Is Open Space Preservation a Form of Exclusionary Zoning? The Evolution of Municipal Open-Space Policies in New Jersey

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Abstract: This paper examines the evolving policy context of municipal open space acquisition in New Jersey. We hypothesize that voters' interest in open space protection is sensitive to changes in state policy, and that municipal acquisition may have exclusionary effects. We examine local acquisition practices using three different approaches: voting behavior, municipal acquisition, and parcel-level characteristics of acquired lands. We find that support for preservation are responsive to growth pressures and changing state policy environments. We also present evidence that municipalities are targeting land able to accommodate higher-density development in their preservation efforts, and that municipalities that preserve open space are also active in transferring away their affordable housing obligations.

Keywords: Open space preservation, exclusionary zoning, municipal behavior

In response to perceived threats to land and community character from suburban sprawl, permanent preservation of open space has become an increasingly popular option in the United States. Although local governments in the United States are able to protect or restrict lands from development through regulatory land use controls and infrastructure decisions, these protections are not permanent and subject to future policy changes. As a consequence, local governments seem increasingly willing to spend public dollars to acquire land in fee-simple ownership or to purchase development rights (conservation easements) on private land in order to protect land

permanently from development. These acquisition efforts have seen tremendous growth in numbers and success in recent years (Hollis and Fulton 2002). The Trust for Public Land's "LandVote" database tallies 1527 successful local and state votes for land preservation financing from 1988 to 2006, with nearly $44 billion of approved financing for acquisition and preservation (Trust for Public Land 2006).

In a 1998 statewide referendum, New Jersey voters overwhelmingly approved (66 percent voting yes) an amendment to the New Jersey Constitution dedicating $1 billion to open space preservation efforts over 10 years. As of January 2006, all 21 New Jersey counties and 218 of 566 municipalities had voter-approved taxes to fund land acquisition programs. This represents an increasing demand to use financial mechanisms as either a substitute for or complement to zoning and other local land regulations in order to provide permanent protection of lands from development.

The purposes of this paper are to examine the evolving policy environment for open space preservation, to understand the evolution of state and local financing mechanisms and voter behavior, and to question whether increased open-space acquisition – like many local land use policies in the United States -- may be exclusionary in its effect. Why is it that voters seem to have become increasingly willing to increase their own taxes to fund local land preservation efforts?

Within the research literature, a series of recent efforts have attempted to explain evolving demand for local government land acquisition efforts and open space ballot measures, but without consensus as to the causes and consequences (Bates & Santerre 2001; Howell-Moroney 2004a, 2004b; O'Driscoll 2006; Romero & Liserio 2002; Romero 2004; Solecki, Mason, & Martin 2004). This literature on open space preservation policies has tended to

analyze open space preservation policy decisions as distinct policy arenas, separate from the context of other local government land use planning and regulatory strategies. Despite the fact that both regulatory (zoning, development controls) and incentive (transferable development rights –TDRs) mechanisms exist to preserve land, acquisition is an increasing popular option. Daniels (2005) argues that land preservation has become increasingly popular and important because local citizens and land trusts are frustrated with the inability of local regulatory and incentive strategies to achieve the desired level of permanent land preservation.

This paper is organized as follows. Section 2 describes a theoretical approach to understanding municipal open space acquisition behavior, and reviews previous research literature. Section 3 outlines the mechanics of state and municipal policies and financing mechanisms for open space preservation in New Jersey. Section 4 describes our specific research hypotheses and the data utilized. Sections 5 and 6 present empirical results on municipal voting and municipal acquisition policies, while section 7 tests whether open space acquisition efforts are exclusionary. We conclude with some policy implications.

EXPLAINING MUNICIPAL OPEN SPACE ACQUISITION POLICIES

Understanding the growth in local land preservation efforts and increasing support for dedicated open space financing is a function of explaining the evolution of voter and resident preferences as they interact with evolving state and local policy environments. Throughout American history, those who have moved to suburban and exurban areas have been drawn by -- and vigorously defended -- a landscape aesthetic of open spaces, lower-densities, and an idealized vision of rural life (Rome 2001; Stilgoe 1988). There has always been a strong demand for open spaces in suburban landscapes. Accompanying the traditional suburban taste for open spaces was a desire to keep public expenditures and taxes low. What is remarkable in recent

years, therefore, has been voters' increasing willingness to raise their own taxes to acquire lands for open space.

The planning profession has long incorporated open space planning as a central component of the process of managing urban development (Schmidt 2008a). Providing open spaces catered to middle-class suburban aspirations towards upper-class country estates (Hayden 2003). Beginning with the earliest master-planned suburban communities such as Olmsted and Vaux's Riverside, Illinois, developers of suburban housing provided significant open spaces in both yards and parks. These ideals of detached houses with setbacks, wide yards, and tree-lined streets were later codified in zoning and subdivision regulations. Idealized suburban landscapes incorporated at least three distinct, but related, forms of open space: private open space in lawns; public open space in parks, trails, parkways, etc.; and near-by privately owned undeveloped land in farms or forests.

Codes providing for minimum lot sizes, yard and setback requirements, and open-space set asides have, over the past 50 or so years, increased the amount of open land on each development parcel (Evenson and Wheaton 2003; Fischel 2004). As active local government financing for permanent open space preservation through acquisition has only recently gained broad support, we suggest that voters have come to view these regulatory protections of undeveloped land as inadequate. We posit that open space acquisition can thus serve as a complement or supplement to other regulatory approaches of preserving undeveloped land.

There are three general approaches to explain voters' recent interest in open-space protection through dedicated funding. First, we can attribute such policies to an intensification of or widespread acceptance of environmental awareness in response to the rapid pace of suburban development and its attendant degradation or destruction of landscapes (Lubell, Feiock,

& Ramirez 2005; McQueen & McMahon 2003; O'Driscoll 2006; Rome 2001; Romero & Liserio 2002; Wassmer & Lascher 2006). Open-space preservation support, in this view, may be the result of an increased environmental consciousness which has resulted in changed ideologies and a willingness to vote for spending increases.

A second way to interpret the rise of open-space preservation funding is within the context that sees local land use planning tools as designed to protect the real estate interests of existing homeowners. A large and growing literature suggests that local homeowners exert political influence to control local land use decisions in order to protect and enhance their own property values (Fischel 2001). In states like New Jersey, where municipal boundaries are fixed, open space preservation reduces the supply of potentially developable land. This supply constraint raises the value of existing homes. Additionally, open space is positively capitalized into existing home values because of its amenity value (Crompton 2004; McConnell & Walls 2005). Fiscal impact studies suggest that population growth and real estate development (particularly residential) can be fiscally harmful to local governments (Burchell & Listokin 1992). Thus, preserving open space land from development can provide significant fiscal benefits to existing residents. These 3 channels (scarcity effect, amenity effect, and fiscal effect) mean that open space preservation is likely to increase the value of existing homes.

Land trusts and local environmental groups have used both the “environmental consciousness” and the “home-value protection” arguments in framing the debate over open space preservation under the rubric of quality of life and place (Schmidt 2008b). Advocates point not only to the environmental impacts of development, but also the fiscal impacts. In urging greater open space preservation, activists also point to the vicissitudes of local zoning. In interviews with local land preservation activists, we found strong beliefs that developers find

ways to develop through variances, re-zonings, legal proceedings to challenge local zoning, or through well-financed campaigns in local political elections.

A third explanation for the rise of financing mechanisms for land acquisition is the changing legal environment. As a result of U.S. Supreme Court decisions and actions in many state courts and state legislatures to require compensation to landowners for development restrictions on their property, local policy makers increasingly face the choice of compensating landowners for development restrictions, or waiving these restrictions (H. Jacobs 2007; H. M. Jacobs 2008). However, if open space is acquired through voluntary financial transactions from a willing seller, legal claims of "regulatory takings" can be avoided. As regulatory options for preserving land face challenge, municipalities are turning to voluntary methods (Wright & Czerniak 2000).

These three perspectives on open space acquisition (increased environmental consciousness, homeowner property value protection, and a changing legal environment) are not mutually exclusive and are probably mutually reinforcing. All three perspectives are consistent with observed behaviors and outcomes. Empirically, just as in the literature on exclusionary zoning, there is no *a priori* way to distinguish the underlying motivations of municipal actors (Bogart 1993). Indeed, explaining municipal policies requires some prior theoretical perspective. We recognize that there is some level of methodological difference across disciplines in studying and explaining local government behavior. Our purpose in this paper is to offer evidence consistent with our understanding that local government open space policies are reflective of the real estate interests of existing homeowners. Thus, preservation of open space can mean that the apparently "neutral" policy objective of environmental protection may have been coopted for more pecuniary and parochial interests.

To develop our theoretical basis of municipal behavior, we draw on the literature on localism in the environmental movement and on the exclusionary zoning literature. There is now a well established literature –from scholars on both the "right" and the "left" – which sees in the manifestation of the environmental movement at local levels an attempt by middle-class property interests to use the rhetoric of environmentalism to protect and further their own amenity and landscape consumption values (Frieden 1979; R. Gottlieb 1993; Heiman 1988; McClaughry 1976; Rome 2001). When suburban and exurban homeowners critique "sprawl" development, they somehow neglect to mention their own impacts upon the land.

Analogously, there is a well established literature – also involving scholars from opposite ends of the ideological spectrum – which problematizes the localism of American land use planning, whereby municipalities undertake plans and regulations to protect and further the property interests of existing homeowners, often engaging in exclusionary zoning (Babcock 1966; Bates & Santerre 1994; Fischel 2001, 2004; P. Gottlieb 2006; H. M. Jacobs 1989; Ladd 1998; Levine 2006; Paulsen 2006; Pendall 2000; Williams 1971). Previous research on New Jersey in particular has documented the exclusionary nature of local land policies (Paulsen 2006; Rolleston 1987). In the Mt. Laurel decisions, the New Jersey Supreme Court has likewise criticized the parochial localism of municipalities' exclusionary zoning.

There is, of course, no consensus as to when municipal land planning tools become "exclusionary." By definition, all zoning is in some sense "exclusionary" in that it provides exclusive land use districts. Local land use policies can become exclusionary when adoption of restrictive measures reduces the supply and variety of housing types and densities available to lower-income (and, by extension, minority) households. Exclusion is a matter of degree. In states like New Jersey with exclusionary zoning case law, principles such as "fair share" and

“reasonable opportunity” assign an affirmative obligation upon municipalities. Courts adjudicate both the amount of land available for higher-density and/or affordable and/or multi-family housing, as well as the permitting process of these types of developments. Municipal policies to preserve open space can potentially reduce the supply of land for more affordable and/or denser forms of housing, and thereby displace growth to even further exurban areas, exacerbating the sprawl they claim to thwart. When land protection policies do not also make allowance for affordable development opportunities, the aggregate effect for a metropolitan region can be both sprawl and exclusion (Paulsen, 2006).

We turn now from the more general literature on municipal environmental and land policies to the more specific recent research on open space preservation. Recent research has focused both on explaining open-space financing votes (Howell-Moroney 2004a, 2004b; Kotchen & Powers 2006; Romero & Liserio 2002; Romero 2004; Solecki, Mason, & Martin 2004) and the actual open space acquisition practices of local governments (Bates & Santerre 2001). At a national level, Kotchen and Powers (2006) examined all voter referenda for open-space funding in the United States from 1998 to 2003, while Romero and Liserio (2002) studied open-space ballot measures in 1998 and 1999. These studies examine both the factors predicting appearance of open-space questions on ballots and the percentage of voters voting “yes” for open-space financing.

Kotchen and Powers (2006) find that income is a significant and positive predictor of voting on open-space funding indicating that open-space – like other local public goods - is an income-elastic (or “normal”) good. Higher income households have a greater demand for open-space preservation and ballot measures for increased open space funding are more likely to be initiated and succeed in higher-income communities. Similarly, Bates and Santerre (2001) find

open space acquisition to be positively associated with income in Connecticut municipalities. These results are consistent with a wide range of local public finance studies which find that amenity-providing local public goods (such as parks or open space) are income-elastic across households and across communities (Borcherding & Deacon 1972).

Kotchen and Powers (2006) also tested the variable "homeowners" (percent of housing units which are owner-occupied) as a test of the general hypothesis that homeowners are a dominant faction in local land use planning regimes. Their results appear inconsistent across national and state level samples and whether a referendum was held or received voter support. Places with higher rates of homeownership were more likely to see ballot measures for open space. In the national-level regression, a higher percentage of homeowners, however, also reduced the probability of passing a open-space financing referendum. Because they control for different financing methods, we alternatively interpret their results to show that if homeowners bear the full financial burden of preserving open-space through higher property taxes, they are less likely to vote for additional open-space preservation. We argue that homeowners are sensitive to the "tax price" of open space preservation – how much additional preservation efforts will cost in terms of additional taxes paid.

A debate has emerged in the literature (with no apparent consensus) as to the extent to which land use, land use change, and density variables explain the existence of and voting on open space ballot measures. For example, Kotchen and Powers (2006) find that population growth rates are not significantly related to open-space measures at the national level, which is inconsistent with the finding from other state-level analyses (Bates & Santerre 2001; Solecki, Mason, & Martin 2004). Measurement issues and the spatial unit of analysis likely lie behind these different results.

Romero and Liserio (2002) argue that "sprawl" (proxied by low population density) does not explain ballot measures, which they see as better explained as being adopted in wealthier and less diverse communities. In contrast, Howell-Moroney (2004b) argues that, at least in mid-Atlantic states such as Pennsylvania and New Jersey, open space ballot measures were explained by low-density and loss of open space lands to development.

Most national level studies are problematic because the measures obscure large differences in types of places and types of municipalities, and the fact that some states (like New Jersey) have municipal structures where all land is incorporated and municipal boundaries are fixed. In other states, municipalities are larger or are able to annex undeveloped land. If development is deflected outside of an existing municipal boundary in New Jersey, it would show up in the population growth and density figures of the neighboring municipality. In other states, however, this new growth might be annexed into the existing municipality. In both cases, growth may be at the same rates and same densities, but would show different results in a cross-section of municipalities, and lead to different interpretations of the effect of population growth and development densities on open-space policies. The tradeoff in terms of research strategies is that while national level studies allow generalization about trends, more detailed analyses in (a) particular state(s) allows for a richer specification of location-specific policies and institutions. This present research on New Jersey also allows use of high-quality land use data to measure net development densities and accurate measurements of lands available for development and actual loss of acres to development, while controlling for the unique public finance structure in the state.

OPEN SPACE PRESERVATION IN NEW JERSEY

The New Jersey Green Acres Program was created in 1961 with a $60 million bond issue to fund state land acquisition and matching grants to local municipalities (Foresta, 1981). Between 1961 and 1995, voters approved nine bond issues, earmarking $1.4 billion for land acquisition. An audit of land during the mid-1990s determined that only 2 million acres of privately held open land remained in the state. For comparison purposes, the entire state of New Jersey comprises approximately 4.7 million acres of land area, of which 1.3 million acres – approximately 27 percent – is already developed into urbanized uses.

These arguments were cited by proponents of a state-wide referendum passed in 1998, which created a stable and dedicated source of funding for open space, farmland, and historic preservation. The Garden State Preservation Trust (GSPT) Act implemented this referendum, appropriating $98 million per year of sales tax revenues through 2009 with additional authority to issue $1 billion in bonds. In 2003, New Jersey voters approved an amendment to increase GSPT funding by an additional $150 million to $1.15 billion. Between July 1999 and July 2006, 93,000 acres of farmland and 134,099 acres of open space were preserved with GSPT funding.

In 1989, state legislation enabled municipalities and counties to levy their own open space taxes. Currently, all 21 counties and 218 municipalities levy such a tax. As a result of the 1998 GSPT Act, municipalities that levy an open space tax and prepare a formal "Open Space and Recreation Plan" qualify for matching funds from the GSPT for 50 percent of land acquisition costs. Moreover, they are eligible to receive these funds in a block grant to draw upon when needed. Previously, municipalities had to apply to the state for funding for each parcel – a time consuming process that could frustrate efforts to provide rapid financing when faced with a development proposal. The GSPT also provides for the matching grant to be

increased to 75 percent for "urban aid" municipalities to encourage poorer urban areas to acquire land.

Figure 1 shows the number of successful municipal and county referenda on open space taxes by year. Although specifically enabled since 1989, the number of referenda began to increase in 1996 in anticipation of increased and dedicated funding. Although New Jersey municipalities have been preserving land for over 40 years, the passage of the GSPT funding represents a distinct policy shift which serves as the basis of empirical work in later sections. The two regimes of open space preservation are therefore before and after the passage of the GSPT.

FIGURE 1 ABOUT HERE

DATA AND RESEARCH DESIGN

The research presented in this paper consists of three elements. First, following Soleki, Mason and Martin (2004) and Kotchen and Powers (2006), we model the variation in municipal voting behavior on open-space preservation funding referenda. In this case, we utilize the statewide constitutional amendment referendum in 1998 to dedicate $1 billion in funding through the GSPT. The purpose of this analysis is to examine the demographic and fiscal factors associated with increased support for dedicated open-space funding.

In section 6, we follow Bates and Santerre's (2001) work in Connecticut by examining the actual preservation policies of municipalities. While voters may vote in general for additional open-space funding, actual expenditure of funds for acquisition to implement these policies represent the outcome of local political processes. We will examine the variation in the amount of land preserved (on a per-capita) basis by municipalities. As mentioned above, the

GSPT changed the incentive structure as of 1998, effectively reducing the price to municipalities of preservation through a 50 percent match. We model municipal open-space preservation efforts before and after the policy change.

In keeping with previous research discussed above, we model both voter support for open-space funding and actual municipal open space acquisition patterns as a function of the socio-economic and demographic characteristics of residents, their recent land development and population growth pressures, and the fiscal and policy environment.

In section 7 we raise the question as to whether open space preservation policies might serve as a substitute for or complement to exclusionary land use policies First, we examine the relationship between municipalities' open-space acquisition efforts and their affordable housing obligations. Second, we examine the characteristics of parcels acquired for open space, to identify the extent to which municipal acquisition targets land that has sewer service available and/or is zoned for higher density development.

For each municipality, consistently-interpreted high-quality digital land use data from the New Jersey Department of Environmental Protection are available for the years 1986 and 1995. Using GIS, we can consistently measure the development pressure (or level of development) in a municipality by calculating the percent of potentially developable land that has already been developed for urban uses. Potentially developable land excludes land in wetlands, hydric soils, and slopes greater than 15 percent. We also measure population density more accurately as the municipal population divided by the amount of land actually developed for urbanized uses. These two measures provide a more accurate characterization of actual landscape development patterns than do simple Census-based population density measures. Because our land use data are only available for these specific years, we utilize socioeconomic and demographic data from

as close to these years as possible, even when these dates don't perfectly overlap important policy dates.

For each municipality, we also measure the distance to either Philadelphia or New York, the two closest major cities as drivers of employment. In many land use studies, distance to major employment centers measures an important driver of land use change. In the case of New Jersey, rather than being a "monocentric" state, growth pressures come from either Philadelphia or New York. In previous research, Bates and Santerre (2001) find that distance to the nearest major central city significantly explains preservation efforts. As land values and development pressures in New Jersey are also influenced by access to highways, we calculate for each municipality the distance to the nearest major highway interchange. We note that previous studies on actual preservation efforts have employed distance variables as explanatory variables, while studies focusing on voting on open space referenda have not. Anticipating our results, we do find that distance to a highway interchange is positive and significant in predicting "yes" votes on open space referenda.

Because fiscal policy variables can be important in explaining local public policies, we measure the per-capita property tax base for each municipality. Our hypothesis is that municipalities with greater fiscal capacity (higher tax base per capita) might have more financial resources for acquiring open space.

New Jersey has two regional environmental policy frameworks which might influence municipal open space preservation policies. Municipalities along the coast are subject to the Coastal Area Facilities Review Act (CAFRA) and many municipalities in the southern part of the state are subject to the New Jersey Pinelands Commission. In both areas, additional levels of review are required for land development proposals, and municipal plans and zoning policies are

reviewed for consistency with regional environmental mandates. State and regional policies and funding are heavily directed toward environmental protection and land preservation in these areas. We expect that municipalities in these areas will be less aggressive with local open space preservation because state and regional policies already adequately address preservation needs. In this regard, we hypothesize that local preservation efforts and preservation by higher levels of government (county, state, federal) are substitutes. This is contrary to Solecki, Mason and Martin (2004) who interpret lower levels of support for preservation in these areas of New Jersey as reflecting some sort of "anti-government" ideology.

Previous research on New Jersey (Rolleston, 1987) indicated that local land policies might be influenced by the racial composition of neighboring municipalities, as municipalities use low-density zoning to screen out minority residents. Thus, we measure the racial composition of a municipality relative to its neighbors. To construct this measure, we compute a distance-weighted average of all neighboring municipalities' percent black residents. We then divide each municipality's percent black with the distance weighted average of its neighbors. Municipalities with a score greater than 1 contain a higher percentage of African-American residents than do their neighbors, while municipalities with scores less than 1 contain a smaller percentage than their neighbors. This measure enables a specific test for any explicitly racially exclusionary motive in open-space preservation.

Other demographic variables include the percent of housing units owner-occupied, per-capita income, population growth rates, percent of the population over age 65, and median housing unit age. As a proxy for land prices in each county, we utilize the average price per acre of agricultural land from the 1987 and 1997 Census of Agriculture. See Appendix A for a detailed table of all the variables, and Appendix B for descriptive statistics.

EXPLAINING MUNICIPAL VOTING PATTERNS ON OPEN SPACE PRESERVATION

In this section, we examine voting patterns at the municipal level in the 1998 state referenda to establish a dedicated source of $1 billion in open space preservation funding. In our regression analysis, the dependent variable is the proportion, by municipality, of those voting "yes" in the 1998 referenda. ("Yes" votes are measured as a percentage of all who voted on the referenda question, rather than all those voting in that election). Regression results are shown in Table 1.

TABLE 1 ABOUT HERE

The results are generally consistent with previous research with a few notable differences. As expected, communities with higher percentages of "homevoters" (home owners) are associated with increased voter support for state-wide open space funding. While Kotchen and Powers (2006) find that a higher percentage of homeowners reduces support for open space funding, it is important to note that their study looked at local open space referenda where local homeowners would have to pay for open space through higher property taxes. In the statewide New Jersey referendum, homeowners do not bear the full burden of the costs of preservation, as funding is distributed statewide and is funded by sales, not property, taxes. Homeowners are indeed sensitive to the "tax price" of open space acquisition. In this case, homeowners' latent "demand" for open space is expressed, when a portion of the cost of acquisition is shifted to others.

As in most studies, higher income was associated with increased likelihood to vote for additional funding. Those municipalities with faster rates of growth in the preceeding period

(1986-1995) were associated with a higher percentage of yes votes, and municipalities closer to highway interchanges were also more likely to vote yes. Taken together, these results are consistent with other studies in indicating that support for open space preservation responds to growth pressures, both actual (population growth) and potential (highway interchanges).

Our results on the population density variable, measured with more accurate land use data, provides different results than Romero and Liserio's (2002) national analysis, they find that density was not statistically significant in explaining either the appearance of open-space measures, nor their success. We find that higher municipal densities were associated with increased support for open-space preservation funding in New Jersey. We attribute these results to the fact that an increased matching grant (up to 75 percent) for urban municipalities provided the incentives for voters in urban municipalities to believe that some benefit would also occur in their own communities. This might suggests that at a state level, proponents who wish to secure voter approval for additional open-space financing might offer additional financial incentives to urban voters. A second interpretation of these results could be that urban voters also see positive benefits in state-wide open space programs even if not directly benefiting themselves and that therefore preservation efforts have positive spill-over effects across municipal boundaries. This suggests the need for finance at higher levels of government rather than reliance only on local finance.

As predicted, the signs on the Pineland and CAFRA municipalities are significant and negative. Residents of municipalities subject to stricter environmental protection and regional planning mandates feel less need for additional *local* open-space preservation through dedicated financing. In theses areas, there is less land available for development and less overall development pressure because of stricter regulations. Residents in these communities may not

feel that development and growth are problems, or may believe that existing regulations provide adequate land protection already. We interpret this as a substitution effect, rather than an anti-environmental or anti-government effect, and it is consistent with the argument that regulatory measures and preservation through acquisition can be substitutes. This agrees with the analysis that voters believe that regulatory approaches are no longer adequate in preserving the desired amount of land.

It is also worth noting that none of our variables measuring explicit fiscal or racial motivations in open-space preservation are significant. While voting for additional open space preservation funding at a state level is a reaction to growth and development pressures (the coefficient on population growth rates is significant and positive), it is a generalized reaction to growth, rather than based in explicitly racial or fiscal motivations.

EXPLAINING MUNICIPAL OPEN SPACE ACQUISITION BEHAVIOR

Voting on statewide referenda to create dedicated state funding for open space represents one way local voters express preferences for additional open space protection. In this section, we estimate regressions to explain the actual open-space acquisition behavior of municipalities. Because acquisition efforts are undertaken by municipal governments, we would expect these efforts to reflect the policy interests of local residents and local politics. We examine acquisition during two distinct time-periods, from 1986-1995 and from 1995 to 2003, or roughly before and after the state referendum. We model these two time periods to estimate the changes in municipal behavior in response to a changing state policy environment. As Figure 1 demonstrated, during 1996, the number of municipalities with dedicated open-space taxes increased dramatically. Between 1986 and 1995, only 57 municipalities acquired open-space land through local efforts, while during the 1995-2003 time period, 216 did.

The dependent variable is the amount of land preserved on a per-capita basis during each time period. We use land on a per-capita basis, following Bates and Santerre (2001) and in keeping with standard local public finance analysis. One complication for standard linear regression techniques is that this variable is censored because we do not observe the amount of open-space preserved by municipalities that do not preserve any land. Because the data are left-censored, the objective function is "kinked," making standard regression techniques biased. Therefore we use the Tobit regression technique, utilizing Maximum Likelihood Estimation. The interpretation of coefficients in a Tobit model is complicated. For non-zero observations, the interpretation of the coefficients is the same as in OLS regressions: the marginal effect on the dependent variable of each independent variable. However, if one wants to use the coefficients as measuring the "true" marginal effect over all observations, it would only be relative to a "latent" dependent variable. We could think of our "latent" dependent variable in this case as "willingness to preserve open space." The Tobit regression results are presented in Table 2, with results from 1986-95 on the left side, and from 1995-2003 on the right side.

TABLE 2 ABOUT HERE

In both time periods, population growth rates are significant and positive, indicating that municipalities which saw more rapid growth showed a higher willingness to preserve open space with local funds. This is consistent with the hypothesis that open-space preservation efforts are undertaken in response to local population growth and development pressure. We also find that income is significant and positive in both time periods, indicating an income elastic demand for open space, also consistent with previous studies.

As hypothesized, the determinants of municipal open space preservation changed over the two time periods, as the number of municipalities preserving open space dramatically increased due to the statewide policy changes of increased availability of funding mechanisms to increase the ability of local preservation.

During the 1986-1995 time period, the only two other significant variables (other than population growth rate and income) are the percent of housing units owner-occupied and municipal population density. Population density now shows the expected negative sign, with more densely populated areas protecting less open space on a per-capita basis, or less dense areas protecting more land on a per-capita basis.

Prior to the availability of matching funds from the state government, homeowners faced the full cost of local open-space preservation in the form of additional property taxes. Thus, all other things being equal, higher rates of homeownership were associated with lower willingness to preserve open-space. The restrictive zoning favored by "homevoters" could substitute for open-space preservation by requiring each new household to provide private open space through large minimum lot requirements. In communities with high degrees of owner-occupied housing, there may have been no need for additional open space preservation through local funding since zoning already reduced development densities. Before state matching funds, owner-occupiers were less supportive of purchasing open space, presumably because of the additional tax burden.

However, as shown above, high homeownership rates were associated with increased voter support for dedicated funding at the state level. The effect of state matching funds is to reduce the marginal cost of preservation to local property taxpayers, as local taxpayers only paid approximately half of the costs of acquisition efforts. Therefore, after the GSPT (our second time period), the owner-occupied housing variable is no longer statistically significant. Once the

financial incentives are different, the negative impact of open-space funding on homeowners through increased property taxes is balanced by the positive impact of open space preservation on property values.

In comparison with the first time period before the GSPT, the variables which become statistically significant in the second period measure land use and the institutional mechanisms of open-space preservation. In the later time period, the negative coefficient on percent developed indicates that municipalities with more undeveloped land had a greater willingness to acquire open space. Municipalities in the Pineland region were less willing to preserve land (on a per-capita basis) because regulatory measures already protect vulnerable landscapes.

The positive coefficients on non-local acquisition (acquisition by county and state governments inside the borders of the municipality) indicate that non-local acquisition serves as supplement to local acquisition efforts: as the level and pace of non-local acquisition was higher, a municipality is more willing to preserve additional lands with its own funds. Our complimentary effect is contrary to Bates and Santerre (2001) who find that non-local preservation substitutes for (or crowds out) local acquisition efforts in Connecticut. We suspect that the difference lies in the financing mechanism in New Jersey , because matching grant programs encourage additional municipal acquisition without municipalities facing the full costs. Our results suggest that that municipalities are clearly responsive to financial and policy instruments in their local open-space preservation efforts.

IS OPEN SPACE PRESERVATION EXCLUSIONARY?

The above analyses on voting and acquisition behavior, while indicating that open space preservation policies are associated with higher income areas, faster rates of population growth and in response to homeowners' concerns to protect property interests, show no evidence of

explicitly exclusionary motives. However, as we have argued, open space preservation may still serve as a complement or supplement to other local exclusionary policies if it is utilized by wealthier communities to obviate their needs to provide affordable housing, and/or if municipalities disproportionately target lands able to accommodate higher density development for open space preservation. If municipalities have large amounts of potentially developable land available, they could presumably provide some amount of land for affordable housing development while also preserving large amounts of open space. If they did so, then open space preservation wouldn't necessarily be exclusionary, but would represent an attempt to balance between growth and preservation needs.

The link between open space preservation and affordable housing is not simply an "academic" concern. The New Jersey Supreme Court recently dealt with a case involving just such a policy "trade-off." In December 2006, the Court decided a case involving a township's use of eminent domain authority to acquire land under its open space acquisition program – land which had *already* been granted development approval for houses (*Mount Laurel Township v. MiPro Homes, L.L.C.* 188 N.J. 531; 910 A.2d 617 (2006), *cert. denied*, 76 U.S.L.W. 3167 (U.S. Oct. 1, 2007)).

In order to explore the exclusionary effects of open-space policies, we employ two further layers of analyses. First, we investigate the relationship between acquisition practices and the provision of local affordable housing. Second, we examine whether locally preserved open space is targeted towards areas planned for higher density development. The series of "Mt. Laurel" court cases in the 1970s and 80s established the "fair share" doctrine: "Every …. municipality must, by its land use regulations, presumptively make realistically possible an appropriate variety and choice of housing … to the extent of the municipality's fair share of the

present and prospective regional need therefore." *So. Burlington Cty. NAACP v Tp. of Mt. Laurel,* 67 N.J. 151, 336 A.2d at 724 (1975), *cert. denied*, 423 U.S. 808 (1975). However, once a municipality has satisfied its "fair share" obligations, they may engage in "large-lot and open area zoning, that would maintain its beauty and communal character." *So. Burlington Cty. NAACP v Tp. of Mt. Laurel* 92 N.J. 158, 456 A.2d at 421 (1983).

The Fair Housing Act of 1985 established the Council on Affordable Housing (COAH) as an implementation of the court mandates. COAH calculates the number of affordable units a municipality is responsible to produce. Municipalities that submit plans to meet their current and future need can be certified by COAH and be exempt from developer-initiated lawsuits. However, municipalities may "transfer" up to half of their affordable-unit obligations to "receiving" municipalities in exchange for negotiated payments, called Regional Contribution Agreements. In this way, "sending" municipalities (generally suburban and rural) may sell up to half of their affordable housing obligations[1] (Hughes & McGuire, 1991).

We argue that if municipalities are sending their affordable housing obligations outside of the municipality while simultaneously preserving open space, this constitutes evidence consistent with exclusionary policies. To test this, we examine data from COAH on the number of total regional affordable units transferred since the 1985 Fair Housing Act. Since 1985, 107 municipalities have sent their affordable housing obligations to 45 receiving municipalities. Using a simple correlation analysis (n=107), we find a statistically significant and positive correlation (ρ = 0.2518) between the amount of local open space acquisition (on a per-capita basis) and the number of affordable housing units sent. These results are suggestive of efforts to exclude lower-income affordable housing in municipalities that are also preserving large amounts of open space.

In the second line of analysis, we examine the characteristics of actual parcels acquired by local government to see if parcels are targeted that could serve higher density development. As an indicator of the capacity of land to support development we use areas that are serviced by public sewers. Indeed, sewer service is at the center of much debate in New Jersey concerning preserving open space and managing growth (Paulsen, 2006). If land is serviced by sewers, it can be developed at higher densities and is usually so designated on state and regional land use plans. If municipalities have planned for sewer service to be available, that is an indication that these lands were once planned for development to meet forecasted growth needs. If, as we hypothesize, municipalities engage in preservation as a tactic to thwart overall development and particularly higher density development, then their acquisition efforts would disproportionately target land in sewer service areas.

In order to examine this question, we use a GIS database of all land acquired through the Green Acres program through 2003. This digital data at the parcel level includes information on whether the land was acquired by municipal, county, or state governments or by a non-profit land trust. We combine this parcel level data with a statewide layer of approved sewer service areas from the New Jersey Department of Environmental Protection. Using overlay analysis, we can determine whether parcels acquired using Green Acres funding were located within sewer service areas. Table 3 presents the results, which measures the percent of land acquired for open-space preservation in sewer service areas by acquiring agent.

TABLE 3 ABOUT HERE

We find that 42% of all municipal land acquisitions with state matching funds occurred within sewer service areas, while only 11% of non-profit and 5% of state acquisitions were in

sewer service areas. These differences are statistically significant at the 1 percent level. Therefore, relative to state and non-profit acquisition, municipalities disproportionately target areas serviced by sewers in their acquisition practices. Non-profit and state acquisitions are less tied to local politics, and therefore they can focus on regionally important environmental objectives.

In order to adjust these measures to control for total land area, we create an index of sewered land preservation intensity, measured as the percentage of acquisitions in sewered areas divided by the percent of the land area which is sewered. A score greater than 1 would indicate that relatively more acquisition was occurring in sewered areas. For example, if 20 percent of open space acquisitions were in sewered areas, while sewered areas represented only 10 percent of the land area of the municipality, an index score of 2 would indicate that sewered areas were disproportionately targeted for acquisition.

We calculated this index (shown in the third column in Table 3) for acquisitions at the state, non-profit and municipal level. As non-profits are active over the whole state, we calculated total land area as comprising the whole state, and measured total non-profit acquisitions throughout the state. For municipalities, we calculate the index only for those 289 municipalities that had both sewer service areas and local acquisition of open space.

Even controlling for land area, municipalities tend to disproportionately target areas serviced with sewers for acquisition, while state government and non-profit actors tend to target areas without sewer service available. At a minimum, these findings indicate that municipalities are not adequately integrating open space preservation planning with their infrastructure planning. Land within sewer services is generally more expensive because it can support more development, and thus fiscal resources for open space preservation may be inefficiently used.

However, we think this evidence suggests a municipal policy to use open space preservation to thwart development.

DISCUSSION AND POLICY RECOMMENDATIONS

New Jersey is often heralded as a leader in both open space protection and in restrictions on municipal exclusionary zoning. The evidence in this paper, however, suggests that those two important state policy goals may be in conflict. Municipalities may be using the policy objectives and mechanisms of one policy – open space preservation – to thwart or evade their "fair share" affordable housing obligations. All states face the competing challenges of preserving lands and protecting landscapes, while also needing to ensure an adequate supply of affordable and/or higher-density housing. While some areas – notably Oregon – have responded with strong regional planning, others have promulgated state policies and spending in functional areas such as land preservation or affordable housing, but leaving implementation in the hands of municipalities. The New Jersey experience presented here suggests a number of lessons for policy.

First, our results indicate that municipal efforts to acquire and preserve open spaces are sensitive to the particular financial and institutional mechanisms involved. Prior to a dedicated source of funding from state sales taxes and bond revenues, few municipalities had dedicated taxes to preserve open space. However, after the availability of streamlined access to dedicated funds and 50 percent matching grants, there was a rapid proliferation of preservation efforts. Advocates for increased funding for open space preservation in other states can learn that dedicated state funding sources may be necessary. Because open space acquisition efforts by municipalities provide important environmental and aesthetic services to non-residents and

because homeowner-voters who control local politics are sensitive to additional property taxes, there is a rationale for sources of funding at higher levels of government. In the case of New Jersey, the 50 percent matching grant lowered to property-tax cost of acquiring open-space to local residents enough that they were willing to impose additional taxes for open space preservation.

Our second recommendation derives from the positive support for open space preservation from urban residents, which also relates to addressing some of the equity concerns in open space funding. Urban residents were supportive of the state referenda to dedicate $1 billion in funding. We attribute this difference to the increased matching percentage (75 percent) available to urban municipalities and to the recognition of the importance of open space preservation. Other states seeking to preserve open spaces may gain broader political support (and increase regional equity) with similar matching grant incentive structures.

Our third recommendation involves the competing state policy objectives evidenced in this paper. Municipalities in New Jersey can have their affordable housing plans certified by COAH, and can have their open space plans approved by the Green Acres program, but no state agency evaluates municipal plans for consistency across these two policy areas. While it may not always be advantageous to mandate state oversight or certification of all municipal policies, when important state policy objectives and large amounts of state funding are at stake, better inter-agency coordination would seem warranted. There are also a number of New Jersey specific reforms which could be made to reduce the possibility that open space preservation functions as exclusionary zoning, including elimination of the ability of municipalities to “send” away their affordable housing obligations or providing extra financial incentives to municipalities which do meet affordability targets.

APPENDIX A

VARIABLES USED

Variable	Definition
Dependent Variable:	
Percent voting yes (1998 GSPT referendum)	Percent voting yes (of those voting) in the 1998 referendum
Local acquisition (1986-1995, 1995-2003)	Acres of land per capita preserved by the municipality during the time period.
Independent variables:	
Total non-local acquisition (1986, 1995)	Acres of land per capita preserved by state or federal government during the time period.
Percent developed (1986, 1995)	Percent of municipal potentially developable land converted to urbanized uses. Potentially developable land is municipal land area minus lands in water, wetlands, or slopes > 15 percent.
Per capita property tax base (1986, 1995)	*From New Jersey Legislative Data Book*; 1987 and 1996, Center for Government Services, Rutgers University. Normalized to real 2003 $ using BLS implicit GDP deflator.
Percent owner occupied (1990, 2000)	Percentage of housing units which are owner occupied, from 1990 and 2000 US Census.
Relative percent black (1990, 2000)	Distance-weighted average of all neighboring municipalities' percent black residents from 1990 and 2000 US Census.
Distance to nearest exit	Euclidean distance (in miles) to nearest major highway on/off ramp. "Major highways" were: the New Jersey Turnpike, The Garden State Parkway, the Atlantic City Expressway, and Interstates 78, 80, 195, and 287,
Distance to NY or Phil.	Euclidean distance (in miles) from each municipality's centroid to either Manhattan or Philadelphia, whichever is closer
Agricultural value (1987, 1997)	County wide average price per acre of agricultural land from the 1987 and 1997 Census of Agriculture (USDA)
Population rate (1986 – 1995, 1995-2003)	Municipal population growth (numerical) during the period divided by base population level.
Urban population density (1986, 1995)	Municipal population divided by land classified as "urbanized" in NJ DEP digital land database.
Per capita income (1986, 1995)	From New Jersey Dept. of Labor. Normalized to real 2003 $ using implicit GDP deflator.
Pineland dummy	Dummy variable coded as 1 if municipality is in Pinelands region.
CAFRA dummy	Dummy variable coded as 1 if municipalities are subject to Coastal Area Facilities Review Act (CAFRA)
Percent over 65 (1990, 2000)	Percent of municipal population age 65 and older, from 1990 and 2000 Census.
Median house age (1990, 2000)	From 1990 and 2000 Census.

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APPENDIX B: MEANS, STANDARD DEVIATIONS, MINIMUM AND MAXIMUM VALUES, AND DATA SOURCE

Variable	Mean	Standard Deviation	Minimum Value	Maximum Value	Data Source
non-local acquisition, 1986-1995	0.020772	0.124057	0	2.414295	DEP
local acquisition, 1995 - 2003	0.015644	0.079817	0	0.995577	DEP
1986 total local open space	0.006358	0.062733	0	1.456992	DEP
1995 total local open space	0.008036	0.053945	0	1.120824	DEP
1986 total non-local open space	0.122136	0.731653	0	12.2415	DEP
1995 total non-local open space	0.130891	0.728564	0	10.23704	DEP
local acquisition, 1986-1995	0.020772	0.124057	0	2.414295	DEP
non-local acquisition, 1995-2003	0.042557	0.169177	0	2.026028	DEP
1986 percent developable	0.582772	0.303545	0.001298	1.11512	Authors
1995 percent developable	0.60571	0.292766	0.001259	1.162223	Authors
1986 per capita property tax base	86626.34	101740.8	2192.953	1257675	CGS
1995 per capita property tax base	106037.2	129569.7	8123.903	1325449	CGS
1990 percent owner occupied	0.734533	0.168719	0.121602	0.961571	US Census
2000 percent owner occupied	0.740178	0.174933	0.181663	0.975833	US Census
1990 relative percent black	1.131355	2.221777	0	26.88	Authors
2000 relative percent black	0.901843	1.448896	0	12.75857	Authors
Distance to nearest exit	4.531111	4.431812	0.038707	26.54756	Authors
Distance to NY or Phil.	29.58027	15.73635	2.22	74.44	Authors
1987 agricultural value	14260.74	14909.88	3275.53	48131.28	USDA
1997 agricultural value	16816.64	20359.95	4286.7	92720.18	USDA
population rate, 1986-1995|	0.068414	0.131322	-0.51	0.73	US Census
population rate, 1995-2003|	0.07508	0.129352	-0.558	1.627	US Census
1986 urban population density	9.761225	55.20297	1.014984	1303.678	Authors
1995 urban population density	9.625322	52.34165	1.098668	1233.59	Authors
1986 per capita income	30836.62	13372.82	10823.22	137845	US Census
1995 per capita income	30239.07	12364.85	10317.58	122111.1	US Census
Pineland dummy	0.098039	0.297633	0	1	Authors
CAFRA dummy	0.196078	0.397383	0	1	Authors

NOTES

1. While this paper was under review at this journal, in July 2008 the "Regional Contribution Agreement" process was eliminated by legislation passed by both houses and signed by the Governor: A500; P.L. 2008, c. 46.

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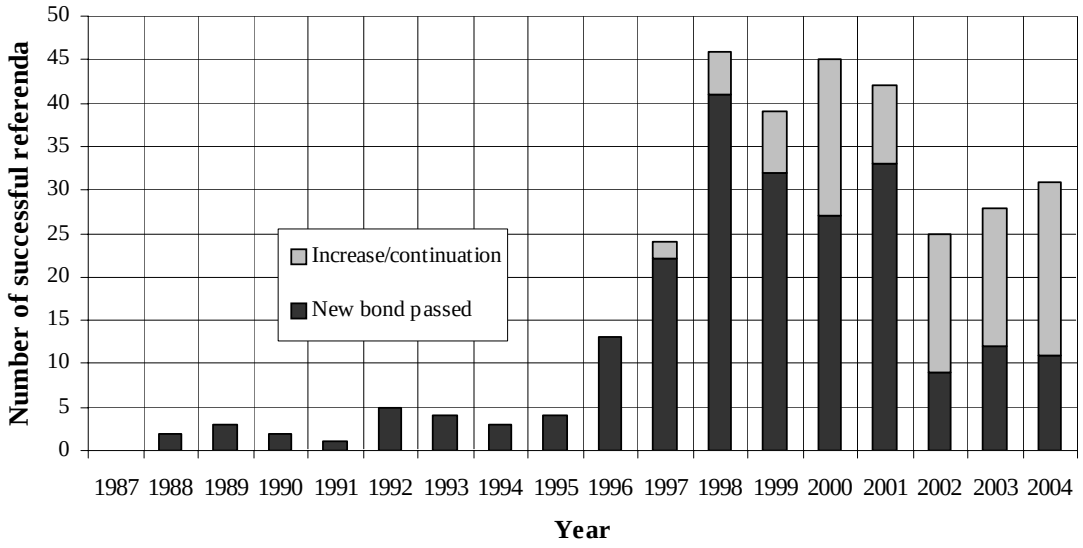
Figure 1. Number of new and continuing successful open-space tax referenda.



SOURCE: New Jersey Green Acres program

Table 1: Regression Results: determinants of municipal votes (percent yes) on Garden State Preservation referendum.

Variable	Coefficient	p-value
Constant	1.41259	0.06 *
1995 percent land developed	0.01172	0.40
2000 relative percent black	-0.00147	0.45
1995 per capita property tax base (thousands)	0.00002	0.55
2000 percent owner occupied	0.03963	0.07 *
2000 percent over age 65	-0.03154	0.58
Distance to NY or Phil.	-0.00038	0.19
Distance to nearest exit	0.00132	0.06 *
2000 median house age	-0.00044	0.25
Population growth rate (86-95)	0.07768	0.01 **
1995 urban population density	0.00007	0.01 **
1995 per-capita income (thousands)	0.00288	0.00 **
Pineland dummy	-0.05485	0.00 **
CAFRA dummy	-0.03789	0.00 **
Adjusted R2	0.4331	
Number of observations	561	

** Significant at 5% level

* Significant at 10% level

Error terms are based on White's heteroskedasticity consistent variance matrix.

Table 2 Determinants of per capita local open space preservation

Determinants of local per-capita open-space preservation

	1986-1995 local acquisition				1995-2003 local acquisition		
Variable	**Coefficient**	**T-value**		**Variable**	**Coefficient**	**T-value**	
Constant	0.005919	0.08		Constant	-0.090624	-1.57	
1986 total non-local open space	-0.021617	-1.13		1995 total non-local open space	-0.159342	-1.27	
1986 total local open space	-0.251844	-0.45		1995 total local open space	0.044469	5.31	**
non-local acquisition, 1986-1995	0.078601	1.24		non-local acquisition, 1995-2003	0.092511	2.01	**
1986 percent developed	0.004774	0.11		1995 percent developed	-0.098480	-2.87	**
1986 per capita property tax base	0.000000	-1.13		1995 per capita property tax base	0.000000	-1.51	
1990 percent owner occupied	-0.131786	-2.04	**	2000 percent owner occupied	0.034031	0.67	
1990 relative percent black	-0.002197	-0.59		2000 relative percent black	0.002101	0.42	
Distance to nearest exit	-0.000314	-0.21		Distance to nearest exit	0.002170	1.58	
Distance to NY or Phil.	0.000259	0.37		Distance to NY or Phil.	0.000528	0.92	
1987 agricultural value	-0.000001	-0.88		1997 agricultural value	0.000000	-0.39	
population rate, 1986-1995	0.101384	2.02	**	population rate, 1995-2003	0.080186	1.69	*
1986 urban population density	-0.011122	-2.32	**	1995 urban population density	0.000046	0.45	
1986 per capita income	0.000001	1.95	*	1995 per capita income	0.000001	1.77	*
Pineland dummy	0.024887	1.14		Pineland dummy	-0.062017	-2.85	**
CAFRA dummy	0.018766	0.85		CAFRA dummy	0.011043	0.55	
LR chi2(15)	46.42			LR chi2(15)	135.27		
Prob > chi2	0			Prob > chi2	0		
Log likelihood	-32.192957			Log likelihood	13.745016		
Sample Size (N)	561			Sample Size (N)	561		
Uncensored observations	57			Uncensored observations	216		

** Significant at the 5% level.

* Significant at the 10% level.

Table 3 Open space acquisition intensity in sewered areas.

Level of acquisition	Percent of acquisition in sewered areas	Index score
Municipal government	42%	1.22 (average)
Non-profit land trust	11%	0.29
State government	5%	0.13