Is Agricultural Zoning Exclusionary?

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Selected Paper prepared for presentation at the Agricultural & Applied Economics Association 2011 AAEA & NAREA Joint Annual Meeting, Pittsburgh, Pennsylvania, July24-26, 2011

Abstract

In rapidly suburbanizing areas, minimum lot sizes of ten acres or greater are often used to discourage residential development and to maintain agricultural critical mass. Because of significant development pressure in these places, there is a good chance these lot size regulations will bind. Such "down-zoning" often appears alongside the purchase of agricultural and conservation easements that reduce housing development even more.

Whatever the benefits of such policies for agriculture and the environment, they raise obvious concerns about housing supply and affordability. The issue of affordability should be analyzed at the regional scale, since we would normally expect some high-income, low density enclaves to exist within any metropolitan area. In addition, the analyst should look beyond median home price to compare the distribution of a region's available housing stock to the distribution of its income. A primary hypothesized effect of large-lot zoning is that it skews the distribution of available housing upward relative to the distribution of income.

The present study will use a unique dataset on the New Jersey Highlands region to help answer the fundamental question posed by its title. This dataset includes historical data on the lot size minima imposed on every residential acre in the 83 Highlands municipalities, as well as real estate listing data on thousands of residential transactions in these 83 municipalities. Data from the U.S. Census are used to examine the distribution of income among New Jersey residents who ought to be served by the housing stock in the Highlands.

The study finds that in the 1990s and 2000s, the stock of Highlands housing was skewed high relative to the metropolitan incomes available to purchase it, even with renters excluded from the analysis. Using a simple threshold of three times household income, the bottom 30% of households were consistently able to afford fewer than 30% of the homes coming on the market, while the top earners could afford a disproportionately large share of the available housing. At the same time, the study was unable to document a deterioration in Highlands housing affordability in the 1990s and 2000s that was attributable to anything other than the national housing bubble. Down-zoning is likely to affect the mix of housing types on the margin, while the majority of real estate transactions involve homes that were built several decades ago. This suggests either a separate analysis of new construction, or a longer time series on home types and prices that would capture the effects of restrictive zoning over several decades.

Introduction

This paper presents new data on whether agricultural zoning is exclusionary. This claim is often made by the opponents of such zoning, including farmers' trade associations. It is also made by low-income housing advocates who seek greater access to rural areas for low-income populations.

We begin by defining the relevant terms. "Agricultural zoning" will be defined as large minimum lot sizes (e.g., four to twenty acres) on land that is undeveloped and is suitable for either agriculture or residential development. In our study area within New Jersey, zones labeled agricultural generally allow homebuilding by right. The only thing that makes these zones agricultural is that they are currently farmed and existing lot-size regulations greatly reduce their development potential. Either the land in these zones continues in agriculture, or it is subdivided into five-acre estates (or larger) that few New Jerseyans can afford. No other uses are permitted according to the zoning ordinance.[1]

"Exclusionary zoning" is the term normally applied to zoning that effectively excludes homebuyers below a certain income level: for example, below the average income of incumbent residents. The term is also used to denote attempts to exclude minorities from a particular town (Pendall 2000). Given the lower average income of minorities in the U.S., the first of these effects virtually guarantees the second, so that the true motive behind exclusionary zoning can be difficult to discern (Ihlanfeldt 2004; Bogart 1993).

[1] Some large-lot zoning ordinances have a lot-size averaging feature, which encourages homes on lots smaller than ten acres next to open space that is permanently preserved. When this option is selected, overall density at the subdivision scale must still be one unit per ten acres. In some cases it can be slightly higher as part of an incentive to cluster development rather than build homes at the maximum density in the usual checkerboard pattern. This incentive is known as a "cluster bonus."

Given these definitions, it would seem that a ten-acre lot size minimum in an area designated agricultural would automatically qualify as exclusionary. The reality, however, is more complicated. A community that enforced ten-acre zoning in its agricultural zone, but permitted ten units per acre in a large residential zone nearby, could hardly be characterized as a place that allows only large country estates. To many urban planners, agricultural zoning has three goals that are fully consistent with residential inclusion. These planners would argue that agricultural zoning maintains critical mass in farming in the short run, concentrates residential development elsewhere in the community, and maintains a contiguous stock of land that can be deployed in the future if necessary. Agricultural zoning is thus viewed as part of a process of orderly development, not permanent preservation. The expectation is that large-lot zoning in agricultural zones will be relaxed as soon as population pressure becomes great enough to justify doing so.

What we need, then, is a definition of exclusionary zoning that is more forgiving in terms of time and space. For purposes of the present paper, exclusionary zoning will be said to exist if it leads to a distribution of housing stock within the metropolitan area (or a sufficiently large portion of the metropolitan area) that is skewed high relative to the income distribution of potential homebuyers. This more regional definition of exclusion also helps to address the argument – common among academics if not practitioners – that exclusionary zoning by individual communities is benign, even efficiency-enhancing, provided that a large selection of communities and housing types exists at the level of the metropolitan area (Hamilton 1976; Fischel 2005).

This definition of exclusionary zoning will be explored using a unique cross-section time series dataset on agricultural/residential zoning in the New Jersey Highlands, an area encompassing 83 municipalities that became the subject of a new regional planning initiative in 2004 (see Gottlieb, 2005). We argue that this region is so large, it really ought to accommodate the full diversity of incomes in northern New Jersey. Over the last thirty years, however, minimum lot sizes on agricultural land in the Highlands have been increasing, while a significant amount of open space has been permanently barred from development (Rudel, *et al.*, 2011). Our

hypothesis is that these policy choices increased the average price of housing in the Highlands and contributed to an increase in the proportion of housing units at the upper end of the price distribution. These trends, in turn, should cause a comprehensive measure of housing affordability to deteriorate.

A literature review is followed by a description of the data. The results section includes histograms for zoned acres, residential transaction prices, and the lot sizes of homes that have been sold in multiple years. The key indicator of affordability is based on home prices as a multiple of household income. Using an innovative method that is similar to the Lorenz curve (Gan and Hill 2009), the entire distribution of home prices in each year is compared to the entire distribution of northern New Jersey incomes. The effect of the national housing bubble is controlled away by adjusting mean income upward over time so that it tracks the time trend in the quality-controlled price of housing in the New York metropolitan area. This allows us to isolate the main hypothesized effect of restrictive zoning, which is to skew the distribution of available housing upward. Without this adjustment, the effects of zoning and of the housing bubble are effectively combined. Those results are also reported.

Past literature on exclusionary zoning

The last decade's housing bubble generated new concerns about housing affordability, along with many works seeking to explain both the causes of the bubble and the differences in its intensity across metropolitan areas. Among the more influential works in the latter category have been those by Glaeser and Gyourko (Glaeser and Gyourko 2003; Glaeser, Gyourko, and Saks 2005). These authors argue that what needs to be explained is not the gap between U.S. home prices and incomes, but rather the gap between home prices and construction costs. This is because construction costs provide us with a market standard of a fair price that can be used as a starting point for affordability analysis. Glaeser and Gyourko are especially concerned that metropolitan areas with very large gaps between home prices and construction costs use zoning and other regulations to restrict new housing supply. Their theoretical arguments and empirical results provide support for this view, as against alternative

explanations like especially strong business demand or a shortage of developable land. Thus Glaeser and Gyourko have given new life to the old critique of suburban zoning as exclusionary, a theme that has also been taken up by a handful of academic planners (Levine, 2006).

The idea that large-lot zoning and related regulatory restrictions increase home prices is, of course, not new. In a review of the relevant literature, Keith Ihlanfeldt (2004) concludes that the empirical evidence for this proposition is strong, and includes both supply- and demand-side effects (e.g., large-lot zoning creates higher amenity neighborhoods that fetch higher prices per square foot). Two empirical articles within the group reviewed by Ihlanfeldt are worth mentioning because they focus on the poor (Zorn, Hansen, and Schwartz, 1986) and on minorities (Pendall 2000). Pendall's work yielded especially strong results for density restrictions, as opposed to other types of local land use control. Other review articles agree with Ihlanfeldt that zoning restrictions are correlated with higher home prices, but they are more circumspect about the literature's overall reliability (Pogodzinski and Sass 1991; Quigley and Rosenthal 2005). The primary caution in these latter articles is that the direction of causation between zoning and home prices -- or between zoning and obvious correlates of home prices, like income -- remains unclear.

The present study will not attempt to prove a causal link between changes in zoning and changes in residential transaction prices in the Highlands region. Instead, it will demonstrate a mild correlation between these two concepts over time. It must be remembered that the increase in minimum lot sizes observed in the region over the last thirty years affects a relatively small proportion of the homes brought to market in a given year, mostly new construction. That being said, residential transaction prices increased continuously in the Highlands region between 1996 and 2004, while the rightward skewness of prices increased up until the recession of the early 2000s. We know that the decade after 1995 witnessed a significant degree of down-zoning statewide (Adelaja and Gottlieb 2009), coinciding with the effects of the national housing bubble. What remains to be seen is if housing in the region became less affordable over this period, using a measure that captures the full distribution of home prices and of the incomes of potential buyers.

The inferential approach taken here is similar to that used in a companion piece analyzing the same region (Rudel, *et al.* 2011). That piece also noted the increase in minimum lot sizes in the Highlands and the significant amount of open space set-asides occurring there in recent years. But its measure of exclusion was even more direct: It reported evidence of a redistribution of population growth from the Highlands region to the inner suburbs of New Jersey in the 1990s. Because metropolitan development normally moves outward, this was seen as evidence that communities in the Highlands had effectively "pulled up the drawbridge" over this period (Rudel, *et al.* 2011). The title of this earlier article, "from middle to upper-class sprawl?", captures the hypothesized changeover to larger residential lots enforced by increasing lot size restrictions.

The present paper uses Rudel *et al's* data on minimum lot-size zoning to make an argument not about supply, but about the related issue of affordability. This requires, of course, some data on home prices. The articles by economists cited above have paid a great deal of attention to prices; the problem is that they tend to ignore the most obvious exclusionary effect of region-wide zoning restrictions. This is zoning's effect on the *mix* of homes brought to market, rather than on the price of a quality-adjusted home. Hedonic analysis, which makes up the majority of economic research on the price effects of zoning, intentionally controls away the attributes of homes that make them more expensive, such as lot size and the number of rooms. Similarly, by focusing only on the gap between market prices and construction costs, Glaeser and Gyourko ignore the regional distribution of dwelling construction costs (i.e., *types* of homes) that zoning may encourage or discourage in a given housing market. The distribution of available housing products matters a great deal, of course, to lower-income residents. Thus the present study explores exclusionary zoning in a common-sense way that is largely missing from the existing literatures in agricultural and urban economics.

Data and approach

The study region consists of 83 municipalities in the New Jersey Highlands, an exurban area in the northwestern part of the state (Figure 1). The southern half of this region tends toward

agricultural use, while the northern half is mountainous with significant forest cover. A significant amount of land use and regulatory data are available on these 83 communities. This is because they were placed under the authority of a new regional planning board in 2005, on the basis of federal research that highlighted the importance of this region to the state's water supply (Gottlieb, 2005; Phelps and Hoppe, 2002).

For purposes of the present study, two things should be noted about the study region. First, it is large enough that one can argue it ought to provide the full range of housing to serve all income groups in New Jersey (see the map in Figure 1). It should be noted that under New Jersey's Mount Laurel court decisions, each municipality is theoretically obligated to provide its own "fair share" of affordable housing. Extending this obligation to a multi-county region is presumably justified. Second, the zoning and homebuilding decisions in this region occurred largely before the Highlands Planning Act was passed in 2004—and certainly before binding state regulations were promulgated. For the most part, then, they reflect private market decisions constrained by local rather than state regulations. In the conclusion we return to the question of whether our empirical findings are tainted by these two types of state-level control: Statewide affordable housing regulations that were on the books before the study period began, and a regional planning regime that began just after the study period ended.

GIS data on minimum lot size zoning for 1995 were collected by Rutgers University's Grant Walton Center for Remote Sensing and Spatial Analysis, as part of the body of work that helped inform the Highlands Planning Act of 2004. This dataset was then extended back and forward in time under the terms of a Human Systems Dynamics grant from the National Science Foundation. This data collection effort provided minimum lot sizes in each residential zone shown on municipal zoning maps for various years, as well as a complete inventory of acres permanently preserved by municipalities, by the state, and to a lesser degree by private conservation organizations (see Rudel, *et al.*, 2011).

Data on home prices and characteristics were collected from the web site of the Garden State Multiple Listing Service (MLS), which is the primary sales support and tracking tool used by licensed real estate brokers. All of the MLS data used in this study are actual closing prices;

ordinary homebuyers using the website see only offer prices. The data contained in the MLS database are rich, including closing date, closing price, location, and just about all of the home characteristics one would expect to see on a broker's spec sheet. There are two drawbacks, however. Computer-readable data go back only to the mid-1990s, and they need a lot of cleaning because they are entered by brokerage staff who have no need to standardize input with a view to creating analyzable datasets. In particular, data on the lot sizes of sold homes are available for only 41% of the observations in the Highlands MLS dataset (these data are described in Figure 3 and Table 2).

These three variables -- minimum lot sizes, lot sizes of sold homes, and closing prices -- are explored in the Highlands region using histograms and simple univariate statistics. The goal is to see how the moments of the distributions change over time. In order to determine if the distribution of housing in the Highlands has been getting more or less affordable for a given reference population, it is necessary to define that population and then measure the distribution of its household income. For simplicity, we assume that the mix of housing in the Highlands should be affordable to the range of incomes that existed in northern New Jersey in the year 1990. Northern New Jersey is defined as the following twelve counties: Bergen, Essex, Hudson, Hunterdon, Mercer, Middlesex, Morris, Passaic, Somerset, Sussex, Union, and Warren. The distribution of household income is available in the 1990 census for each of these counties, and is easily aggregated. We collected the income distribution for owner-occupiers only. This is because we only have 1995-2004 multiple listing service data for single-family detached homes. To include renters among the potential buyers of such homes without including multi-family units on the supply side appears misleading. This choice of reference population, however, parallels arguments made in our earlier work entitled "from middle to upper class sprawl."

One goal of this study is to look for inequities in the distribution of the housing stock at a single point in time, such as 1995 or 2000. A second goal is to see if a measure of affordability changes with changes in the housing stock, holding the distribution of income constant. We intentionally measure the household income distribution in the start year only, because we

want to ensure that it is exogenous to subsequent changes in the mix of housing supply. This does not mean that our measure of 1990 income remains fixed in nominal terms: It shouldn't. Two different methods are used to inflate the bracket endpoints from the 1990 income distribution data to years for which we have a good number of home price observations: 1995, 2000, and 2004. For the first affordability analysis, we inflate 1990 income using the federal Consumer Price Index for the New York metropolitan area. This is a standard method of estimating actual income in a year for which there is no census survey. For the second affordability analysis, we inflate 1990 income using the Case-Schiller quality-adjusted home price index for the New York metropolitan area, which is available on the website of Standard and Poor's. We do this in an effort to control away the effects of the 2000s housing bubble. If 1990 incomes are increased by exactly enough to cover the New York "bubble premium," than any remaining gap in affordability must be the result of a change in the housing stock.

An innovative housing affordability graphic is used to compare the distribution of incomes to the distribution of home prices. As described in Gan and Hill (2009), this technique allows one to look at both distributions together, while standard approaches, such as those that track median home prices, ignore much of the distributional information available on both the demand and supply sides. And yet the technique is not difficult to understand, especially if you are familiar with the Lorenz curve that is commonly used to summarize a country's income distribution with a single comprehensive graph and parameter.

In this technique, all households are lined up in rank order on the horizontal axis, with the richest ones on the left and the poorest on the right. We then calculate and graph a set of coordinate pairs according to the following example: The richest 10% of the population can afford, say, 86% of the homes on the market given the distribution of incomes and home prices we have collected. The definition of "afford" is the realtor's simple rule-of-thumb: In the case of the present study, a home is regarded as affordable if its price is no more than three times a household's income.

The reason why the richest 10% can afford only 86% of the homes on the market (or 93% or 90% or 82%) is that the poorest member of the top 10% sets the limit. *Every* member of the top 10% must be able to afford *every* home in the cumulative percentage of homes for this group. The poorest member of the top tenth might have an income that is only one-third of the number sitting at the 86th percentile of home prices. If that is true, then everybody in the top 10% will be able to afford 86% of the homes---but nothing more. By the same logic, the top 100% of incomes can afford 0% of the homes, because the income on the very bottom will typically be unable to afford anything (using the multiple of three times income). Note that the 45-degree line describes an equitable affordability profile, with the percentage of homes affordable to each group exactly proportional to the group's distribution in the population. See figures 5 and 6.

Results

The data show a consistent increase in the average minimum lot size of residentially-zoned acres after the year 1990 (Table 1). Minimum lot sizes are not normally distributed, but they spike at several common numbers, like half an acre or five acres. Figure 2 shows that the percentage of residential acres zoned for a minimum of five acres rose from below 20% in 1985 to more than 30% twenty years later. This is the most popular lot size minimum for agricultural and forested acres in the Highlands. Four-acre minimum lot size zoning has also increased from less than 1% of the total to close to 8%. Meanwhile, the smallest lot size categories have fallen to less than 20% of total acres. There were also increases in the prevalence of both 10- and 20-acre minima, but the latter are a small minority of total acres and are omitted for readability.

Table 2, based on the 41% of homes in the real estate dataset that have lot size data, does not show a consistent increase in the lot sizes of the homes actually sold in each year. Instead these data look cyclical, with smaller-lot homes sold during the 2001-2002 recession than during the boom periods of the late 1990s and mid-2000s. These data remind us that real estate transaction data reflect not only the underlying stock of housing potentially available for

purchase, but also changes in demand that might be driven by purchasing power. The cyclicality in the data also suggests the need for a longer time series, currently unavailable from the MLS, that would capture structural changes on both the demand side and the supply side.

Table 3 and Figure 4 measure the distribution of nominal home prices for selected years between 1996 and 2004. The steady increase in mean home prices reflects both regulatory restrictions (possibly) and the national housing bubble; there is a marked acceleration in home prices in the early 2000s. Of greater interest, perhaps, is the statistic on rightward skewness, which increased through 2000 before falling back down. This trend may be related to the up and down trend in the lot sizes of homes sold shown in Table 2.

Figures 5 and 6 compare the distribution of home prices in multiple years to the distribution of household income (excluding renters) in the twelve counties surrounding the Highlands in 1990. In Figure 5, the New York metro CPI is used to inflate the breakpoints of the 1990 income distribution to match the years for which home price data are available. In Figure 6, the Case-Schiller index for the New York metro is used for the same purpose. Thus Figure 6 corrects more completely for the housing bubble, since it uses a price index for a market basket that contains quality-adjusted housing only.

Before discussing the time trend, we observe that the distribution of home prices is generally inequitable using the 45-degree line criterion based on the 3 x income standard. Unlike the Lorenz curve for income distribution, observations in Figures 5 and 6 can lie above or below the 45-degree line. Equity problems might be indicated when points at the upper end of the income distribution lie “Northeast” of a 45-degree line and points at the lower end of the income distribution lie “Southwest” of a 45-degree line. This backwards S-shape of the affordability profile is evident in all scenarios except those where affordability is poor for everybody, such as year 2004 in Figure 5.

While zoning regulations could have contributed to the relative lack of Highlands homes priced at less than three times the lowest incomes, Figures 5 and 6 would be more persuasive if they were compared to the same graph from an unregulated region. Even in the absence of supply restrictions, it is rarely the case that people choose to spend exactly the same proportion of

their incomes on a good like housing, no matter how much they earn. The standard affordability threshold of three times income should presumably be adjusted to account for the possibility that the income elasticity of demand for housing is less than 1.0.[2]

If a backwards S-curve in the data is to be expected, then zoning restrictions might cause affordability problems that increase for northern New Jerseyans over time, since we know that the average minimum lot size has been increasing. So the goal now is to see if all or most of the points in Figures 5 and 6 move northeast or southwest over time.

In both figures, the changes in affordability over time are systematic but run in opposite directions. Figure 5 shows the change in affordability using our best estimate of what incomes actually were in 1995, 2000, and 2004. Housing became less affordable for all quantiles in this period, increasing markedly between 2000 and 2004. The most likely explanation for this result is the across-the-board increase in transaction prices caused by the housing bubble. A simple way to remove the effects of the bubble is to inflate the incomes of potential buyers using the best available index of bubble prices. This is done in Figure 6, and the points now move to the northeast over time, with the possible exception of the very poorest quantiles. We are therefore unable to measure any decline in housing affordability in the Highlands that was driven by any cause other than the national housing bubble. Indeed, controlling for the housing bubble, there actually appears to be a slight increase in affordability over this period when home prices are measured using transaction price data.

Conclusion

This study uses a straightforward – we would argue correct – method to measure the exclusionary impact of lot size restrictions in a single metropolitan area. That is because such zoning has three exclusionary effects, in theory: (1) It lowers the overall stock of housing that is allowed in the long run; (2) It raises the price-per-square-foot of homes in the short run by

[2] The income elasticity of demand for housing has been estimated in the range of .6 to .7 using permanent income (Carliner, 1973). For more recent estimates using US data, see Hansen, Formby, and Smith (1998).

increasing amenities and making the homes harder to build; (3) It skews the distribution of available homes in an upscale direction, even if the incomes of those who might buy the homes are not similarly skewed.

Theoretical reason #1 is an arithmetic fact, but its impact on prices in the short run is unclear. Theoretical reason #2 is where the bulk of work by economists has taken place. It seems to us that this pathway ignores the dominant exclusionary effect, which is that homes are simply bigger and more expensive in those metropolitan areas where small homes are prohibited on a significant percentage of the developable acres.

The fact that we have selected the most logical pathway for zoning to be exclusionary does not mean that it is the easiest one to measure or to prove. Because the geographic unit of analysis is an entire housing market, we effectively have only one observation in this study. Minimum lot sizes and home prices (as well as other relevant factors) have increased over time, giving us what is effectively a time series problem on this single geographic observation. Moreover, the covariates in such a time series analysis would consist of the moments of various distributions, the argument being that one distribution (lot size minima) must eventually influence others (delivered lot sizes and associated prices), all in a world where much of the housing stock is a legacy handed down to us from before the study period began. Indeed, one insight from the analysis is that changes in zoning affect the distribution of housing transactions through their effects on new construction, so it may take decades for such effects to be observed. Yet MLS price data are not available before 1994.

One obvious criticism of our housing price data is that they do not measure supply as shaped by zoning, but rather by the intersection of supply and demand. The first question to be asked is if some kinds of homes change hands more frequently than other kinds of homes. If so, then a database of transaction prices will not reflect the true underlying distribution of the stock of housing. The frequency with which certain types of homes change hands can also change over time in response to cyclical or demographic demand considerations, as we suggested in our discussion of Table 2. The solution to this problem is to use home price data from census questionnaires or tax assessment records. The census approach also permits a longer time-

span of home price data to be collected in a consistent way; the downside is that prices are self-reported. We are currently pursuing this line of additional research.

The study area chosen for this analysis presents two additional challenges. First, each of the 83 Highlands municipalities is required to supply a certain amount of affordable housing under the regulatory framework of New Jersey's Council on Affordable Housing. In our opinion this has not affected the present paper's results for two reasons: (1) The provision of Mount Laurel housing throughout the state is well below targets because of chronic litigation and foot-dragging; (2) Mount Laurel Housing is mostly multi-family.

Second, we have examined home prices in a ten-year period immediately preceding the enactment of a regional planning law that developers worried would significantly close off land to development. This could, in fact, be one explanation for the observed fall in the lot sizes delivered in 2002, as developers scrambled to build as much as they could before the Highlands planning law went into effect.

The regional planning law moved through the legislature very rapidly, however, and developers would have to have been excellent political forecasters to put such projects into their pipelines in 1999 or 2000. And because most transactions involve homes that are not even new, the recession seems a more convincing explanation of the trend in Table 2.

The solution to this problem, as with so many of the others, is to collect home price data in the Highlands for the same period as the available zoning data, roughly 1975 to 2005.

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Figures and tables

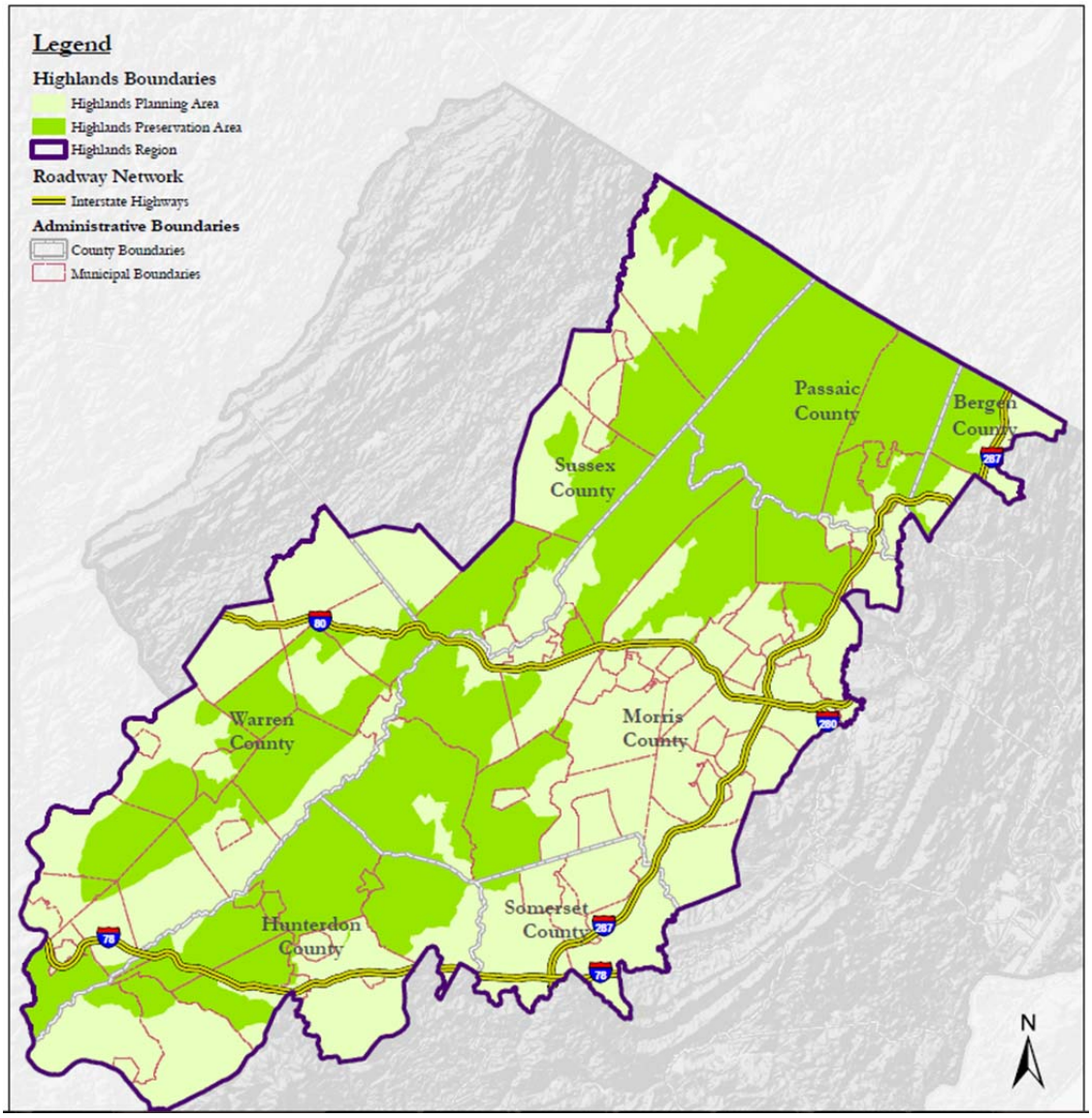
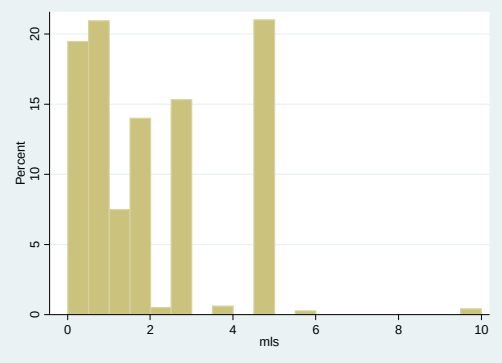


Figure 1. New Jersey Highlands Planning Region (83 municipalities)

Courtesy of the New Jersey Highlands Council, Department of Environmental Protection, State of New Jersey.



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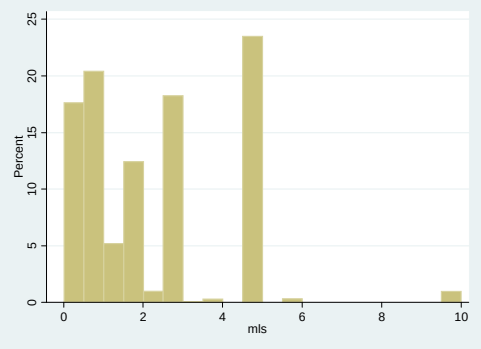

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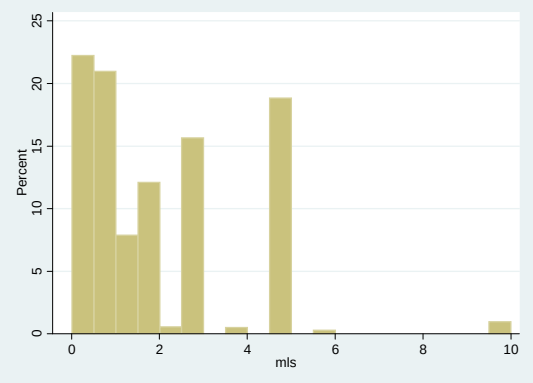

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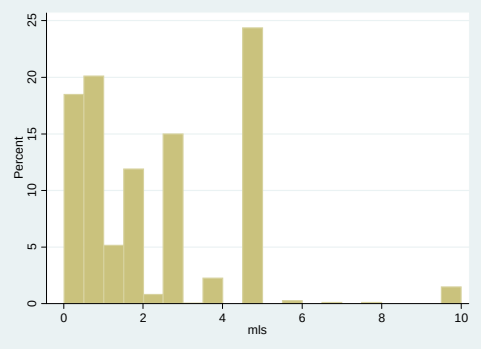
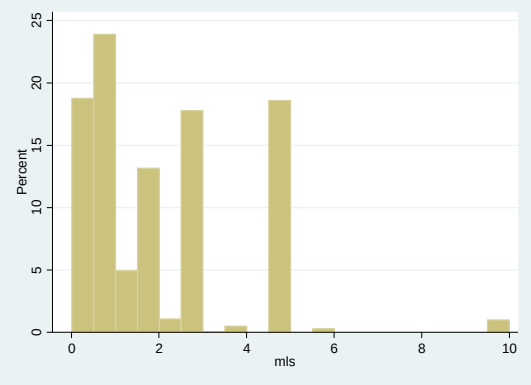
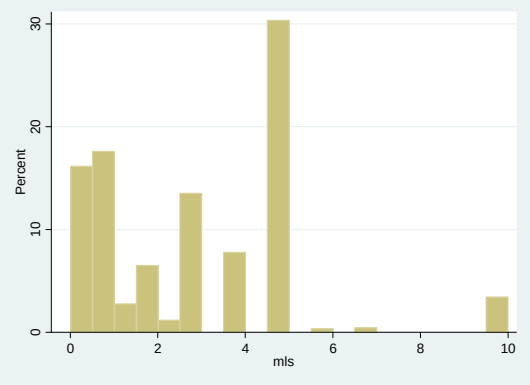


2000*



1990



2005*

Figure 2. Distribution of residential acres by minimum lot size in NJ Highlands communities, 1980-2005 (* a small right-hand tail is omitted for readability and comparability.)

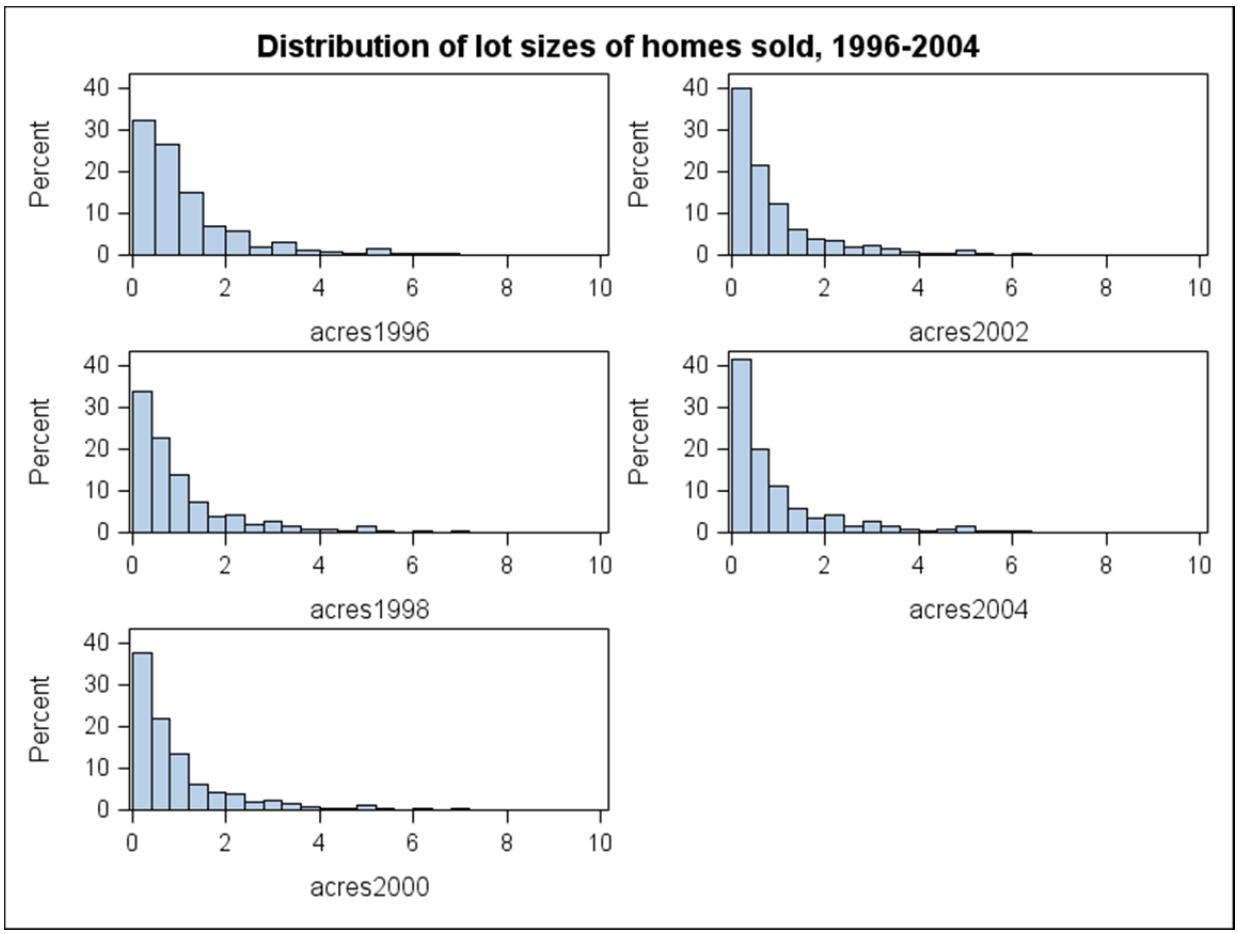


Figure 3. Distribution of lot sizes of homes sold in the NJ Highlands, 1996-2004

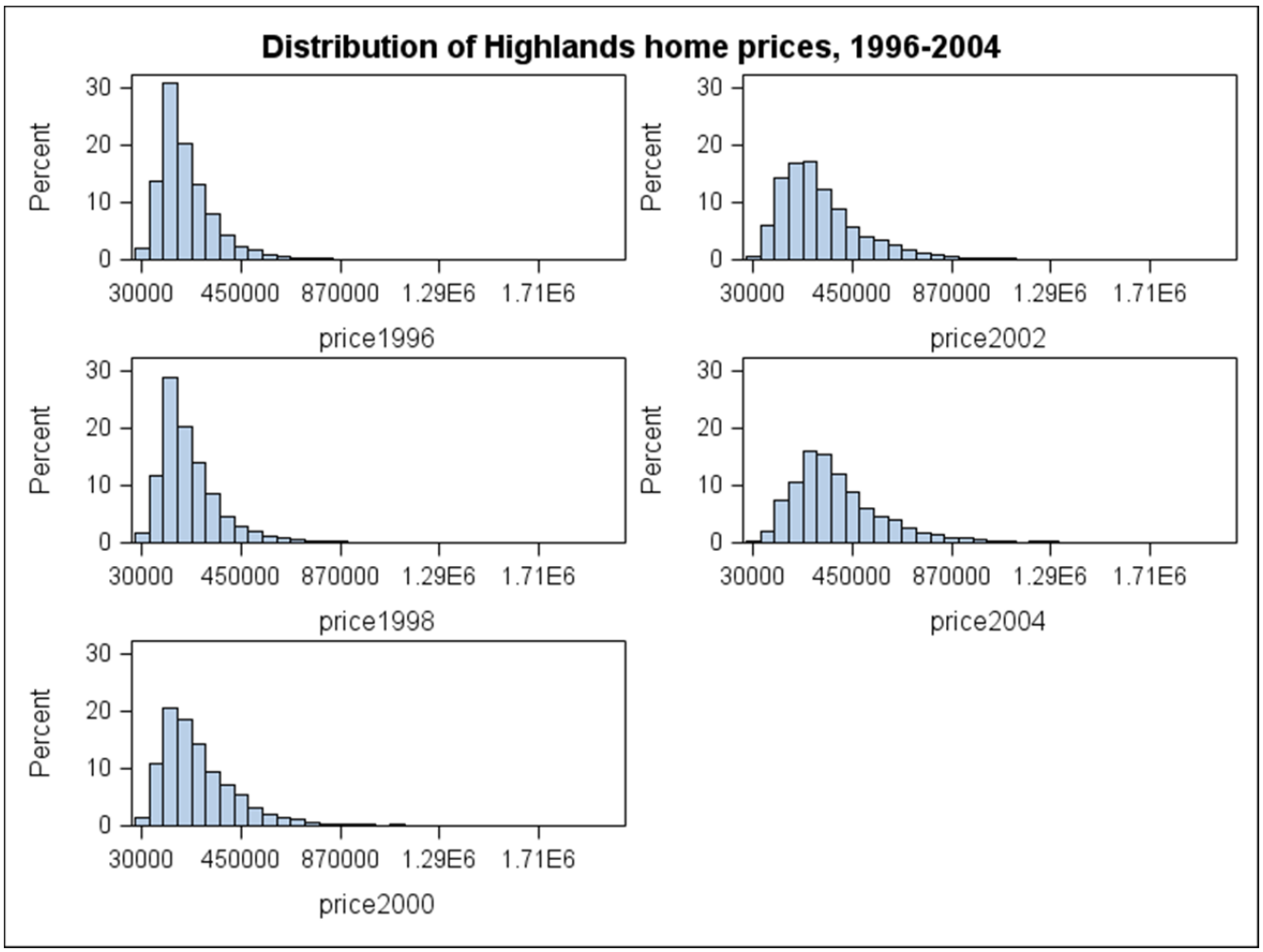


Figure 4. Distribution of nominal housing prices in the NJ Highlands, 1996-2004

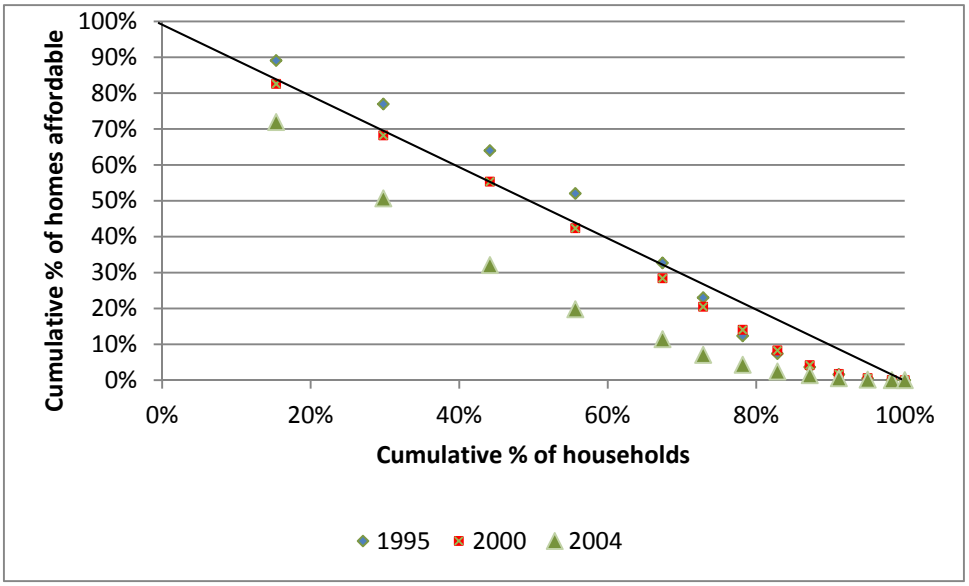


Figure 5. Housing affordability Lorenz curve with 1990 incomes adjusted using the New York metropolitan area Consumer Price Index.

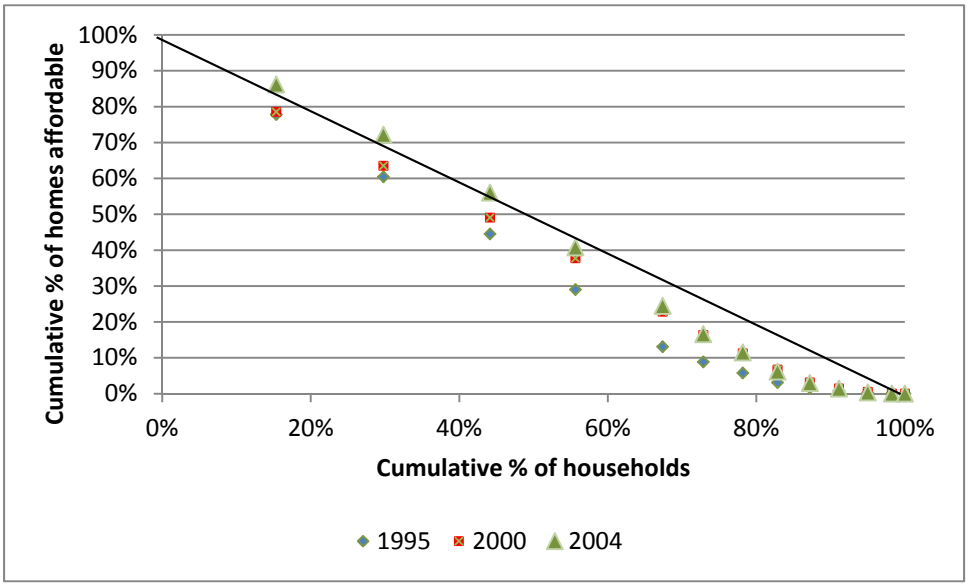


Figure 6. Housing affordability Lorenz curve with 1990 incomes adjusted using the Case-Schiller housing price index for the New York metropolitan area.

Table 1. Univariate statistics on minimum lot size for residentially-zoned acres in the Highlands, 1980 to 2005

YEAR	N	MEAN	MEDIAN	ST. DEV	SKEWNESS
1980	623932	2.222	2.000	1.752	0.905
1985	613258	2.211	1.500	1.830	1.162
1990	608757	2.259	2.000	1.809	1.139
1995	612000	2.434	2.000	1.857	0.919
2000	594093	3.060	3.000	3.071	3.136
2005	652214	3.527	3.000	3.374	2.388

Table 2. Univariate statistics on lot sizes of homes sold in the Highlands, 1996 to 2004

YEAR	N	MEAN	MEDIAN	ST. DEV	SKEWNESS
1996	2921	1.4026	0.73	2.87695	13.0868
1998	5745	1.46323	0.63	3.56871	12.994
2000	6308	1.38859	0.57	3.34819	12.2761
2002	6676	1.22572	0.51	2.51959	10.3138
2004	5698	1.45661	0.51	3.93471	10.6202

Table 3. Univariate statistics on single-family transaction prices ($) in the Highlands, 1996 to 2004

YEAR	N	MEAN	MEDIAN	ST. DEV	SKEWNESS
1996	7482	226,297	187,000	156,234	4.19
1998	8642	244,651	197,850	194,677	7.35
2000	9603	292,115	235,000	256,565	11.10
2002	10753	338,048	277,000	253,031	4.92
2004	8623	422,442	350,000	297,757	3.88