that the chi square tests used by both Crecine et al. and Reuter to demonstrate the insignificance of zoning and externality effects are invalidly interpreted. The chi square test used by both studies to determine the randomness of the intervals depends on the independence of those significance levels for its validity. Since the estimated coefficients in a regression are not independent, the significance levels calculated from the estimates are not independent and the chi-square test is invalid. Moser, Riker, and

Rosett (1979) studied the effect of zoning and externalities on land
prices in Monroe county, New York. They found results that supported
the two Pittsburgh studies and concluded that zoning does not affect
the relative supply of land in each use category or the price of land.
This study, like the previous two, had methodological problems which
make the results of all of them inconclusive.

In contrast, Stull's (1975) results in his study of suburban
communities in the Boston metropolitan area differed greatly from
those found in the Pittsburgh and Monroe county studies. Stull's
findings support the traditional view that zoning acts to protect and
enhance the value of single family residential property. Stull used
the percentage of land in a community devoted to each major non-single
family use category as a measure of the effect of zoning and land use
environments on the value of single family homes. He found that house-
holds were sensitive to the land use environments in which they purchased
homes and that homeowners paid the highest premium to live in municipal-
ities which were predominantly single-family residential but also had a
small amount of commercial activity. The negative externalities associated
with certain uses were verified by Stull's finding that homes in areas
with large amounts of industrial, multifamily, commercial, and/or vacant
lots sold at a discount, ceteris peribus. The negative coefficient on the
vacant land variable may have picked up the effect of restrictions on the
supply of developable land as well as an externality effect. Stull's
study suffers from one important shortcoming. That shortcoming is that at
the community level the percentage of land devoted to non-single family

uses may not be a realistic measure of the negative effects of external

uses since the geographic area is not small enough to insure that the resi-

dences actually are subjected to the externalities. Still, with this

qualification the effects of alternative land use environments and

zoning arrangements do seem the best explanation of Stull's results.

Peterson (1974), in a study of suburban Boston housing values, also

found a substantial direct price effect of zoning after controlling for

neighborhood variables. In another study of the Boston area, French and

Lafferty (1978) also found results to support the conventional view that

certain land uses do have a deleterious effect on the market-value of

nearby single-family homes and that zoning can influence home values.

Although there is, conflicting empirical evidence, zoning's land supply

limitations and externality effects do seem to have some impact on land

and housing values. There clearly is a need for more research, especially

in an area where zoning has removed a large portion of land from the devel-

opable land supply.

In addition to reducing the supply of developable land, zoning can

also raise costs by restricting the intensity of development. Sternlieb

and Sagalyn (1972) found that large lot zoning directly raises the price

of land per unit and also indirectly raises house prices by leading to

larger floor areas and house sizes. Peterson (1974b) analyzed the impact

of zoning on undeveloped land prices in Fairfax county, Virginia and

found that density controls had a significant impact on land prices with

a price premium for higher density zoning that was considerable and varied

with distance from the central business district.

## SUBDIVISION REGULATIONS

Subdivision regulations also add significant costs to land development. Early subdivision ordinances required only the disclosure of certain engineering and surveying information as a prerequisite for plot approval. Present-day ordinances, however, often demand numerous on-site and off-site improvements and frequently involve complex and lengthy approval procedures. Sewers, streets, drainage and water lines, curbs, shade trees and many other public improvements which fifty years ago were typically built by the municipal government and financed by special assessments against property owners in the immediate neighborhood, have almost universally become the responsibility of the residential developer (Babcock and Bosselman, 1973).

The standards for subdivision design and the number of required improvements have increased drastically over the years. Although these regulations have generally improved residential environments, they have also substantially increased lot preparation costs. Subdivision regulations increase housing costs through increased and often excessive improvements requirements, the shifting of public service costs to the developer, delays, and the increased administrative, planning, and engineering costs of various fiscal and environmental impact assessments. Graphically, as shown in Figure 3, these increased costs represent an upward shift in the supply curve from S to S'. In a highly price-inelastic situation, such as given by $D_1$, the shift in the supply schedule from subdivision regulations will cause prices to rise steeply (P to $P_1$). Whereas in a price-elastic demand situation, prices will increase by much less (P to $P_2$).

Figure 3
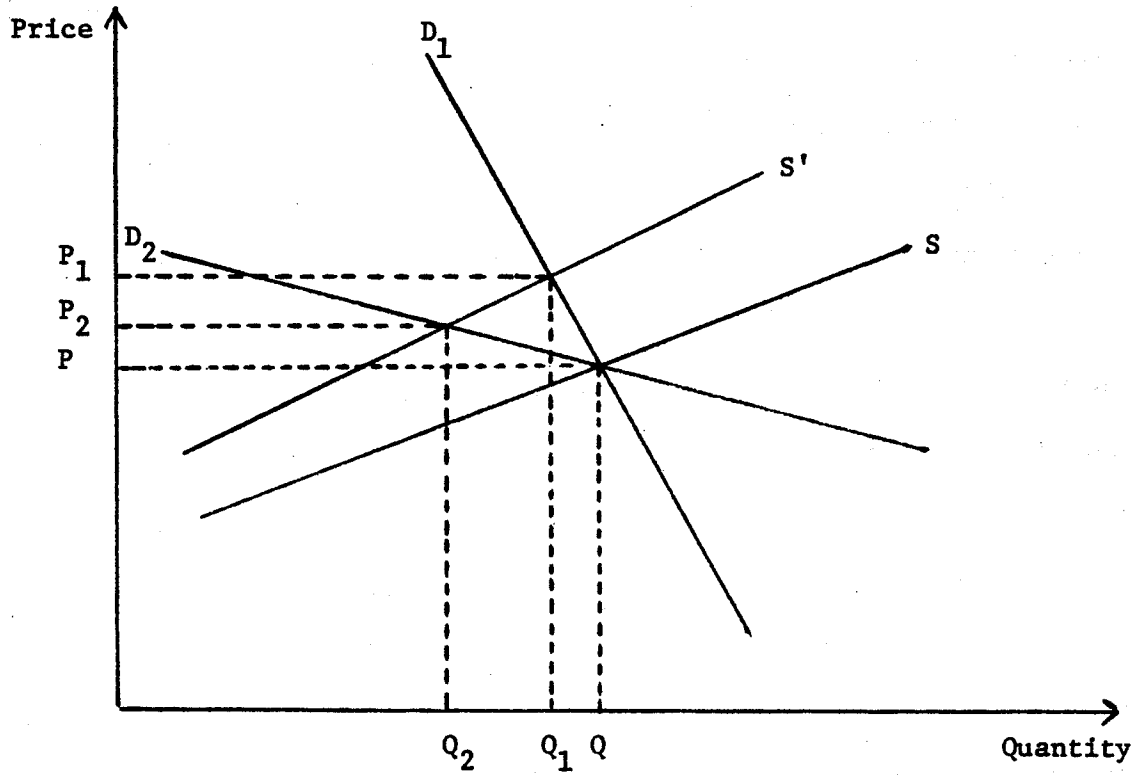
Also, in a highly price-inelastic demand situation the supply shift will have less of an effect on the amount of land developed than under more price-elastic demand conditions.

The first way that subdivision controls can increase housing costs is through the costs of unnecessary or excessive requirements. If a requirement is truly unnecessary to promote the "health, safety, and general welfare of the public" then the increase in costs must be directly attributed to regulation. Yet, the determination of whether a minimum standard or requirement is necessary or excessive is extremely difficult. Still, Babcock and Bosselman (1973) assert that subdivision ordinances frequently impose standards for improvements that add costs beyond what are needed for genuine consideration of public health and safety and which serve the purpose of increasing house prices to exclude moderate and low income families.

Some empirical work has been done on the impact of increased subdivision requirements on housing costs. In a 1976 study of New Jersey, Seidel[1] (1978) alleges that unnecessary site improvement costs, such as excessive sidewalk and utilities requirements, attributable to subdivision regulations increased total costs $877.17 per unit or 2.3 percent of the selling price of a unit. In a study of Jacksonville, Florida for 1976, the Urban Land Institute found that changes in water system standards and street width requirements added $830 to land development costs per unit (ULI and Gruen Gruen & Associates, 1977). Although it is quite difficult to separate unnecessary from necessary requirements, the literature

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[1]Seidel considers to be unnecessary those costs which an "experienced developer" would consider excessive.

suggests that excessive subdivision requirements do impose additional costs in many localities.

Subdivision regulations can also increase housing costs by shifting the public service costs of new development from the municipality onto developers themselves. Communities which have traditionally covered the bulk of public service costs of new residential development have become increasingly conscious of the fiscal impact of land development. This fiscal awareness is extremely acute in California under the influence of Propositions 13 and 4, two recent tax and spending limitations passed by statewide initiative. A recent survey of 64 San Francisco Bay Area communities revealed that over half of the communities use cost-revenue analysis in decisions concerning new residential development, and that over 60 percent indicated that consideration of this factor has become more important since the passage of Proposition 13 (Gabriel, Katz, Wolch, 1979, p. 16). The major instrument for communities to shift public facilities costs to developers has been the imposition of substantial fees and taxes as well as land and dedication requirements on new developments. The costs of public facilities and of processing the development is passed onto the developer through school impact fees, sewer and water connection or facilities fees, capital improvements fees, park fees, storm drainage fees, construction taxes, subdivision map filing fees, and miscellaneous other charges. In the San Francisco Bay Area, development fees on a 3 bedroom house range as high as $5000 in some communities, and the regional mean fee level was $1907.02 for a standard 3 bedroom home in the summer of 1979, with more fee increases to be expected under the continuing impact of Proposition 13 and the uncertainty caused by the new state spending

limitation   (Gabriel, Katz, Wolch, 1979).  Also, requirements for the
dedication of land for school and park sites can add substantial costs
to development.  In many cities, the developer can choose between dedicat-
ing land for recreation or paying a park dedication fee.  In the San
Francisco Bay Area, park dedication fees or the equivalent value in land
dedication can be as high as  $1800 per standard 3 bedroom unit   (Gabriel,
Katz, Wolch, 1979).  Although many fees reflect the actual costs of
providing services to the new development and, thereby, may be both
reasonable and desirable, there are also many examples where the efforts
to shift costs appear excessive since the revenues generated by the change
not only cover the costs of services to the new development but provide
services for the general community as well.  In this latter case, develop-
ment charges act as exclusionary instruments raising the costs of housing
and extracting surplus from the developers and potential residents for the
benefit of existing property owners.

Subdivision requirements as well as other land use regulations can
add substantial administrative and delay costs. Increased concerns by
municipalities over the environmental, social, and fiscal impacts of new
development mean  that many developers must invest much time and money
into analyzing development alternatives and their effects.  This increases
administrative, planning, engineering, and architectural costs.  A variety
of subdivision regulations also increase the amount of time spent on sub-
mittals, reviews, and negotiations with public officials.  The use of
fiscal and environmental impact analysis as well as the lengthy and uncertain

subdivision review procedure have greatly increased the time to obtain
development approval in recent years and can add prohibitive costs of delay
(Frieden, 1979). The carrying costs imposed by delay consists of the interest
costs of land development financing, the opportunity costs of the capital
tied up in the project, the additional property tax on the land, staff
costs, and other increased overhead costs. The uncertainty and risk
involved in the regulatory process may also increase the developer's required
profit margin. Seidel (1978) reports that most home builders estimate
that each additional month added to the completion date of a unit can
increase the final selling price of a unit by up to 1-2 percent. A
national survey of builders regarding the length of time necessary to
gain development approval found that in 1970 72.2 percent of the devel-
opers interviewed obtained approval to develop in less then 7 months and
only 2.8 percent required over a year to gain approval. By 1975, only
14.5 percent were able to gain permission in less then seven months and 58
percent needed over a year. (Seidel, 1978; p. 135).

While each particular subdivision regulation may not seem to add
that much to housing costs, the entire complex of subdivision requirements
can add substantially to housing costs through increases in land develop-
ment costs, land development financing and holding costs, administrative
costs, and fees and taxes.

## GROWTH MANAGEMENT SYSTEMS

The conscious and systematic control of growth by local governments
has spread rapidly throughout Northern California and other parts of the
country in recent years. Although there are a wide variety of growth
management techniques ranging from outright building permit moratoria to
fully developed growth management timing ordinances, all serve to greatly
increase municipal control over private development decisions. Localities
typically justify growth controls in terms of the benefits of improved
environmental quality, lower municipal service costs and property taxes,
and the preservation of small town character (S. Schwartz et al.,1979).
Proponents also assert that growth control practices enable communities
to better control suburban sprawl and the many problems connected with it.
Critics respond that growth controls act to exclude low and moderate
income households (Babcock and Bosselman, 1973; Seidel, 1978) and to
promote the immediate economic self-interest of property owners in the
growth control communities at the expense of losses imposed on current
renters and potential buyers and renters of housing in the growth control
communities (Ellickson, 1977).

Growth management programs are likely to have an important inflation-
ary effect on housing costs and housing prices. In theory, any growth
management system which works to restrict the supply of land available
for development will probably raise the cost of developable land and there-
by the costs of new housing since the increased probability of receiving
rents on parcels of land in the limited areas where development is allowed

will tend to increase the present value of those parcels (S. Schwartz et al., 1979; p. 11). The degree to which the increase in costs will be reflected in higher new housing prices depends on the elasticity of demand. The higher new house price will tend to increase the price of the municipality's entire housing stock. Also, if substitute housing is available in nearby jurisdictions which do not have strong growth controls, a shift in demand can be expected to occur which will raise prices in substitute areas. The overall impact of growth controls on housing prices in the growth management jurisdiction and in surrounding communities to a large extent depends on the amount of substitutable developable sites available in the surrounding municipalities and elsewhere in the region. If there are plenty of available, alternate sites then the restrictions imposed by the growth management program may not have a very serious impact on housing prices, but may only influence the location of demand. On the other hand, if development is restricted in much of the region and if demand is strong, such as in much of the San Francisco Bay Area, then growth controls are likely to have a significant inflationary impact.

Figure 4 illustrates the effect of a growth management program on the new housing market of the community imposing the program. The increase in residential land price from restrictions on the developable land supply, the usually heavy administrative and time costs imposed on developers by growth management, and the more expensive amenities often required to gain development approval will shift the supply curve upward from S to S'.

-21-

Figure 4

New Housing Market:  Growth Control Community
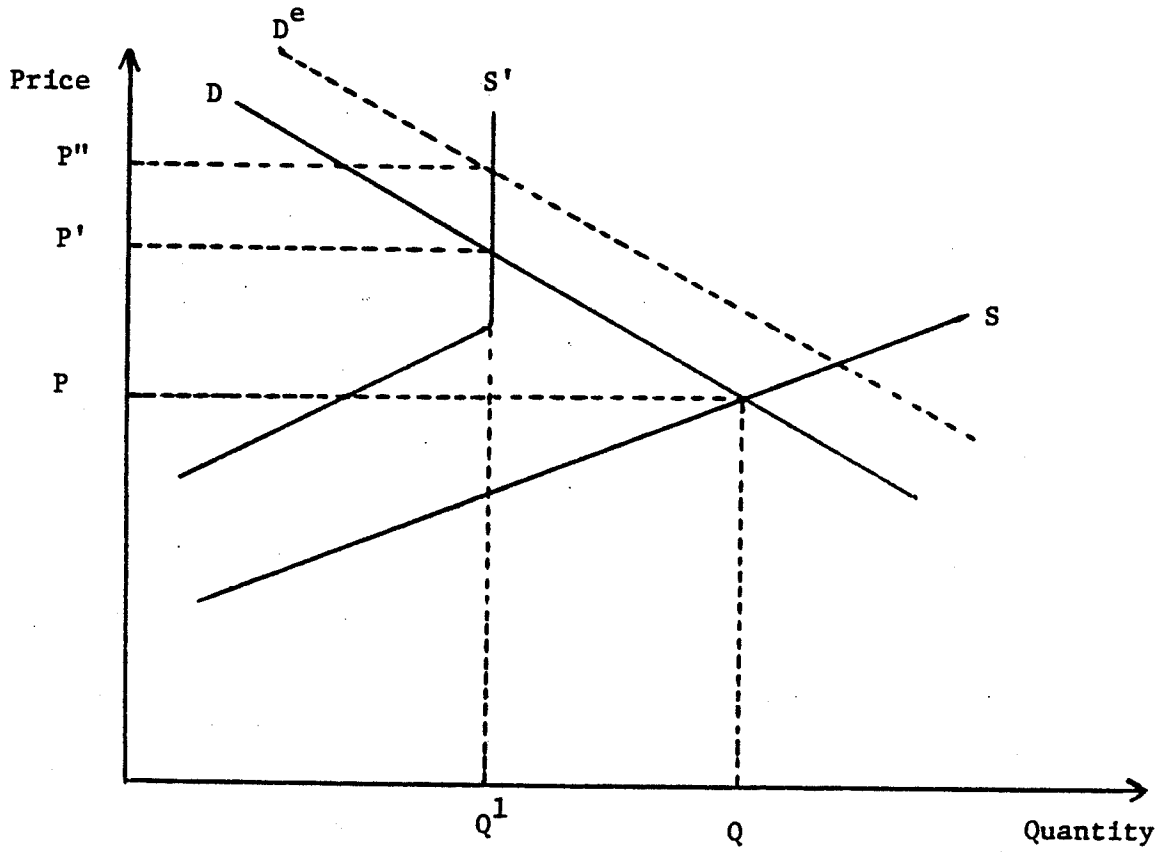
The limitation on the number of building permits or on the amount of land available for residential development in any given period will turn the supply curve vertical at a much earlier point. The effect of this supply curve shift is to raise new housing prices from P to P' and to reduce the quantity of new homes from Q to $Q^1$. Also, if growth management makes the community seem more desirable, possibly since it is more exclusive, then this increased desirability will increase demand for housing in the community. Graphically, this increased desirability effect causes a shift in the demand curve from D to $D^e$ and an even greater price increase from the growth management program (P to P").

The effect of growth management in one community on a nearby community with an interdependent new housing market is illustrated in Figure 5. To the extent that nearby communities offer a substitute housing market to that of the growth management city, demand will be shifted into those nearby communities. In Figure 5, this shift in demand is represented by the shift in the demand schedule from D to $D^1$. The effect of this increased demand on the new housing market depends on the elasticity of supply in the nearby community. In a highly elastic supply situation ($S_1$), prices will rise only slightly (P to $P_1$) and the number of homes built will increase greatly (Q to $Q_1$). On the other hand, if supply is fairly inelastic ($S_2$), the price increase will be greater (P to $P_2$) and the quantity effect smaller (Q to $Q_2$). Overall, the effect of growth management in one community on nearby communities depends on the degree to which housing in the nearby community is felt to be substitutable for that in the growth control community, the

Figure 5

New Housing Market:   Interdependent housing market in nearby community
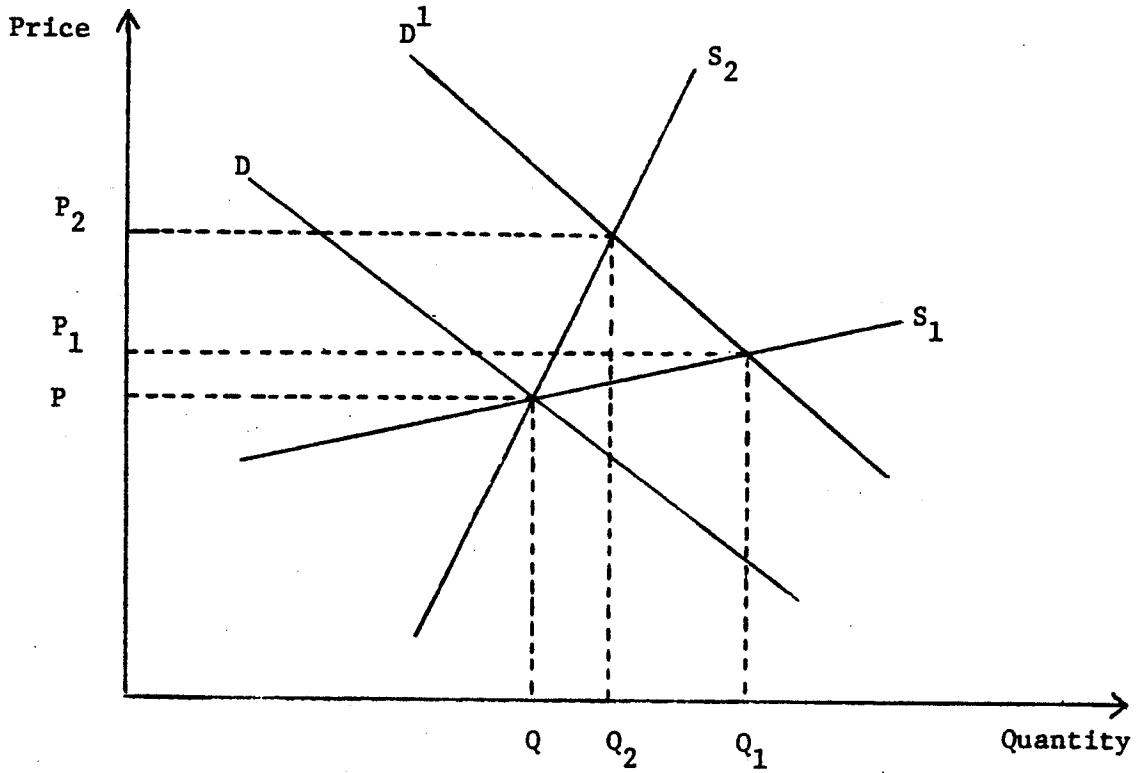
degree of restriction on development imposed by the growth management municipality, and the supply elasticity of housing production in the nearby community.

The equity impact of growth controls is also important to examine. This section relies on Ellickson's (1977) analysis of the distributive effects of growth management. Ellickson demonstrates that any type of growth control program tends to reduce the overall housing supply and increase housing prices. The major beneficiaries of controls are the owners of existing housing in the growth management jurisdiction since they gain from the increase in house value caused by the program. If the community becomes perceived as unique and demand becomes more inelastic, the benefits to existing homeowners increase. Conversely, the increase in new and existing housing prices and in rents, will adversely affect current tenants, all households moving into the community in the future, and potential residents who decide not to move into the city since prices have increased. The major losers will tend to be moderate and low income households who can no longer afford housing in the community, and are thereby effectively excluded. If nearby jurisdictions are good substitutes for the growth control city, then the demand for housing will increase in those communities and cause a housing price increase which benefits existing homeowners and imposes losses on renters and prospective residents. The more elastic the supply of housing in adjacent communities the smaller will be the price effects.

Communities attempting to control growth most frequently use a wide range of policy tools. A frequent case is the amalgamation of programs to restrict high municipal cost development, to plan for infrastructure requirements, to prevent the overcrowding of facilities, and to preserve open space and agricultural land through the stiffening of traditional devices such as zoning and subdivision ordinances and through the adoption of a more sophisticated growth management technique. Some examples of tools used specifically for controlling growth are adequate public facilities ordinances, growth management timing ordinances and building permit limitations, urban service areas, and building permit moratoria (Seidel, 1978).

Several jurisdictions have attempted to relieve pressures on the municipal treasury, prevent the overcrowding of public facilities, and control growth through the enactment of ordinances which mandate the availability of public facilities as a prerequisite for permission to develop. In San Jose, an adequate public facilities ordinance, measure B, was passed as an initiative in 1973 to help alleviate overcrowding in various schools by the control of residential development (Seidel, 1978; ULI, 1977). The ordinance made the availability of school-space a condition for approval to develop and placed a moratorium on residential building permits in certain areas unless they were approved by the school board and by the city council. This ordinance added to the city's growth control program which was established by its urban development policy in 1970. This policy partitioned San Jose into an urban service area, an urban

transition area and an urban reserve with most development limited to
the urban service area. Also, much land was designated as vacant and
removed from the developable land supply. The Urban Land Institute and
Gruen Gruen and Associates (1977), studied the effects of growth management
on housing costs in San Jose. They conclude that between 1967 and 1976
at least 20-30 percent of the housing cost increases their case study
identified could be directly attributed to local growth management
policies and that between 1968-1976 the price of one builder's standard
unit increased 121.3 percent with 43.4 percent of the increase related to
growth management policies. Still, these results must be treated
with some skepticism since land price increases were fully attributed to
growth management, although major portions were probably due to inflation
and other market factors, and since the increases in profits and costs
attributed to growth management are not clearly justified without a control
city for comparison.

Other communities have attempted to control growth through growth
management timing ordinances and/or annual building permit limitations.
In Ramapo, New York, the growth management system is based on phased devel-
opment controls which link development permits to the availability of
certain public facilities while directly controlling the location and the
timing of the latter. In Petaluma, California, the growth management
system combines ceilings on the annual number of units that can be built
by both type and location with various requirements relating to the avail-
ability of services, the quality of design, and the environmental and fiscal

impact on the community. Gleeson (1979) hypothesizes that the effect of these types of growth control timing ordinances is to segment the land market into distinct submarkets: those parcels that can be developed at a particular point in time and those that cannot because of public action.

Schwartz et al.(1979) examined the impact of Petaluma's growth management program on new housing prices in Petaluma and in the nearby communities of Rohnert Park and Santa Rosa. Schwartz et al.compared housing prices in Petaluma before and after growth control with the corresponding prices in Santa Rosa and Rohnert Park. They used dummy variables for city, time, interactive dummy variables between city and time, and three way interaction terms between city, time, and housing characteristics to estimate separate price equations for each city in each time period (before and after growth management). Schwartz et al.'s results showed that prices of "standard houses" increased significantly more in Petaluma than in Santa Rosa (by approximately 7 percent of the before-control value of the home). They assert that this price difference is mainly attributable to Petaluma's growth control program. Petaluma's prices also increased relative to Rohnert Park, but the increase was small and not statistically significant. This Schwartz et al. attributed to the strong interdependence between the housing market of Petaluma and Rohnert Park. A major problem with this explanation is that if the new housing supply in Rohnert Park were fairly elastic, then, unless housing in Rohnert Park and Petaluma were perfect substitutes, an effective growth

control program in Petaluma would increase prices in Petaluma a great
deal more than in Rohnert Park.  Schwartz et al. give no reason for
the supply to be highly inelastic in Rohnert Park.  In comparisons of
actual houses, Schwartz et al. found that much of the price increases
in Petaluma relative to Santa Rosa could be attributed to a substantial
increase in floor area.  They conclude that much of this increase in
floor area can be attributed to growth control since the evaluation
system under which building permit allocations are awarded was heavily
based in favor of high quality and generally larger units.  This
evidence suggests the Petaluma system may lead to a market reorienta-
tion towards larger and more expensive homes geared for higher income
buyers.  These results must be accepted with caution since the study
suffers from a serious flaw.  This flaw is that the price differences
attributed to growth control may actually have been caused by many
important factors which were not controlled for in their estimations.
For example, the price difference could have been produced by changes
in property taxes, public service expenditures or transportation
costs, all which were omitted from Schwartz el al.'s price equation.

Another growth management technique is the creation of "urban
service areas" or the designation of an urban limit line.  Urban limit
lines reduce the supply of developable land by restricting development
to serviced areas.  The expected effect of this type of growth manage-
ment system would be to segment land markets into developable and un-
developable portions.  Gleeson (1979) hypothesizes that this segmenting

would lead to a divergence in land prices between the developable and undevelopable segments. Also, the restriction on the supply of developable land should cause land prices in the developable portion to rise and, thereby increase housing costs. Gleeson (1979) examined the impact of ther urban limit line system in Brooklyn Park, Minnesota on land values. Gleeson found that the segmenting of the market into developable and undevelopable portions had a significant effect on land values in Brooklyn Park and that two-thirds of the difference in mean value, $1,463 per acre, between the developable and undevelopable portions could be attributed to the growth control system. Gleeson was unable to estimate the amount of increase in land price caused by the land supply restriction imposed by urban limit lines, but felt the abundance of available land in the region meant that land values in Brooklyn Park would represent little or no increase because of supply restriction.

A final major growth control tool is the building moratorium. A building moratorium refers to the freezing of the building permit - approval process usually in response to a lack of the adequate supply of some essential public service, notably sewers, water, or schools. The building moratorium has become one of the most common temporary devices for controlling growth. For example, a recent survey of 64 San Francisco Bay Area jurisdictions showed that since 1970 approximately half had imposed some sort of moratorium on residential development for some period of time  (Gabriel, Katz, Wolch, 1979; p. 167). The direct impact of a building moratorium is to restrict the supply of new housing (shift

.the supply curve leftwards with it eventually becoming vertical). This will tend to increase housing prices with the intensity of the impact depending on the extent and duration of the restriction and the elasticity of demand. Janczyk and Constance (1980) hypothesize that a building permit moratorium will also have important anticipatory impacts that occur before it takes direct effect. They suggest that large builders will in anticipation take out enough permits ahead of time to match the expected flow of demand over time and that prospective buyers will revise their overall expectations of price increases upward. Thus, the anticipatory input will be an outward shift of demand and supply. Janczyk and Constance found strong empirical evidence of both the anticipatory increase in permits and the direct impact reduction in permits in a forecasting model of a temporary moratorium in Rancho Cucamonga, California (Janczyk and Constance, 1980). Unfortunately, they did not estimate the price or cost effects of the moratoria. Much more empirical work is needed upon the inflationary effect of a building moratoria.

Although the ostensible goal of a growth control system is to reduce the fiscal, social, and environmental costs of growth to a community, these costs do not easily disappear and often the result is a shifting of the costs to other communities, to developers, and to prospective home buyers and renters. Overall, growth management systems have the potential of having a significant inflationary impact on housing prices. The restrictions on the supply of developable land

that result from most growth control practices lead to a higher price for developable land, and hence, to higher housing costs. Dowall (1979) hypothesizes that growth management timing ordinances are likely to have the greatest inflationary impact of any of the techniques examined. They tend to increase land costs by restricting development to serviced areas. Through the competition for development approval, residential allocation systems encourage developers to provide high-cost amenities which greatly increase land development costs and often force developers to reorient projects to a higher income market. Growth management programs are usually complex and often impose substantial administrative costs. Finally, Dowall asserts that growth management systems confer monopoly power on developers which allows them to increase profit margins and with them house prices (Dowall, 1979).

## BUILDING CODES

Although land-use regulations generally do not affect the prices charged for materials and labor used in house construction, regulations - such as minimum floor area ordinances, density controls, or growth management allocation systems - that require larger houses can greatly increase structural materials and labor costs. Structural costs can also be increased by the local variation in building and housing codes throughout the country. Building codes can add to housing costs through the costs of administrative inefficiencies in administering the code and through the costs of excessive requirements. Unnecessary delays and discretionary abuses by building officials can lead to increased costs (Seidel, 1978; p, 86). Building codes also are often burdened with provisions which may have had a basis in public health or safety many years ago but that presently serve to perpetuate unnecessary costs (Babcock and Bosselman, 1973; p. 17).

Muth and Wetzler (1976) attempted to estimate the impact of local building codes on housing costs using a dummy variable to indicate the presence of a locally modified building code. They concluded from their regression analysis that the average effect of local modifications of a national building code adds less than 2 percent to structure costs. On the other hand, Babcock and Bosselman (1973) found in a builder interview that building codes could add as much as 250 percent to structure cost in some areas of Ohio. Seidel (1978) cites evidence that in the 1970-5 period in Colorado increased safety requirements, such as smoke

detectors and flame retardant carpeting, amounted to $1,100 or 5 percent of the selling price of a typical Colorado house.  In analyzing these impacts, one must be cautious in making a cost-quality trade-off and in the fine line dividing a necessary from unnecessary health or safety requirement.

## ENVIRONMENTAL REGULATIONS

The initiating force behind much of the increase in land-use regulation was the tremendous increase in environmental consciouseness that occured in the late 1960's and the commitment it fostered to protect the physical environment from the damaging aspects of unrestrained suburban growth. Environmentalists characterize suburbia as inefficient and ugly, and attack sprawling developments as unnecessarily adding to public service and improvement costs as well as causing damage to the natural environment (Frieden, 1979). Environmental regulations and many growth management techniques have as their asserted primary objective that of providing for the more compact use of land and channeling developments into areas where it will not damage important features of the natural environment. While often serving their purpose of protecting the environment, these regulations frequently generate the corollary effects of increased housing costs and limiting the provision of moderately priced housing. Frieden (1979) reports that rather than showing a committment to guide the growth of the San Francisco area according to environmental principles, environmental groups have shown hostility to growth or development of any kind. Frieden asserts that the result of increased environmental regulation in the San Francisco Bay Area has been for developers to move to the fringes of the region and to build small conventional developments that do not attract much attention. Thus, the net impact of the regulation may be to lead to a return to old-style suburban sprawl, a situation which is even more costly at present with higher energy prices.

Environmental regulations may take the form of open space preservation plans, coastal land management regulations, and are often an important element of growth management programs. Probably, the most prominent of the specifically environmental land-use regulations is the environmental impact review (EIR). EIR procedures aim to assemble accurate measures of the major effects of new development on municipalities and regions and to apply this information to the land-use planning process. The analysis of the environmental impacts of development are contained in an environmental impact statement (EIS) whose preparation is usually the responsibility of the developer, who typically engages consultants. As of 1975, over half the states had begun to require EIR's for some types of development (Frieden, 1979; p. 16). EIR's can add to housing costs in several ways. An EIR imposes the direct costs of preparing the EIR and the costs of the public review of the impact statements. By the time a development reaches the formal environmental impact review stage, the developer has typically already bought the land and invested in various planning studies. This means that delays caused by the EIR process can impose significant carrying costs in terms of interest costs, overhead costs, and additional property taxes upon the developer. James and Muller (1977) estimated that delays from EIR's imposed costs that amounted to $160 a unit in Florida and $77 per housing unit in California. Regulations resulting from the EIR process may also increase the cost of housing by mandating expensive alterations in the physical characteristics of new residential

developments to comply with the requirements arising out of EIR.  James

and Muller (1977) estimated the per unit cost of EIR preparation, review,

and litigation in 1975 to be about $386 in southeastern Florida and $165

in San Diego, California.

The evidence suggests that EIR procedures do provide important

benefits in terms of a reduction of some of the adverse effects of un-

constrained development.  For example, in many instances, EIR's have

proved successful in altering development so to prevent increased traffic

congestion or the degradation of important wildlife habitats  (James

and Muller, 1977).  Although the EIR process can produce significant

benefits, it is difficult to compare the benefits with its costs since

the benefits fall mainly on existing residents, while the costs fall

primarily on developers and new home buyers.  Also, the costs of EIR

in terms of higher housing costs and diminished housing availability

are most likely to fall on moderate or low income groups.  The changes

in development plans that are often required for EIR compliance

usually lead to fewer units being built and to the reorientation of

the existing units to a higher income house buying group.

# LAND USE CONTROLS AND HOUSING COSTS:
## SOME EMPIRICAL EVIDENCE RELATING TO THE CALIFORNIA EXPERIENCE

It is quite clear from the numerous references in the literature that California has seen more extensive use of local land use and growth control techniques than elsewhere in the country. A number of the articles and books we have cited (Frieden, Schwartz, Dowall) have in case studies shown the negative consequences on housing costs of these policies. In this section of the paper we attempt to provide a more comprehensive assessment of these policies. First we compare land and housing costs in California with other states to see if there actually is a difference in the level and rate of change in developed land costs and housing prices. Second, we present the results of a detailed econometric analysis of the impact of land use policies across 64 communities in the San Francisco Bay Area.

It is a fairly well-known fact that California in general and the San Francisco and Los Angeles areas in particular have house prices which are the highest in the country, exceeding the national median by over 50%. What is not well-known, however, is that less than ten years ago California house prices were at the national median. This dramatic surge in California house prices has coincided with three other phenemona: a large increase in net migration to California from the rest of the country, a surge in household formations reflecting the maturation of the post World War II baby boom, and a massive increase in the use of land use and growth management techniques to slow and stop new housing production. While we contend that there is a direct causal

relationship between all these factors and the sharp relative acceleration in California house prices, by far, the most important element in the California house price rise is the stringent land use regulations that have been imposed in the mid and late 1970's.

Table I shows the large differences in land costs between California and other parts of the country. Land costs per square foot are nearly twice as high in California as any where else in the country, and are triple land costs in states with average land costs, such as Texas. An average tiny California lot costs nearly thirty-thousand dollars--over $140,000 per acre! This compares with a $10-12 thousand lot ($45,000 per acre) elsewhere in the country. A response to this high cost of land is that California lots are typically less than 1/5 of an acre, about 1/3 less than the U.S. average. Even with this smaller lot size, land costs comprise 27% of the value of new homes in California versus 18.7% nationally. As Table I also reveals, this high cost of developed lots in California, is not caused by the high price of rural farm land. California farm land values are in fact only a little above average and are far below values in places such as Illinois and New Jersey. It is also not caused by such factors as population density, higher income, or more compact urban areas---as many Eastern states surpass California in these statistics. In our view the main explanation for these higher developed lot costs is local land-use regulations.

TABLE I

LAND COSTS

-1979-

| | Average Cost of Lot (1) | Average Cost of Lot Per Square Foot (Dollars) (2) | Average Cost of Lot Per Acre (Dollars) (3) | Average Size of Lot (Acres) (4) | Average Cost of Farm Land Per Acre (Dollars) (5) | Average Sales Price of House (Dollars) (6) |
|---|---|---|---|---|---|---|
| California | 28,466 | 2.96 | 142,906 | .199 | 844 | 103,698 |
| Colorado | 12,613 | 1.44 | 69,750 | .181 | 297 | 71,034 |
| Florida | 12,049 | 1.13 | 54,477 | .22 | 838 | 58,277 |
| Georgia | 9,839 | .52 | 25,281 | .389 | 491 | 60,220 |
| Illinois | 16,484 | 1.57 | 76,029 | .217 | 1,484 | 83,270 |
| Michigan | 12,986 | .95 | 46,146 | .281 | 708 | 69,363 |
| Mississippi | 9,174 | .70 | 34,069 | .269 | 424 | 56,447 |
| Missouri | 10,427 | .89 | 43,065 | .242 | 560 | 68,756 |
| New Jersey | 16,486 | .98 | 47,204 | .341 | 1,884 | 71,019 |
| Texas | 9,689 | .96 | 46,245 | .209 | 320 | 63,474 |
| Virginia | 15,754 | 1.19 | 57,778 | .272 | 672 | 74,627 |

Source:  Derived from Proprietary Builder Survey and Department of Agriculture:  *Farm Real Estate*.

A further confirmation of this view is illustrated in Table II.  This table shows land and housing prices in 1976 and 1979, and the percentage change over this period.  It shows an increase in land costs in California which is nearly double that of any other part of the country.  It is precisely during this period that land use controls were becoming increasingly prevelant in California.  While these numbers seem hard to contradict we now proceed to a more rigorous econometric analysis of the cost of land use controls in the San Francisco Bay Area in 1979.

Table II

LAND COSTS AND HOUSING COSTS

1976 and 1979

| | Average Cost of Lot-Dollars Per Square Foot | | | Average Cost of House-Dollars Per Square Foot | | |
|---|---|---|---|---|---|---|
| | 1976 | 1979 | % change | 1976 | 1979 | % change |
| California | 1.57 | 2.96 | 88.5 | 36.01 | 54.81 | 52.2 |
| Colorado | .95 | 1.44 | 51.5 | 27.43 | 41.88 | 52.7 |
| Florida | .95 | 1.13 | 18.9 | 28.85 | 34.85 | 20.8 |
| Georgia | .45 | .52 | 15.6 | 31.99 | 34.35 | 7.4 |
| Illinois | 1.09 | 1.57 | 44.0 | 34.04 | 48.52 | 42.6 |
| Michigan | .72 | .95 | 31.9 | 30.93 | 40.05 | 29.5 |
| Missouri | .79 | .89 | 12.7 | 29.01 | 37.82 | 30.4 |
| New Jersey | .79 | .98 | 24.1 | 31.27 | 36.87 | 17.9 |
| Texas | .69 | .96 | 39.1 | 24.34 | 36.54 | 50.1 |
| Virginia | .87 | 1.19 | 36.8 | 31.95 | 42.26 | 32.2 |

Source:  Derived from Proprietary Builder Survey.

# AN ECONOMETRIC TEST OF THE IMPACT OF GROWTH
## CONTROLS IN THE SAN FRANCISCO METROPOLITAN AREA

In order to test the impact of land use and growth management tech-
niques on the cost of housing in the San Francisco metropolitan area, a
cross-section hedonic price model was developed.  Data on home sales for
64 communities for the period from January to June 1979 was obtained from
the Society of Real Estate Appraisers Data Base.  These data provided
information on sales price, size, age, and condition of houses which were
sold in the sample time period.  Community means were constructed from
the raw individual transaction data for each of the housing data series.

Data on other variables such as income, journey to work, property
taxes and local public expenditures, were obtained from various state
and county agencies.

Finally, data on growth controls and the fees associated with
growth management were obtained from two extensive Land Use Policy Surveys
of local officials done in 1979.  Most of the data on specific growth
management policies were derived from a mail and telephone survey by
the Center for Real Estate and Urban Economics.  Data on fees and charges
were also obtained from a Survey of Development Fees by The Association of
Bay Area Governments.

The basic model we developed is represented by a simple hedonic
house price equation.  House prices in community X were a function of
housing characteristics, such as size (in square feet) and age of the unit,
community characteristics, such as income, property tax rates, and commute

time to downtown San Francisco, and of course land use variables. Since the land use variables were constructed from our surveys they need further explanation.

Our major land use variable concerns the presence of a growth moratoria or a growth management plan in the community which affects all new residential single family development. If the community had such a plan in effect for at least two years prior to 1978 then it was assigned a value of 1. If there were a shorter moratoria or a recently instituted growth plan the community was assigned a value of 1/4 to 3/4 depending on answers to other survey questions which indicated the degree of anti-growth sentiment in the locality. Communities that had no moratoria or growth management plan were assigned a value of 0. Still, this variable probably underestimates the actual impact of a growth control program since it does not account for spillover effects into nearby communities.

The second land use variable is merely the sum of development fees per unit acquired for a small single family home development in the community. It combines the CRUE and ABAG Development Fee surveys.

We summarize our empirical specification in equation (1).

(1)  HPJJ79 = f(SQFT79, AGE79, INC,

where  TRANS, PTAX79, LUM, FEES)

HPJJ79 = Mean sales price in dollars
of house sold January-June 1979

SQFT79 = Mean square footage of
house sold January-June 1979

AGE79 = Mean age in years of
house sold January-June 1979

INC  = Median income in dollars

TRANS  = Commute time to San Francisco
in minutes

PTAX79 = Local property tax rate in 1979

LUM  = Land use control index based on moratoria
and growth management plans

FEES  = All development fees in dollars for
a typical single family house

Two potential problems arise if the parameters of equation (1)
are estimated by ordinary least squares. The first is due to possible
heteroskedasticity in the error terms. This might arise because of the
large differences in the size of jurisdictions in the sample, and the
substantial variance in the number of sales transactions occuring in each
community. To **correct** for heteroskedasticity a weighted least squares equation
was estimated, with each data series weighted by the term 1/square root
of sales transactions.

A second potential difficulty could be caused by the possible
correlation between the error term and the size of houses and income of
the community. As stated earlier more stringent land use controls could,
through exclusionary effects, lead to a community having larger houses
and higher income households. These simultaneous relationships can be
handled by a two stage least squares estimation proceduce. In fact, the
nature of our data make this procedure unnecessary. Our land use
variable does not capture directly zoning and subdivision regulations
(other than fees) which are the prime deteriments of house size and
quality. Also, our housing data is for all traded housing units, not

just new construction, and the moratoria and fee measures of land use restrictions are probably too recent to have dramatically effected the size of all houses traded on the secondary market. Finally our income variable represents a lagged observation and so simultaneity biases should not be present.

With these qualifications in mind the parameter estimates of equation (1) are shown in Table III. The basic specification, a log-log weighted least squares regression is shown in column 1. All the key control variables in the equation, with the exception of the journey to work variables, have coefficients with the correct signs which exceed their standard error by a factor of 2. Larger houses and older houses command higher prices. Higher income communities and lower property tax communities also bring higher prices. Longer commute times have only a marginally statistically significant negative impact on house price. Finally our measure of land use stringency (LUM) has a coefficient over three times its standard error, indicating a strong positive impact on house prices. The linear version, an unweighted version, and the two stage least squares weighted version of this equation presented in columns (2), (3), and (5) confirm these results. They also indicate that a community with a growth moratoria in effect for more than two years will have house prices $20-30,000 higher than a comparable non-moratoria community. This amounts to between an 18-28% increase in housing costs attributable to these land use regulations.

Table III

## HEDONIC PRICE EQUATION
## SAN FRANCISCO METROPOLITAN AREA

| Variable | Log-Log WLS (1) | Linear WLS (2) | Linear OLS (3) | Log-Log WLS (4) | Log-Log WTSLS (5) |
|---|---|---|---|---|---|
| SQFT79 | 1.388 (.162) | .126 (.019) | .107 (.015) | 1.57 (.187) | 1.29 (1.17) |
| INC | .278 (.136) | .00087 (.00135) | .0025 (.0011) | .243 (.148) | .350 (.892) |
| AGE79 | .115 (.025) | 1.0015 (.379) | 1.149 (.333) | .111 (.032) | .117 (.056) |
| PTAX79 | -.710 (.095) | -20.03 (2.93) | -20.23 (4.94) | -.862 (.129) | -.698 (.254) |
| TRANS | -.0599 (.0464) | -.339 (.173) | .056 (.163) | -.107 (.052) | -.048 (.168) |
| LUM | 3.036 (.900) | 30.003 (7.529) | 20.27 (6.23) | 2.76 (1.06) | 3.009 (1.98) |
| FEES | — — | — — | — — | .35 (.34) | ¬ — |
| Constant | -7.28 (.54) | -.38 (.15) | 33.93 (30.84) | -8.22 (.78) | -7.35 (1.36) |
| $\bar{R}^2$ | .991 | .987 | .931 | .989 | .991 |
| n (observations) | 64 | 64 | 64 | 55 | 64 |

Finally, column (4) shows a version of the basic model with the development fee variable included. It has the correct sign but is not statistically significant, indicating that in our sample development fees on new houses are not reflected in higher existing home prices in the community.

## Conclusion and Summary

This paper has summarized, through a careful review of the literature and the presentation of some simple theoretical models, the impact of local land use regulations on the price of land and the cost of housing. Some preliminary empirical research on California and the San Francisco Bay Area indicates that land use regulations have had a substantial impact on house prices. Our regression analysis indicates that growth moratoria and growth control plans have raised prices between 18-28% in those San Francisco communities where they are present. These results are not surprising given the widespread use controls in many communities which of course limits the available supply response in neighboring communities. Spread of these techniques to non-California metropolitan areas clearly will have negative consequences on the affordability of housing for the maturing post-World War II baby boom cohort now entering the housing market.

# Bibliography

Babcock, Richard F., and Bosselman, Fred P. *Exclusionary Zoning: Land Use Regulation and Housing in the 1970's.* New York: Praeger Publishers, 1973.

Crecine, John P.; Davis, Otto A.; and Jackson, John E. "Urban Property Markets: Some Empirical Results and Their Implications for Municipal Zoning." *Journal of Law and Economics* 10 (1967): 79-99.

Crone, Theodore M. "A Role for Zoning in the Control of Externalities." An unpublished dissertation prospectus, University of California, Berkeley, May 21, 1980.

Dowall, David E. "The Effect of Land Use and Environmental Regulations on Housing Costs." *Policy Studies Journal* 8 (1979): 277-88.

Ellickson, Robert C. "Suburban Growth Controls: An Economic and Legal Analysis." *The Yale Law Journal* 86 (Jan. 1977): 385-511.

French, H.E., and Lafferty, Ronald N. "Community Environment and the Market Value of Single Family Homes: The Effect of the Dispersion of Land Uses." *Journal of Law and Economics* 21 (1978): 381-94.

Frieden, Bernard J. "The New Regulation Comes to Suburbia." *The Public Interest,* no. 55 (1979), pp. 15-27.

Gabriel, Stuart; Katz, Lawrence; and Wolch, Jennifer. "Local Land Use Regulation and Proposition 13: Some Findings From a Recent Survey." Program in Real Estate and Urban Economics Working Paper No. 80-4. Berkeley: University of California, September, 1979.

Gleeson, Michael E. "Effects of an Urban Growth Management System on Land Values." *Land Economics* 55 (1979): 350-65.

James, Franklin J. and Muller, Thomas. "Environmental Impact Evaluation, Land Use Planning, and the Housing Consumer." *AREUEA Journal* 5 (1977): 279-301.

Janczyk, Joseph T., and Constance, William C. "Impacts of Building Moratoria on Housing Markets Within a Region." *Growth and Change* 11 (1980): 11-19.

Maser, Steven M.; Riker, William, H.; and Rosett, Richard N. "The Effects of Zoning and Externalities on the Price of Land: An Empirical Analysis of Monroe County, New York." *Journal of Law and Economics* 20 (1977): 111-132.

Muth, Richard F., and Wetzler, Elliot. "The Effect of Constraints on Housing Costs." *Journal of Urban Economics* 3 (1976): 57-67.

Ohls, James C.; Weisberg, Richard; and White, Michelle J. "The Effect of Zoning on Land Value." *Journal of Urban Economics* 1 (1974): 428-44.

Peterson, George E. "The Influence of Zoning Regulations on Land and Housing Prices." Washington, D.C.: The Urban Institute, 1974a.

Peterson, George E. "Land Prices and Factor Substitution in the Metropolitan Housing Market." Washington, D.C.: The Urban Institute 1974b.

Reuter, Frederick H. "Externalities in Urban Property Markets: An Empirical Test of the Zoning Ordinance of Pittsburgh." *Journal of Law and Economics* 16 (1973): 313-49.

Sagalyn, Lynne B., and Sternlieb, George. *Zoning and Housing Costs: The Impact of Land Use Controls on Housing Price.* New Brunswick, New Jersey: Rutgers University, Center for Urban Policy Research, 1972.

Schwartz, Seymour I.; Hansen, David E.; Greer, Richard; Moss, William G.; Belzer, Richard. "The Effect of Growth Management on New Housing Price: Petaluma, California." Davis, Calif.: Institute of Governmental Affairs, University of California, 1979.

Seidel, Stephen B. *Housing Costs and Government Regulations.* New Brunswick, New Jersey: Center for Urban Policy Research, 1978.

Stull, William J. "Community Environment, Zoning, and the Value of the Single Family Home." *Journal of Law and Economics* 18 (1975): 535-557.

Stull, William J. "Land Use and Zoning in an Urban Economy." *American Economic Review.* 64 (1974): 337-47.

Urban Land Institute, and Gruen Gruen and Associates. *Effects of Regulation on Housing Costs: Two Case Studies.* Washington, D.C.: Urban Land Institute, 1977.

Urban Land Institute. *Management and Control of Growth: Issues, Techniques, Trends, and Problems.* Washington, D.C.: Urban Land Institute, 1975.

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