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Putting Private Lands into Public Hands: Explaining Voter Choices to Purchase Public Lands*

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The closing decades of the 20th century witnessed a remarkable trend towards open markets, deregulation, and privatization of state assets, in the developed and developing worlds.[1] Skeptics from the political right (Lindsey, 2002) and the political left (Stiglitz, 2002) agree that these trends, unforeseen at the beginning of the last century, will continue. Markets are playing an even greater role in conserving environmental and natural resources (Anderson and Leal, 2001). For example, individual transferable quotas are making markets possible for fish, such as Alaskan and British Columbian halibut and Australian blue tuna. Similarly, mitigation permits are creating markets in wetlands, and electric utilities have traded sulfur dioxide emissions since congress amended the Clean Air Act in 1990. Market-driven environmental decision-making is also protecting some ecologically-sensitive coastal areas (Rinehart and

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[1] See Yergin and Stanislaw (2002) for a readable account of this trend.

Pompe, 1998). In addition, private land purchases to protect and preserve environmental amenities are increasingly common, with nonprofit organizations such as the Nature Conservancy and smaller land trusts protecting approximately 17 million acres in the United States.[2]

Nevertheless, the public=s trust in government to own and manage environmental and natural resources remains strong. Citing numerous surveys, Russel Shay of the Land Trust Alliance notes that 88% of voters nationwide agreed that >we must act now or we will lose many special places, and if we wait, what is destroyed or lost cannot be replaced.= (LandVote 1999, p. 2). In addition, he notes that 32% of voters identified protecting natural lands as >one of the most important things= state and local governments should focus on (LandVote 1999, p. 3). Governors from New Jersey (Christine Todd Whitman) to California (Gray Davis) have championed their states= efforts to protect open lands. As Whitney Clark, Executive Director of the Friends of the Mississippi River, said, >People care about the environment and are willing to pay to protect it [through government] when the benefits are clear and close to home= (Landvote, 2002, p. 9).

[2]For a discussion of the growth of land trusts in the U.S., see Mulholland (2001) and Albers and Ando (2003).

The trend towards increased public land purchases has important implications for private development and public land management, and calls for an examination of the determinants of these purchases. Our purpose is to conduct a positive analysis of voters= decisions that direct municipal governments to purchase private lands and conservation easements. Specifically, we attempt to identify, measure, and test the significance of social and economic factors that influence the likelihood that voters will direct a municipal government to purchase private land or conservation easements for public uses such as parks, recreation, conservation, and historic preservation. Our results yield insights that may be of interest to academics, policymakers, and ordinary citizens who want to more fully understand the trend towards greater public land purchases, a trend that runs counter to the broad movement towards markets of recent decades.

In the following section we document the trend of greater local government purchases of public land and conservation easements in the U.S. The next section examines theories of voter behavior that have bearing on the empirical model and estimates that follow in the succeeding sections. We offer some final thoughts in the conclusion.

Open space ballot measures: examining the rend

The concern about protecting open space is fueled in large part by rapid urban development and sprawl. A recent study by the Brookings Institute reports that from 1982 to 1997, the amount of urban land in the U.S. increased from 51 million acres to 76 million acres, an increase of 47 percent, compared to a 17 percent increase in the U.S. population. Metropolitan density fell in 264 of 281 areas surveyed, and density fell even more rapidly in non-metro areas (Fulton, et al. 2001). The commonly-cited consequences of sprawl are traffic congestion, longer commutes, greater pollution, erosion of

inner cities, and, of particular importance to this paper, the loss of open space.[3]

[3]See the Sierra Club=s 1998 Sprawl Report at: www.sierraclub.org/sprawl/report98 and the Sierra Club=s 1999 Sprawl Report at www.sierraclub.org/sprawl/ report99 for additional discussions of the problems of urban sprawl.

The benefits of preserving open spaces such as forests, wetlands, farmland, and historic sites are evident. For example, wetlands purify water, forests absorb carbon dioxide, and undeveloped areas provide habitat for wildlife. Nevertheless, a complete analysis of assigning environmental resources to the state must consider not only the benefits of open spaces, but also the consequences of public ownership and management, some of which may be detrimental to the environment. For even if private development is averted and this is not certain to be the case as shown by the aftermath of the Supreme Court=s 1992 Lucas decision,[4] the incentives of, and constraints on, public land managers may be inconsistent with the preservation and conservation of environmental resources. One problem that may arise is overuse by a public that now owns the resource. If all citizens pay taxes, all feel entitled to use public lands, and attempts to exclude (e.g., pricing at state and national parks) raise the ire of many citizen-taxpayers. Further, if one faction of the citizenry objects to use by another, conflicts among citizens and interest groups may arise, placing public managers in the difficult position of trying to satisfy conflicting constituencies.[5] Compounding all these problems are the short time horizons of public managers. In the worst case, publicly-owned and managed environmental resources are at the mercy of politics (Bethell, 1998, p. 274).

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[4]In this landmark decision, the Supreme Court ruled the state of South Carolina must compensate landowner David Lucas for effectively taking his property through legislation designed to limit beach erosion. The state bought the property from Lucas, but subsequently sold it for development. See Rinehart and Pompe (1995) for details.

[5]For a case study of these problems when Duke Energy sold 33,000 acres in the Blue Ridge Mountains to the state of South Carolina, see Lipford, Slice, and Yandle (2002).

Voters can express their preference for open space at the ballot box in two ways. Voters can support regulatory referenda, such as urban growth boundaries and zoning restrictions, which restrict land development to designated areas. The costs of such regulatory options are diffused, but generally fall on property owners who receive lower rents for property that cannot be developed.

Alternatively, voters may approve measures that increase taxes or issue bonds to purchase public lands. Data indicate broad public support for the purchase of open space in most states. The Trust for Public Land and Land Trust Alliance track state, county, and local initiatives (which are placed on ballot by citizens= petition) and referenda (which are placed on ballot by referral from town or city council, county board of commissioners, or state legislatures). As shown in Table 1, the support for initiatives and referenda that purchase open space or conservation easements, whether for parks, farmland preservation, wildlife habitat, or wetland protection, is overwhelming. Over the past six years, in 41 different states, local governments have passed 734 of 923 ballot measures (almost 80 percent) and appropriated $26.2 billion. Some statewide measures have passed as well. In 1998, for example, the state of Florida passed a measure that gave the state legislature the power to sell bonds for land conservation indefinitely. The strong support for land purchases in recent years is especially noteworthy, given the sluggish economies and budget deficits of many states. However, in 2003, states passed the fewest ballot measures since the Land Trust Alliance and Trust for Public Land began tracking this movement in 1998.

The popularity of open-space measures varies widely across the nation. As shown in Table 2, the Mid-Atlantic region passed the most measures (320), and the West region passed the fewest (17). The states with the most passed measures are New Jersey, Massachusetts, Colorado, New York, and Pennsylvania with 225, 80, 46, 42, and 40, respectively. In 2003, New Jersey, which is the most

densely populated state in the nation, became the first state in which every county had approved an open-space ballot measure (Landvote 2003, p.1).

Despite polarization on many issues in recent years, support for open-space initiatives spans the political spectrum. In 2003, for example, even Republican-dominated Laramie County, Wyoming, approved a sales tax to raise $4.5 million to improve a local greenbelt. Also in 2003, a 71 percent majority passed a $5.4 million bond issue in Republican-dominated Salt Lake City (Carlton, 2003).

Although the popularity of open-space measures is evident, there is not much information about the factors that explain this popularity. Yet, two studies examine some issues that are similar to our paper. Bates and Santerre (2001) explain the demand for open space in 169 Connecticut cities and towns. Their key findings are that the demand for open space is price inelastic and income elastic. They also find that land owned by the federal and state governments is a weak substitute for locally-owned public lands, and, surprisingly, that population growth does not exert a significant effect on the demand for locally-owned open space. Albers and Ando (2003) determine the optimal number of private land trusts in a state. Variables that explain the variation in the number of conservation groups include the percent of urban land, population, degree of environmentalism, and the amount of government-protected land. Although our study is significantly different from the above two papers, we find some similarities, which we discuss in the results section. But, first we turn to theories of voter behavior.

Theories of voter behavior

Two theories of voter behavior are postulated in the economics literature. One theory argues voters are rational, self-interested, and well informed (Wittman 1989). The implication of this theory is that political outcomes, like their market counterparts, are efficient.[6]

[6]For a critique of Wittman=s analysis, see Boudreaux (1996).

A second theory argues that political outcomes are likely to be inefficient because voters are rationally ignorant, rationally irrational, or both. The theory of rational ignorance asserts that the complexity of political issues makes voters poorly informed. This ignorance is exacerbated by the (potentially high) opportunity cost of voters= time and the trivial likelihood that any single vote will be decisive. Further, politicians have both the incentive and capability to raise transactions costs to voters, whose monitoring of politicians= activities might otherwise circumscribe the role and scope of government (Twight 1988, 1994). In a similar vein, the theory of rational irrationality (Caplan 2001b) asserts that the private cost of irrational political beliefs approaches zero because the marginal impact of a single vote approaches zero. The striking implication of this theory is that political failures, such as rent seeking, pork barrel politics, large and unresponsive bureaucracies, and public resistance to economic reforms, will be pervasive because the private cost of irrationality is less than the social cost. While theories of rational ignorance and rational irrationality are distinct (the voter is aware of his ignorance, but unaware that a rationally held belief is errant), both provide explanations of political failures.

Caplan (2001a) provides strong evidence that the theory of self-interested voters performs poorly in micro-level studies of a wide array of economic beliefs. Indeed, the idea variables of education, ideology, and party affiliation are powerful determinants of voter opinion. On the other hand, the self-interested voter hypothesis fails miserably in the face of evidence that income is not a significant determinant of beliefs on regulation, tax policy, and income distribution, and that education is a significant determinant of beliefs on these issues, with educated people more likely to have lower estimates . . . of the economic damage of high taxes, foreign aid, welfare, and affirmative action (p. 554). Ideology may be especially likely to trump self interest when environmental issues are concerned

because social pressures may cause inflated valuations of environmental amenities (Boudreaux, Meiners, and Zywicki, 1999).

Entering the debate over voter rationality and the efficiency of political outcomes is beyond the scope of this paper. Nevertheless, we are informed by these theories and their implications for our empirical modeling and tests. We now turn to the empirical model.

Data and model

With much of the public and many environmental interest groups placing considerable faith in governments= ability to own and manage environmental resources, despite some evidence to the contrary, analysis of factors influencing this faith should yield valuable insights to economists, policymakers, and all parties with an interest in public lands. Rather than examining the amount of locally-owned open space, we estimate a model to determine the political outcomes of ballot measures to purchase open space. Specifically, our objective is to explain the percent of yes votes on ballot measures to use public funds to purchase open spaces. We use the LandVote studies from 1998 to 2003, which identify all state and local government initiatives and referenda on public purchases of open space.[7]

We may express our model in equation form as follows:

$$\text{Percent Yes Vote} = a_0 + a_1\text{BOND} + a_2\text{HOME} + a_3\text{ED} + a_4\text{INCOME} + a_5\text{CONSMEMB} + a_6\text{FARMACRE} + a_7\text{CHGACRES} + a_8\text{DENSITY} + a_9\text{SHORE} + a_{10}\text{FEDLAND} + a_{11}\text{STATEREG} + e.$$

[7]We note that only measures that made it to ballot are included in the data set (i.e., failed petitions are excluded from the sample). Also, we deleted referenda for statewide measures and park and recreation districts for which the geographic area is unclear.

The explanatory variables are method of finance (BOND) which equals 1 if the measure is bond-financed and 0 if tax-financed; the percent of owner-occupied housing in each municipality=s county (HOME); the percent of each municipality=s county population with at least a bachelor=s degree (ED); the per capita income of each municipality=s county (INCOME); the 1990 membership per 1,000 population in the Sierra Club, Greenpeace, and the National Wildlife Federation in each municipality=s state (CONSMEMB); the percent of each municipality=s county acreage that is farm acreage (FARMACRE); the percent change in farm acreage from 1992 to 1997 (CHGACRES); the population per square mile of each municipality=s county (DENSITY); a dummy variable equal to 1 if the municipality=s county is located on the Atlantic, Pacific, or Gulf coasts (SHORE); the percent of land in each municipality=s state that is owned by the federal government (FEDLAND); and a dummy variable equal to 1 if the municipality=s state received a summed land use rating from the Sierra Club of less than 11, indicating stringent regulation, and 0 if the rating is 11 or higher.[8] [9] Table 3 provides summary statistics for these variables.

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[8] The Sierra Club=s 1998 Sprawl Report rates each state=s land use planning as very effective (1 point), moderately effective (2 points), and not effective (3 points) by four criteria: the passage of statutes implementing statewide planning, the role state governments play in local land use planning, the strength of the state=s implementation program, and the consideration of field expert input. Because of relatively little variance in these ratings across states, we consider states with summed ratings of less than 11 to have effective regulation and states with summed ratings of 11 or higher to have ineffective regulation.

[9] Data for these variables comes for the following sources. The dependent variable and bond issue data come from the LandVote studies. Data on home ownership, education, income, farm acreage, and population density come from the U.S. Census Bureau, *County and City Data Book: 2000*. Data on federal land ownership comes from the U.S. Census Bureau, *Statistical Abstract of the United States: 2002*. Data on conservation membership comes from *1991-1992 Green Index*, Bob Hall and Mary Lee Kerr.

The dummy variable BOND determines whether general obligation bond-financed measures or tax-financed measures are more likely to pass. If the world is Ricardian, the variable should be insignificant. If voters are not completely rational, the sign should be positive.

The homevoter hypothesis provides a model to explain the popularity of open-space measures (Fischel, 2001). Fischel explains that homevoters (i.e., homeowners who are voters) have a strong interest in any issue that affects property values. Two-thirds of homes are
owner-occupied and for the great majority home equity is their most valuable asset (p. 4). If homeowners are rational and self-interested, they would favor open space protection because they wish to protect their property values. With increased sprawl over recent decades, homeowners are likely concerned that increased congestion and lost woodlands will lower property values. Numerous econometric studies of single-family homes have shown that the value of various location characteristics, including open-space, are capitalized into the home value (Frech and Lafferty [1984], Ford [1989], Do and Grudnitski [1995], Le Goffe [2000]). Therefore, even if a homeowner didn=t care about open space, he or she would care if a prospective buyer was concerned. Homevoters may also wish to simply restrict housing supply to increase the value of their existing homes.

We include education as an idea variable and believe its sign should be positive, if educated citizens are more likely to value environmental amenities and believe that government can and will protect and preserve public lands.[10]

[10] A referee questioned our assumption about the effect of education on votes to purchase public lands, arguing that educated voters should understand the potential for public mismanagement of land and the relative merits of privatization (i.e., free market environmentalism). Yet, as explained above, Caplan=s (2001a) empirical results find that educated voters are more likely to underestimate the inefficiencies of many government programs, such as those that redistribute income. If educated voters fail to understand the relative merits of private income redistribution (i.e., private charity) over inefficient and coercive state run income redistribution programs, we see no reason to think they should understand the relative merits of free market environmentalism over government ownership and management of environmental resources.

The sign on INCOME should be positive. Evidence on the environmental Kuznets curve shows that after some minimum standard of living has been reached, emissions of many pollutants from nitrous oxide, sulfur dioxide, and particulate matter in the air to biological oxygen demand, chemical oxygen demand, and some heavy metals in water fall. The explanation is that environmental amenities are income-elastic goods. As incomes rise beyond some threshold level, citizens express preferences for environmental quality by demanding more regulation and the elimination of government subsidies, while producers utilize cleaner production technologies (Gossman and Krueger, 1995; Dasgupta et al., 2002; and Yandle et al., 2002). If high income voters are more likely to consume and enjoy environmental amenities, such as open spaces, we expect the sign on INCOME to be positive and significant, provided these voters are also self-interested and rational.

CONSMEMB is expected to have a positive sign because conservation groups are likely to support public land purchases for ideological reasons. What matters is that members of environmental organizations are especially likely to believe in the merits of government land ownership and management, regardless of the reality. The appearance of caring about the environment is paramount and easily trumps any evidence of government mismanagement. FARMACRE, which should reduce the demand for public land purchases if farmland is a substitute, is expected to have a negative sign. We expect the sign of CHGACRES to be negative because a decrease in farm acreage (perhaps because of sprawl) will increase voter support for public land purchases. Similarly, FEDLAND should have a negative sign if federally-owned land is a substitute for state or local government-owned land. DENSITY should have a positive sign because greater crowding should raise the demand for public land purchases. We point out again, however, that

these predictions are contingent on voters being rational, well-informed, and self-interested.

SHORE is expected to have a positive sign because coastal areas have been particularly subject to population growth and developmental pressures.[11] We note too that the unique environmental amenities of coastal areas, from wildlife to water-cleansing salt marshes, may enhance voters= desire to appear to care for these areas.

Finally, the sign on STATEREG should be negative if voters rationally consider purchases of public lands as substitutes for land use regulations. Bolick (2000) argues that a (near) corner solution favoring regulation in lieu of purchases is more politically palatable than massive tax increases (p. 863), but the data on the number and value of public land purchases presented in Table 1 cast doubt on this argument.[12]

Empirical results and discussion

[11]Excluding the Great Lakes, the U.S. population living in coastal counties has grown from 84 million in 1970 to 121 million in 2000, an increase of 44 percent, compared to an increase of 34 percent for non-coastal counties. Approximately 43 percent of the U.S. population lives along the Atlantic, Pacific, and Gulf coasts. See U.S. Bureau of the Census, *Statistical Abstract of the United States: 2003*, Table 24, p. 27.

[12]We omit the amount appropriated per capita because these data are generally unavailable for failed measures. In addition, our data set does not provide information on the size or type of land purchases, making it impossible to determine exactly what voters get when land is purchased.

Although the model=s fit is not high, its overall explanatory power is significant, and the coefficient values and significance levels provide interesting insights into the factors determining citizens= willingness to vote for public purchases of open space. We now turn to those insights, interpreting them in light of the theories of voter behavior discussed above.[13] We examine columns one, two, and three first. Column one contains the complete model, while columns two and three omit the education and income variables, respectively.[14]

The coefficient on bond finance is positive and highly significant, casting doubt on an assumption of Ricardian rationality. The education and conservation membership variables are also positive and highly significant, showing ideology is an important determinant of voter behavior on environmental issues. We note Albers and Ando (2003) also find that environmental ideology is important, although they use a different measure.[15] The positive and significant coefficient on the SHORE variable likely reinforces this conclusion since many voters may believe preservation of these areas is especially important and a strong indicator of concern for the environment.

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[13]Because the dependent variable is constrained to values between 0 and 1, we conducted a logistic transformation for estimation. The results were comparable to those estimated when the dependent variable was not transformed. For ease of interpretation, we report in the tables and discuss in the text the results without the logistic transformation.

[14]We report regressions with ED and INCOME separately because of the high correlation between these variables. The simple correlation coefficient is 0.72.

[15]Albers and Ando use the percentage of voters who voted for George Bush in the 2000 presidential election, with low values signaling stronger environmental ideology.

The insignificance of the home ownership and density variables cast doubt on the self-interested-voter hypothesis, since self-interested voters should be especially likely to favor public land purchases, if they provide environmental amenities or restrict development so that home values rise. The insignificance of the farm acreage variables suggests voters do not consider these lands as substitutes for local government land purchases. And, of particular interest, income too is insignificant. Though this finding conflicts with that of Bates and Santerre (2001), it is consistent with the hypothesis that income is not a significant determinant of voter beliefs.

The negative and significant signs on federal land ownership and state land use regulations indicate voters may recognize federal lands and state regulations as substitutes for land purchased by local governments. In Caplan=s (2001b) model, the demand for irrationality depends on its price, measured in terms of foregone private wealth. Though the likelihood of any single vote determining an electoral outcome remains trivial, some voters may decide that restraints on economic development from federal land ownership and state land use regulations reach a point where, at the margin, it is rational to vote against additional public land purchases. At any rate, we note this finding is consistent with Bates and Santerre (2001) and Albers and Ando (2003).

In columns four and five, we report the results of further investigation of the preferences of homeowners. If self-interested, homeowners, with relatively long time horizons, should be willing to pay for the benefits of governmental conservation efforts. However, the sign on the home ownership variable is consistently negative and insignificant in the first three regressions. When we add an interaction variable equal to the product of the home ownership variable and a dummy variable equal to one if the funds for the

public land purchase are to be financed with property taxes,[16] we find that the coefficient on the home ownership variable remains negative, becoming significant in column five, and that the coefficient on the interaction term is negative and highly significant. When homeowners know property taxes will be used to fund public land purchases, their vote more closely approximates a private market decision so that they are less likely to support these purchases. We note, however, that the effect is quite small at -0.152 percentage points in the regression reported in column four and 0.174 in the regression reported in column five.

Modeling voter behavior is difficult. Yet, we argue such efforts are important, especially with regard to public land purchases that are growing in popularity across the U.S. We have drawn upon competing theories of voter behavior—one suggesting that voters are self-interested, rational, and well-informed, so that political outcomes are efficient, and a second, suggesting voters are rationally ignorant or rationally irrational, so that political outcomes are inefficient to inform our empirical model of voters= decisions to purchase public lands. Our findings are broadly consistent with theories of rational voter ignorance or irrationality. Bond finance, education, and membership in ideologically-driven environmental groups are significant determinants of voter preferences on local referendums and initiatives to purchase public land, regardless of any resultant inefficiencies from public management, while income and population density are not. However, we are reluctant to completely disregard the self-interested voter hypothesis, as voters appear less likely to support public land purchases if *their* taxes are being raised to fund

[16]We omit BOND because of its high correlation with the interaction term. The simple correlation coefficient is 0.7.

these purchases. Further, our findings indicate voters may recognize the loss of private wealth from public land purchases at the margin, when federal land ownership is extensive and state land use regulations are stringent, and that this recognition may be reflected at the ballot box, despite the insignificance of any single vote. What we may conclude is that to the extent that rational voter ignorance and irrationality are present, the amount of land owned and managed by government will not be optimal.

Conclusion

Many U.S. citizens are concerned by the negative impacts of sprawl as indicated by the popularity of >smart growth= planning. One way for voters to express this concern is to pass local referenda and initiatives to fund public purchases of land and conservation easements to preserve open space and protect environmental amenities. This trend is widespread and expanding, as shown by the large number of ballot measures that pass and the billions of dollars they appropriate for these purposes.

Recognizing the importance of this trend, not only for development, but also for lands owned and managed by the public, we have investigated the factors that influence voter preferences on local government proposals to purchase land and conservation easements. Our investigation yields interesting insights that we hope further the understanding of economists, policymakers, and all parties with an interest in public lands.

Table 4
Regression Results

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Table 1
Ballot Measures to Purchase Land for Open Space Protection

Year	No. of Ballot Measures	Number Passed	Percent Passed	Amt. Appropriated for Open Space Protection (billions of $)
1998	150	126	84	$ 8.3
1999	102	92	90	$ 1.8
2000	210	174	83	$ 7.5
2001	196	137	70	$ 1.7
2002	188	141	75	$ 5.7
2003	77	64	83	$ 1.2
Totals	923	734	79.5	$26.2

Sources: LandVote 1989-2003, by The Trust for Public Land and Land Trust Alliance.

Table 2
Ballot Measures by Region

Region	Number of Ballot Measures Passed
New England	154
Mid-Atlantic	320
Southeast	53
Midwest	57
Southwest	34
Rocky Mountain	54
West	17

Note: New England region consist of CT, ME, MA, NH, RI and VT. The Mid-Atlantic region consists of DE, MD, NJ, NY, PA, VA, and WV. The Southeast region consists of AL, Ar, FL, GA, KY, LA, MS, NC, SC and TN. The Midwest region consists of IA, IL, In, KS, MI, MO, MN, NE, ND, OH, SD, and WI. The Southwest region consists of AZ, NM, OK, and TX. The Rocky Mountain region consists of CO, Id, MT, UT, and WY. The West region consists of AK, CA, HI, NV, OR, and WA.