Does the Federal Tax Treatment Of Housing Affect the Pattern Of Metropolitan Development?

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To encourage home ownership, the United States tax code treats the financing and sale of housing differently from most other goods. For example, the interest payments on your home mortgage and your property taxes are deductible from your federal income taxes while the interest on your credit card bill for your vacation to Paris is not. Furthermore, the profit you make on the sale of your house may be exempt from capital gains taxation, but similar profits on your mutual funds are not. These special provisions in the tax code–the deductibility of mortgage interest and property taxes from federal income taxes and the special treatment of capital gains on the sale of owner-occupied housing–effectively lower the cost of owner-occupied housing relative to other goods. Lowering the after-tax cost of owner-occupied housing favors home ownership because it gives owning a financial advantage over renting for higher income house-

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holds that can take advantage of these provisions.[1]

While providing an incentive for home ownership, the special status of owner-occupied housing in the federal tax code has other consequences as well. One is its effect on the level of investment in housing: by lowering after-tax housing costs, the tax code encourages increased investment in housing because households buy larger houses and bigger lots than they otherwise would.[2] An area that has been the focus of far less attention is the potential impact of tax incentives on the patterns of metropolitan development.

Relative to metropolitan areas in other developed countries except Australia, U.S. metropolitan areas have very low densities. The densest metropolitan area in the United States, New York, with 5561 people per square mile, is far less dense than typical metropolitan areas in Europe. For example, Paris has 12,489 people per square mile, Amsterdam 13,152, and Stockholm 13,294.[3] Asian metropolitan areas are even denser, with Hong Kong topping out at 75,992 people per square mile. Not only are U.S. metropolitan areas less dense than their counterparts outside the United States, American central cities, with the exception of New York City, tend to be less dense as well.

Of course, European and Asian countries typically have less land overall for their populations, and therefore, one might expect that their cities and metropolitan areas would have greater population density. Furthermore, European cities were developed largely before the automobile, which partially explains their higher density. The impact of the automobile can be seen in American cities as well: older American cities tend to be denser than those developed after cars became the dominant means of transportation.

Land availability and city age do not tell the whole story, however. Toronto, for example, is nearly twice as dense as the New York metropolitan area, despite the fact that land is abundant in Canada and that Toronto's development has been relatively recent. In Europe, Sweden is less dense overall than the United States, yet its largest metropolitan area, Stockholm, is far denser than any U.S. metropolitan area.

Metropolitan areas throughout the world have been decentralizing, but the pace of decentralization has been especially rapid in the United States. Most U.S. central cities have experienced not only population declines relative to their suburbs but absolute population declines as well. Some declines in central city population have been dramatic; for example, St. Louis lost nearly half of its population from 1960 through 1990. Cleveland, Pittsburgh, Detroit, and Buffalo all lost more than 38 percent of their populations over the same period. Among the 20 largest U.S. central cities that did not expand their geographic borders, only Los Angeles and Miami significantly gained population.[4] In contrast to most U.S. central cities, the central cities of most large Canadian metropolitan areas have

[1]Technically, the deductibility of mortgage interest and property taxes from federal income taxes provides a tax advantage only because the imputed value of rental income of owner-occupied housing is not taxed. Landlords can deduct mortgage interest and property taxes from federal income tax, but they must pay taxes on the rental income they receive from tenants. Home owners, on the other hand, do not pay taxes on the implicit rental income of the house. The tax advantages of owner-occupancy are offset, to some extent, by the ability of landlords to depreciate their property.

[2]See the article by Edwin S. Mills and the articles referenced therein for estimates of the effects of tax-related housing subsidies on the level of housing investment.

[3]The international comparisons have been computed by Peter Newman and Jeffrey Kenworthy and are published in *Cities and Automobile Dependence: An International Sourcebook*, Brookfield: Gower Technical (1989). The data are for 1980; unfortunately, more recent internationally comparable data are not available.

[4]See the 1997 Working Paper by Joseph Gyourko and Richard Voith.

continued to grow, although at a slower pace than their suburbs.

Not only have most U.S. cities lost population, but the 20 largest central cities that did not expand their boundaries became poorer relative to their suburbs (Table 1). In 1960, city per capita incomes averaged 93.2 percent of suburban incomes, and eight of the 20 cities had higher average per capita incomes than their suburban neighbors. By 1990, city per capita incomes averaged only 75.3 percent of suburban per capita incomes, and only two cities had average incomes greater than or equal to those of their suburban neighbors. Even though real income grew in all cities during the period, real income in the city grew at a much slower pace than in the suburbs, so per capita income in all 20 cities fell relative to that in their suburbs.

Most observers of U.S. metropolitan development, with its low density and increasing concentration of low-income households in the center, assume that this pattern is simply a result of American preferences for open space, of the abundant supply of land, and of changes in transportation and communications technology. This pattern, however, may reflect not only people's tastes and technological change but also the relative costs of housing and land, which, in part, reflect the tax advantages of owner-occupied housing. While mortgage interest and property taxes have long been deductible from federal income taxes, the value of these deductions for high-income households increased significantly in most of the second half of the century as marginal tax rates for these households increased.[5] The impact of these subsidies on pat-

TABLE 1

Ratios of City Per Capita Income to Suburban Per Capita Income

1960, 1990, and Change from 1960-1990

	1960	1990	% Change 1960-90
Detroit	0.92	0.54	-41.3
Baltimore	0.91	0.64	-29.7
Milwaukee	0.85	0.63	-26.9
Oakland	1.02	0.75	-26.5
Miami	0.87	0.67	-23.0
Cleveland	0.69	0.53	-23.2
Buffalo	0.89	0.69	-22.5
Atlanta	1.14	0.89	-21.9
Philadelphia	0.83	0.65	-20.7
Minneapolis	1.08	0.86	-20.4
Chicago	0.82	0.66	-19.5
Cincinnati	1.01	0.82	-18.8
St. Louis	0.76	0.64	-15.8
Washington	1.00	0.86	-14.0
Pittsburgh	1.02	0.88	-13.7
San Francisco	0.95	0.82	-13.7
Seattle	1.18	1.03	-12.7
New York	0.75	0.68	-9.3
Boston	0.87	0.81	-7.9
Los Angeles	1.07	1.00	-6.5

Source: Income data are from the County and City Data Book Consolidated File 1947-77 (tape), County and City Data Book 1983 (tape), and County and City Data Book 1994 (CD ROM). All dollar values are deflated using the national CPI, with 1982-84=100.

[5]The marginal tax rate for households with incomes that are twice the median income trended upward from about 22 percent in 1955 to over 40 percent in 1981. Marginal rates for these households declined considerably after the tax law changes in 1981, 1982, 1984, and 1986 but, at 28 percent, remain higher than in the 1950s. Note there has been very little change in the marginal rate for median income households. See the paper by Leonard Burman, William Gale, and David Weiner.

terns of metropolitan development is long term in nature, so that the full consequences of changes in the value of deductibility may not be fully realized for decades. The extent to which the long-run consequences of public policy, rather than people's tastes, have led to the dispersed pattern of development and the relative decline of U.S. central cities is an important policy question.

SUBURBANIZATION: PREFERENCES AND TECHNOLOGY OR POLICY?

Preferences and changes in technology are undoubtedly important factors driving the decentralization in U.S. metropolitan areas. Traditional models of metropolitan development suggest that improvements in transportation and communication technologies, as well as growth in income, result in increased decentralization. Improvements in transportation and communications reduce commuting costs and increase the desirability of residential parcels farther from employment centers. At the same time, advances in production technologies lessen the need for centralized production facilities and thereby make central locations for residences less imperative. The pace of technological change augments decentralization in another way: better technology increases our productivity and makes us wealthier. Higher income, in turn, increases the demand for larger houses on larger lots, thus leading to less dense patterns of development.

These traditional urban models are consistent with geographic sorting by income, with wealthier residents living in suburban locations, but the framework does not necessarily imply that wealthier households choose only suburban residences. From a theoretical point of view, the choice between a city or a suburban location for higher income households depends on two factors that work in opposite directions. On the one hand, higher income increases the demand for land, and this demand encourages more dispersed, suburban locations where land is in abundant supply. On the other hand, higher income imports greater value to people's time, and a more distant location may involve more time spent commuting. Given a household's budget and prices for housing and transportation, people's preferences—how much they value housing, land, and time—determine where they choose to live and how much land they consume. Although most high-income communities in U.S. metropolitan areas are suburban, there are many exceptions. For example, the upper East Side of Manhattan and the Golden Mile in Chicago are dense, central city areas that have many high-income residents.

Many economists have argued that the observed U.S. pattern of development reflects unique American preferences for low density living that have resulted in wealthier households' outbidding lower income households for low density suburban housing. Economists Edwin Mills and Peter Mieszkowski call attention to the role of preferences:

> "The older, smaller, centrally located units, built when average real incomes were lower, filter down to lower income groups. This natural working of the housing market leads to income stratified neighborhoods, and there is a tendency for low income groups to live in central locations, and for affluent households to reside in outlying suburban areas. *The majority of the middle class apparently prefers larger single family lots in the suburbs to denser multi-family residences in the central city.*" (emphasis added)[6]

People's preferences, however, do not exist in a vacuum. Even if people have strong preferences for houses on large lots, the lot size they choose will be affected by the price they have to pay.

[6]Note that in the absence of an assumption of preferences for low density living, sorting by income in the traditional monocentric model could just as well result in higher income households' choosing city residences.

The costs of housing and transportation, which have been affected significantly by public policies, may play an important role in establishing the U.S. pattern of metropolitan development.

THE ROLE OF THE FEDERAL TAX TREATMENT OF HOUSING

Tax breaks for owner-occupied housing amount to about $65 billion annually.[7] These tax breaks increase demand for housing. The extent to which the increased demand simply increases the price of houses rather than the amount of housing investment depends on how developers respond. If developers do not increase the supply of housing, the market price of houses simply rises until there is no change in after-tax housing costs and therefore no change in the rate of housing investment. Economists say that the tax break is "capitalized" into the price of the house. On the other hand, if housing supply readily adjusts, the market price of houses rises very little and the after-tax cost of housing falls, encouraging individuals to buy larger houses on bigger lots.

There is a wide range of estimates on how extensively federal tax breaks are capitalized into the price of housing. In a recent paper, Todd Sinai estimated that about 20 percent of the value of federal tax breaks for housing are capitalized into the price of houses, although earlier papers found much higher capitalization rates.[8] Also, capitalization rates are likely to differ widely across communities. In suburban communities on the urban fringe where land is in abundant supply, developers can easily increase the rate of construction in response to an increase in demand. In those communities, we would expect an increase in housing subsidies to result in increased construction rather than increased prices. However, in dense, fully developed communities, housing subsidies are more likely to be capitalized into house prices because there is less land available for new housing.[9]

To the extent that part of the value of tax deductions is capitalized into the value of a house, tax breaks help maintain the high values of residential properties in communities with high-income residents. Even if tax breaks are not capitalized, eliminating deductibility or reducing its value would lower the demand for housing, especially for large houses, which would result in a short-run oversupply of these homes. The ex-

[7]There is a range of estimates for the aggregate value of housing tax breaks. For 1999, the Treasury Department estimates the mortgage interest and property tax deduction will reduce tax receipts by $72.1 billion (Auten and Reschovsky). Todd Sinai estimates that current tax breaks for mortgage interest and property tax deductions reduce tax payments by about $56.2 billion per year. Using simple assumptions regarding house values and marginal income tax rates, I estimate the value of deductions to be about $65 billion, an amount that falls between the above two estimates.

For comparison, federal highway expenditures, which are often cited as a factor in promoting decentralization, totaled $19.4 billion in 1994, less than one-third the value of tax breaks for owner-occupied housing. Source: Table 83, *National Transportation Statistics, 1996*, U.S. Department of Transportation, Bureau of Transportation Statistics. Note that the federal highway expenditures are not subsidies for highways, since the bulk of the expenditures is financed by user fees. However, the new highway investments make decentralization feasible, and frequently, new highway investments are located in fast-growing suburban markets on the urban fringe. In my paper "Transportation Investments in the Philadelphia Metropolitan Area: Who Benefits? Who Pays? And What Are the Consequences?" I show that in the Philadelphia area, per capita highway expenditures benefiting suburban residents are about 2.5 times the size of those benefiting city residents. Because suburban residents also drive more, they also pay proportionately higher user fees.

[8]See, for example, the paper by Jesse Abraham and Patric Hendershott.

[9]Because older developed communities compete with communities on the urban fringe, the extent to which federal taxes can be capitalized into prices is limited. Local taxes and subsidies, however, are more likely to be fully capitalized because of the competition among communities for residents.

cess supply of large houses would result in declining values for these properties until natural growth in demand restored the balance between supply and demand.

Because the value of deductibility varies across individuals of different incomes, and because the extent of capitalization differs across communities, the special tax treatment of housing is likely to affect the population, land use, and demographic composition of communities. The total effect of the tax treatment will depend on the choices of individuals and communities.

Deductibility: Effects on Individual Choices. A key feature of housing's special tax status is that the value of the deductibility of mortgage interest and property taxes varies with income. Because individuals' marginal tax rates generally increase with income, the value of housing-related deductions also increases. In addition, higher income people are more likely to purchase larger houses with bigger mortgages and higher property taxes. Therefore, deductibility is more valuable for higher income households (Table 2).[10] As house values and incomes rise, the value of deductibility increases rapidly. A wealthy household that owns a $500,000 house

TABLE 2
Ownership-Related Deductions In Excess of the Standard Deduction*

House Prices	Interest + Property Taxes	Interest and Property Taxes - Standard Deduction	Assumed Marginal Rate	Value of Deductions for Assumed Tax Rate
$20,000	$1,660	($4,890)	.15	$0
$25,000	$2,075	($4,475)	.15	$0
$35,000	$2,905	($3,645)	.15	$0
$45,000	$3,735	($2,815)	.15	$0
$55,000	$4,565	($1,985)	.15	$0
$65,000	$5,395	($1,155)	.15	$0
$75,000	$6,225	($325)	.15	$0
$85,000	$7,055	$505	.28	$141
$95,000	$7,885	$1,335	.28	$374
$112,500	$9,338	$2,788	.28	$781
$137,500	$11,413	$4,863	.28	$1,362
$162,500	$13,488	$6,938	.28	$1,943
$187,500	$15,563	$9,013	.28	$2,524
$225,000	$18,675	$12,125	.31	$3,759
$275,000	$22,825	$16,275	.31	$5,045
$350,000	$29,050	$22,500	.36	$8,100
$450,000	$37,350	$30,800	.36	$11,088
$500,000	$41,500	$34,950	.36	$12,582

*There are five key assumptions underlying the calculations in Table 2: 1) a loan to value ratio of 80 percent; 2) mortgage interest rate of 8.5 percent; 3) an effective property tax rate of 1.5 percent; 4) the standard deduction, which is forgone for those choosing to itemize their tax deductions, is equal to $6550; and 5) household income is consistent with house values using the rule of thumb that house values are 2.5 times annual household income. Note that we ignore the possibility that households have other deductions such as large medical bills or local income taxes that make itemization more attractive. In addition, we do not analyze the complex phase-out provisions for very high income households.

could save more than $12,500 annually from deducting mortgage interest and property taxes. Thus, mortgage and property tax deductions represent large incentives for higher income people to purchase more expensive houses that typically are on larger tracts.[11] Because suburban communities have a greater supply of land, they have a competitive advantage in producing large houses on large lots; therefore, tax deductions increase the number of households choosing suburban communities.

The housing deduction alone, however, cannot explain geographic sorting by income. As I show in my 1998 paper with Joe Gyourko, the differential value of housing-related tax deductions, when taken in isolation, simply results in high-income households' increasing their land consumption more than low-income households, but not in high- and low-income households' choosing different communities. When there are restrictions on land use such as minimum-lot-size zoning, however, the differential tax advantages for housing can provide a financial incentive for high- and low-income people to locate in separate communities. Because these restrictions prevent low-income households from buying small parcels, and because low-income households do not benefit from tax-related housing subsidies, they are likely to find the parcels in communities with large minimum lot sizes unaffordable. By the same token, the tax advantages make the large parcels more attractive to higher income households that enjoy lower after-tax costs. Thus, the tax code indirectly promotes suburban communities for high-income households and provides incentives for low-income households to concentrate in older, denser city neighborhoods. (See *The Geographic Distribution of Housing-Related Tax Savings*.)

Deductibility: Effects on Community Choices. The twin factors of reduced after-tax housing costs and subsidies that increase with income affect not only the housing and location choices of individuals but also communities' choices. In particular, they affect communities' decisions regarding the provision of public amenities and the use of zoning restrictions, such as minimum lot sizes, to exclude low-income residents.

In high-income communities, property tax deductibility lowers the cost of providing local amenities, such as schools and parks, that are financed by property taxes. For example, a community in which all residents were in the 36 percent tax bracket could raise $1 million in property tax revenue for schools, but its residents would pay only $640,000 because of deductibility. For a community composed of moderate-income residents who find it most advantageous to use the standard deduction, the local residents would pay the full $1 million for school funding. By lowering the after-tax cost of local amenities for high-income communities, deductibility is likely to increase the investment in public amenities in these communities. Thus, deductibility not only makes these communities more financially attractive, it also helps them become relatively more attractive in terms of the amenities they offer their residents.

A potentially more important consequence of the special tax status of housing is its effect on suburban communities' choices regarding large-lot zoning and other land-use rules that restrict

[10]The most striking aspect of Table 2 is that owners of houses valued at $75,000 or less are not likely to receive any benefit from deductibility. For these owners, it is in their interest to use the standard deduction–which they can take whether or not they own their housing–instead of itemizing their deductions. According to the IRS, 77 percent of all U.S. taxpayers use the standard deduction and less than 40 percent of home owners use the mortgage interest and property tax deductions. Some home owners choose not to hold mortgages and, therefore, do not itemize, but they still receive the benefit of implicit rental income that is not taxed.

[11]More expensive does not always mean more land. Large apartments in Manhattan are very expensive, for example, but consume very little land.

The Geographic Distribution Of Housing-Related Tax Savings

Geographic sorting by income, coupled with deductibility whose value increases with increases in income and house value, has striking implications for the distribution of housing-related tax savings across communities. Almost 57 percent of all owner-occupied homes in central cities were valued at less than $80,000 (Table A), and thus their owners were unlikely to derive any benefit from the deductibility of mortgage interest and property taxes (see Table 2 on page 8). In the suburbs, where average house values and household incomes are higher, the corresponding figure was only 37 percent. The high concentration of high-income households and large houses in suburban communities means that the tax savings associated with deductibility disproportionately benefit residents of suburban communities. In fact, roughly $49.5 billion of the $65 billion in tax breaks were claimed by residents of suburban communities, while the corresponding figure for city residents was one-third as high, only $15.4 billion (Table B).[a]

TABLE A
Distribution of Owner-Occupied Homes by Price
Metropolitan Areas Only, Inside and Outside Central Cities (CCs)
1990

Total Owner-Occupied Homes in Metro Areas:	44,045,859
Owner-Occupied Homes in CCs of Metro Areas:	14,588,932
Owner-Occupied Homes Outside CCs, Metro Areas:	29,456,927

House Price Ranges	Central Cities			Outside Central Cities		
	# in Range	Percentage	Cumulative	# in Range	Percentage	Cumulative
<$20,000	591,186	4.1	4.1	465,891	1.6	1.6
$20,000-$29,999	823,806	5.6	9.7	651,505	2.2	3.8
$30,000-$39,999	1,270,521	8.7	18.4	1,153,439	3.9	7.7
$40,000-$49,999	1,490,195	10.2	28.6	1,706,889	5.8	13.5
$50,000-$59,999	1,463,435	10.0	38.7	2,082,127	7.1	20.6
$60,000-$69,999	1,448,369	9.9	48.6	2,450,430	8.3	28.9
$70,000-$79,999	1,204,672	8.3	56.8	2,443,166	8.3	37.2
$80,000-$89,999	921,292	6.3	63.2	2,097,099	7.1	44.3
$90,000-$99,999	740,000	5.1	68.2	1,857,961	6.3	50.6
$100,000-$124,999	1,073,677	7.4	75.6	3,109,044	10.6	61.2
$125,000-$149,999	784,544	5.4	81.0	2,581,582	8.8	69.9
$150,000-$174,999	604,012	4.1	85.1	2,079,698	7.1	77.0
$175,000-$199,999	460,717	3.2	88.3	1,550,566	5.3	82.3
$200,000-$249,999	588,717	4.0	92.3	1,894,954	6.4	88.7
$250,000-$299,999	383,578	2.6	94.9	1,167,916	4.0	92.7
$300,000-$399,999	362,124	2.5	97.4	1,099,998	3.7	96.4
$400,000-$499,999	154,511	1.1	98.5	456,855	1.6	97.9
$500,000+	223,814	1.5	100.0	607,806	2.1	100.0

Source: U.S. Census: General Housing Characteristics (CH-1-1).

TABLE B
Annual Value of Subsidy (Tax Breaks)
By Home Price and Location
Within Metro Area[b]

Home Price Ranges	Central City	Outside Central City
<$20,000	$0	$0
$20,000-$29,999	$0	$0
$30,000-$39,999	$0	$0
$40,000-$49,999	$0	$0
$50,000-$59,999	$0	$0
$60,000-$69,999	$0	$0
$70,000-$79,999	$0	$0
$80,000-$89,999	$130,270,689	$296,529,799
$90,000-$99,999	$276,612,000	$694,505,822
$100,000-$124,999	$838,004,899	$2,426,608,842
$125,000-$149,999	$1,068,156,656	$3,514,823,893
$150,000-$174,999	$1,173,293,310	$4,039,813,365
$175,000-$199,999	$1,162,619,350	$3,912,853,301
$200,000-$249,999	$2,212,840,024	$7,122,658,348
$250,000-$299,999	$1,935,246,905	$5,892,428,199
$300,000-$399,999	$2,123,204,400	$8,909,983,300
$400,000-$499,999	$1,713,217,968	$5,065,608,240
$500,000+	$2,816,027,748	$7,647,415,092
Total	$15,449,493,947	$49,523,228,700

[a]These figures are based on 1990 data from the American Housing Survey. See my 1997 paper with Joseph Gyourko for details. According to the 1990 census, 40 percent of the metropolitan population lived in the central city. Note that only 24 percent of the value of deductibility accrued to residents of central cities.

[b]These figures overstate the total tax breaks because they are based on a loan to value ratio of 80 percent, which exceeds the market average. The assumptions here are the same as those for Table 2, page 8.

how parcels of land can be used. There are a number of reasons communities adopt zoning regulations. But one reason they adopt large-lot zoning is that residents of small, low-priced housing may not generate enough property tax revenue to cover the costs of providing the local public services they use. Minimum lot-size requirements can make residence in the community unaffordable for low-income households. In my 1998 paper, I show that the special tax treatment of housing reinforces communities' incentives to adopt restrictions that effectively limit access by low-income households.[12]

The tax code provides incentives for communities to adopt restrictive zoning rules through its effect on the relative cost of housing for high- and low-income households. The income tax code encourages high-income households to choose large lots while leaving low-income households' demand for large lots unchanged. (Remember, low- and moderate-income households' housing costs are unaffected by tax breaks because they generally find it advantageous to take the standard deduction.) The tax code encourages a high-income community to set high minimum-lot-size restrictions that do not affect the choices of high-income people (because their desired lots are at least as large as the minimum, given their subsidy) but effectively make the community unaffordable for low-in-

[12]See my August 1998 mimeo.

come residents. As the value of the tax deduction rises, the difference in the desired lot size between high- and low-income households becomes larger, thus a rising subsidy effectively lowers the cost to the community of imposing this barrier to low-income households.[13]

On the flip side, if there are extra costs associated with having low-income households in the community, more extensive sorting will negatively affect the communities that have larger concentrations of low-income residents effectively excluded from other communities.[14] The increasing concentration of low-income residents in these communities, which are usually older, dense urban centers, forces these communities to either raise taxes or reduce services. These adjustments make them less competitive with suburban communities, so the additional zoning restrictions induced by the tax code spur further decentralization and lower density development. The very policies that encourage home ownership also encourage geographic sorting by income when there are restrictions such as zoning.

HOW LARGE IS THE IMPACT OF DEDUCTIBILITY?

Deductibility affects metropolitan-area land use directly through its impact on how much land households demand and where they choose to live and indirectly through its impact on communities' choices regarding public amenities and zoning. While it is extremely difficult to precisely determine the magnitude of either the direct or indirect impact, it is possible to make some estimates of the direct impact on residential density and, through simulation, to evaluate the potential consequences of the indirect effects.

Deductibility and Residential Density. Deductibility's most direct effect is on individuals' demand for residential land because deductibility reduces the after-tax cost of residential land. If we know how sensitive people's land consumption is to the cost of land and if we know how much deductibility changes the after-tax cost of land, we can estimate the direct effect of deductibility on residential land use in a metropolitan area. Using a large data set on house sales in Montgomery County, a suburb of Philadelphia, Joseph Gyourko and I have estimated that a 10 percent reduction in the after-tax cost of land would yield a 10 percent increase in the desired residential lot size.[15]

On average, the mortgage interest and property tax deduction lowers the after-tax cost of residential land and housing roughly 15 percent.[16] Given our estimate of the effect of price on lot size, this implies that the mortgage interest

[13]In my 1998 mimeo, I show that increases in tax-related housing subsidies for high-income households can increase the likelihood of the adoption of restrictive zoning rules even if low-income households do not impose extra costs on high-income ones. Assuming the objective of the suburban community is to maximize the value of its land, this occurs for two reasons. First, as subsidies increase, more low-value agricultural land is converted to high-value residential land for each high-income resident as his or her land consumption increases with the subsidy. Second, constraining low-income residents in the city results in a much higher city-to-suburban relative rent, so that more high-income people choose suburban locations than would be the case without zoning restrictions.

[14]See Janet Rothenberg Pack's paper "Poverty and Urban Public Expenditures," for a discussion of the higher cost of providing public services to low-income households.

[15]In the jargon of economists, this is a price elasticity of -1.0. The econometric problem of estimating the relationship between quantity of residential land demanded and the price of land is extremely complex because, in general, we do not observe the price of land. Instead, we observe the price of housing, which includes both the land and the structure. As discussed in my 1998 mimeo with Joseph Gyourko, it is possible to estimate this relationship if the appropriate kind of data, such as our data on housing sales in Montgomery County, are available.

deduction directly reduces residential density 15 percent. The estimated impact on residential density must, however, be interpreted with caution for at least two reasons. First, while the housing subsidy makes the after-tax cost of housing lower than the market price, the subsidy may be partially capitalized, thus raising the market price of houses. To the extent that increases in market price offset the tax advantage, the increase in land consumption will not be realized. In fact, if supply does not adjust to changes in demand at all, the housing subsidy will be offset by increases in the market price. Second, the direct effects on individual decisions do not capture the indirect effect of deductibility on communities' choices regarding zoning policies.

Deductibility and Residential Zoning. Because deductibility lowers the costs, for high-income families, of imposing zoning restrictions, it has an impact on people's choice of community, residential sorting by income, and metropolitan density. It is nearly impossible to directly evaluate how large this impact is because it involves fundamental shifts in the community's laws. If, for example, a change in the tax code ultimately caused a community to adopt very large minimum-lot-size zoning, the outcome in terms of who lives in the community, the size of residential lots, and the levels of public amenities might be dramatically different than if the community did not choose large-lot zoning.

In my paper on the relationship between the tax treatment of housing and zoning, I conducted numerical simulations of a variety of models to evaluate how larger tax breaks for housing affect suburban communities' choices regarding zoning, and, in turn, how these choices affect where high- and low-income households choose to live, the size of residential lots, and the relative amenities of city and suburban communities.[17] While these simulations are only illustrative, they suggest that the *indirect* effects of deductibility on community zoning choices may have more important consequences for metropolitan development than the *direct* effects on individuals' choices.

In most cases, these simulations suggest that increases in housing subsidies for high-income households increase the attractiveness of zoning policies that limit access by low-income households.[18] In a typical simulation, if the subsidy becomes large enough, it can cause suburbs to adopt restrictive zoning (Figure 1). The number of wealthy households residing in the city slowly declines as the subsidy increases to 15 percent, then shifts dramatically downward before it resumes its slow decline as the subsidy increases further.[19] The shift occurs because the suburban community can increase the total value of its land by shifting from no zoning to exclusionary zoning. Remember, Figure 1 illustrates only the *potential* large effect; the actual magnitudes of impact depend on the type of model used and should not be taken literally.

The simulation also provides interesting information about the changes in residential land consumption by high-income households. Residential land consumption rises smoothly as subsidies rise because the after-tax cost of land for high-income households falls even though the market price of land rises (Figure 2). When the

[16]See the paper by James Poterba for a discussion of the tax-related subsidy to owner-occupied housing.

[17]These simulation models are fully described in my 1998 paper "Does the U.S. Tax Treatment of Housing Create an Incentive for Exclusionary Zoning?"

[18]The subsidy is defined as the percentage reduction in the after-tax cost of housing relative to the before-tax flow of housing services.

[19]In this simulation, *households* are choosing their favored communities and lot size given the after-tax prices of land, while *communities* are choosing whether to pursue zoning policies that effectively exclude lower income households (Figure 1).

community shifts to a zoning plan that excludes low-income households, however, land consumption jumps to a much higher level, then resumes its smooth upward path. The average amount of land acquired by each home owner increases because the price per acre of land falls when the community shifts from no zoning to restrictive zoning. The aggregate value of the community's land, however, increases because more land is converted from low-value agricultural use to residential use as more high-income people move to the community and purchase homes on larger lots. Once again, the path of housing consumption shown in Figure 2 illustrates only the potential effects of individual and community responses to housing subsidies.

The bottom line of the simulation is that individual responses to changes in the tax treatment of housing are unlikely to capture the full effect of such changes on the pattern of metropolitan development. If one focuses only on individual responses to housing subsidies, one might conclude that they have

FIGURE 1

Community Zoning Choice and Number of High-Income People In the City

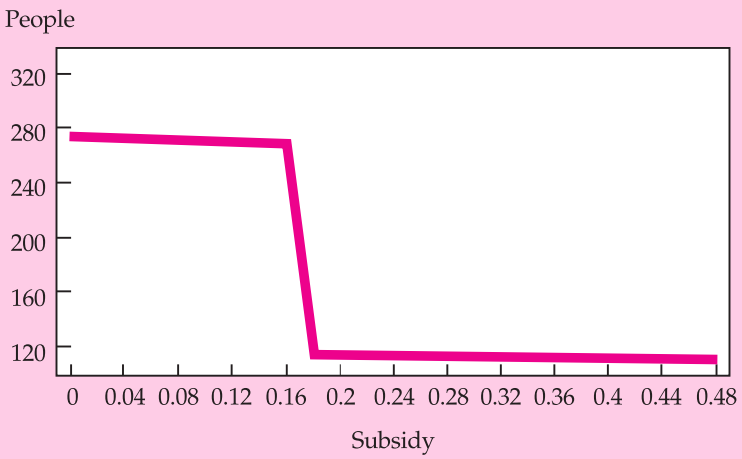
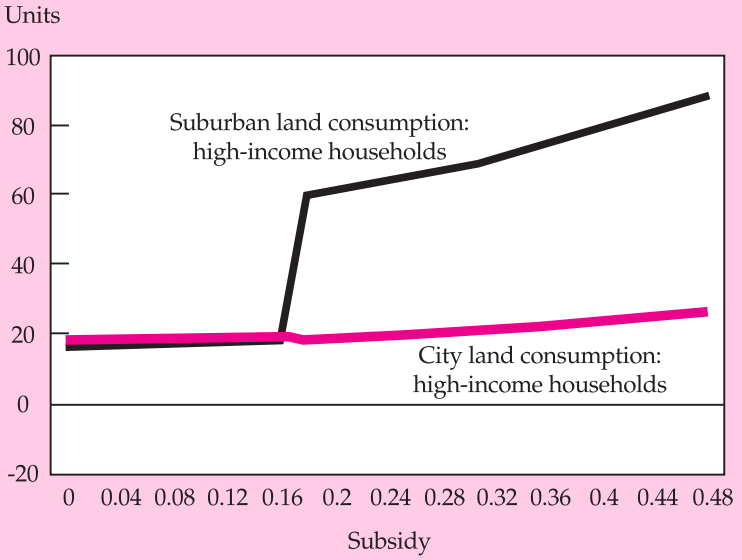


FIGURE 2

Community Zoning Choice and Suburban Land Consumption By High-Income People



increased decentralization and concentrated low-income households in central cities. But one might also conclude that the subsidies have not changed the pattern of metropolitan land use that is characterized by higher income households predominantly choosing to live in low density suburban communities. If one considers the possible community responses as well, one might reach a substantially different conclusion: potentially, the tax treatment of housing can fundamentally change the pattern of metropolitan development. When subsidies induce communities to institute restrictive zoning policies, such as large minimum-lot sizes, such policies may have a large impact on where high- and low-income households choose to live, the size of lots households buy, and the fundamental levels of public services and amenities provided by the community.

CONCLUSION

The U.S. tax treatment of housing affects household choices regarding where to live and how much land to consume. It also affects communities' incentives regarding their provision of public amenities and their adoption of zoning policies that exclude low-income households. Deductibility tends to magnify the impact of other economic forces that lead to decentralization and geographic sorting by income. Housing subsidies directly increase the amount of land households wish to consume, and when there is zoning, they increase the likelihood that high- and low-income households will choose separate communities. Indirectly, deductibility lowers the cost of providing public amenities for communities with primarily high-income households. More important, deductibility lowers the cost of restrictive zoning and makes it more likely that suburban communities will pursue such policies.

Because deductibility affects not only individuals' incentives but also communities' incentives, it is difficult to judge the size of the total contribution of deductibility to decentralization or geographic sorting by income. Estimates suggest, however, that for U.S. metropolitan areas, the direct impact has lowered density about 15 percent. Housing tax policy may have had even larger effects on the patterns of metropolitan development and sorting through its effect on community zoning choices. Our simulation models suggest that the impacts of housing tax policy on zoning choices could alter the basic pattern of development rather than just the degree of decentralization. As many urban communities struggle with high concentrations of poverty, and as suburban communities confront challenges associated with rapid, decentralized development, our analysis suggests that the mortgage and property tax deductions may make it more difficult to cope with these challenges.

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