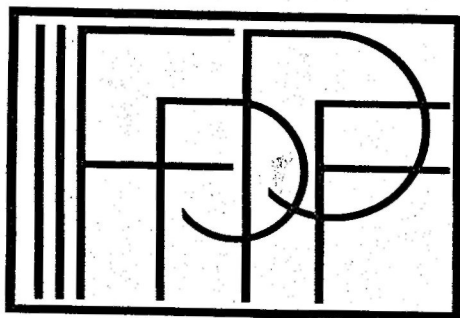


PUBLIC FINANCE

FINANCES PUBLIQUES



**ON THE ROLE
OF BUDGETARY POLICY
DURING DEMOGRAPHIC CHANGES**

Proceedings of the 48th Congress of the
International Institute of Public Finance / Institut International
de Finances Publiques
Seoul 1992

Edited by Barbara L. Wolfe

Supplement

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Demographic Characteristics and the Public Bundle*

David M. Cutler, Douglas W. Elmendorf,
and Richard J. Zeckhauser**

Abstract

This paper explores the relationship between the demographic characteristics of a community and the quantities of goods and services provided by its government, what we label the "public bundle." We consider three models of public spending. The first is a traditional "selfish" public choice model in which individuals care only about themselves and not about others. The second is a "community preference" model in which an individual's preferred spending depends on the characteristics of his or her community, either in a discriminatory fashion, where an individual's concern for other people depends on their similarity to that individual, or in an even-handed way, where an individual's concern for others depends on those people's needs but not their identities. The third model presents a sorting process through which individuals choose communities according to their tastes for public spending. To evaluate these models of spending, we examine how county and state spending in the United States is affected by the age and racial composition, and the total size of a jurisdiction. We find that the estimated effects of demographic characteristics in the state equations are strikingly different from the estimated effects in the county equations. One possible explanation for these differences is that a jurisdiction's spending is affected differently by its own demographic characteristics and by the characteristics of the surrounding area. We conclude that community preference is important in explaining local spending, but that its determination is more complex than simple theory suggests.

Japan's population is rapidly aging. In Europe, foreign nationals flow across borders. The Soviet Union, Czechoslovakia and Yugoslavia have splintered along

* We are grateful to Robert Haveman, Jim Hines, Marjorie Honig, Ted Lascher, Richard Musgrave, Jay Patel, Jim Poterba, Julie Wilson, and Barbara Wolfe for helpful comments, and to Anne Case, Jim Hines and Harvey Rosen for providing data. We are also grateful to Andrew Wang for excellent research assistance, and to the Hewlett Foundation, the National Bureau of Economic Research, the National Institutes on Aging, and the National Science Foundation for financial support.

**Harvard University and NBER, Cambridge, USA.

ethnic lines. And in the United States, the non-white share of the population continues its rapid increase.¹ As the demographic compositions of political jurisdictions change, their citizens' preferences for public expenditures may change as well. This paper explores the relationship between the demographic characteristics of a community and the quantities of goods and services provided by its government, what we label the "public bundle."

We consider three models of public spending. The first is a traditional "selfish" public choice model in which individuals care only about themselves and not about others. The second is a "community preference" model in which an individual's desired spending depends on the characteristics of his or her community, either in a discriminatory fashion, where an individual's concern for other people depends on their similarity to that individual, or in an even-handed way, where an individual's concern for others depends on those people's needs but not their identities. The third model presents a sorting process through which individuals choose communities according to their tastes for public spending.

To evaluate these models of spending, we examine how county and state spending in the United States is affected by the age and racial composition, and the total size of a jurisdiction. Our analysis proceeds in three steps. First, we discuss the theory relating demographics and public spending. Second, we review the existing literature on the relationship between demographic composition and state and local public spending. Third, we present our results for county and state spending in the United States. The data yield intriguing patterns and enable us to distinguish, at least in part, among our three models of public spending. The sorting model does not provide an adequate explanation of the effects of demographic composition on spending, because controlling for jurisdictional fixed effects fails to eliminate the explanatory power of demographic variables. The selfish public choice model seems less than sufficient to explain our results as well, because demographic characteristics of the area surrounding a jurisdiction appear to affect individual preferences for spending within that jurisdiction. We thus tentatively support a community preference model of demand for public spending, although the determinants of the community preference function are complex.

I. Demographics and Public Spending: Theory

Our concern is with citizen preferences for the "public bundle," the goods and services provided by government. There are at least three reasons why demographic characteristics may be correlated with the level of public spending.² First is the well-known sorting or Tiebout model, in which individuals choose among communities according to their tastes for public spending. If some individuals value education more than others, for example, they will choose to live in communities that spend more on education. Families with children will also want to live in these communities. Hence, a

larger share of children in a community is associated with higher spending on education, but this is due solely to the sorting of people, not because the presence of children has any direct impact on education spending decisions.

A second explanation for a correlation between demographic characteristics and public spending is what we refer to as the selfish public choice model. In this view - the most traditional in economic analyses of public choice - people act entirely in their own self-interest, paying no heed to the interests of others. Given majority-rule voting, the only effect of variations in the demographic composition of the population is to change the identity of the person with the median level of desired spending. Thus, if families with children wish to spend more on education, the median voter in child-rich communities will prefer more education spending than median voters elsewhere.³

A third explanation derives from what we call the community preference model, in which individuals implicitly consider a welfare function for their community in deciding on spending. In this view, people care about the welfare of others within their community, although presumably less than they care about their own welfare. Changes in the demographic composition of a community could therefore affect each individual's desired spending - for example, individuals may care about the welfare of children and thus spend more on education when there are more children in the community. This offers a sharp contrast to the selfish public choice model, in which variations in demographic composition affect only the identity of the median voter and do not change any individual voter's preferences. With even-handed community preferences, the welfare function of a citizen does not depend on the group to which he or she belongs. With discriminatory community preferences, it may.⁴

The classic statement of the proposition that voting behavior is determined by self-interest is Downs (1957). Empirical support for this view is presented in Deacon and Shapiro (1975), Riker and Ordeshook (1968), Rubinfeld (1977), and Sears and Citrin (1982), among others. The alternative proposition that voting behavior is influenced strongly by individuals' perceptions of community welfare is summarized by Mansbridge (1990), Kelman (1987), and Orren (1988). Huckfeldt and Kohfeld (1989), Jackson and King (1989), and Wolfinger (1974) emphasize the role of ethnic and racial allegiance in voting behavior.⁵

To explore the difference between the selfish public choice hypothesis and the community preference hypothesis, we present a simple model of individuals' preferences for public spending. Our starting point is the observation that a large and growing share of public spending is "directed," in that it predominantly benefits restricted groups within the population, such as poor people, school children, or the elderly. This directed spending includes both transfers and a large share of non-transfer spending, such as primary education. It is important to recognize this directed character of public spending because it explains why the existence and form of community preferences may have a large effect on that spending.⁶

Suppose that individuals fall into different groups based on income, occupation, age, race, or some combination of those characteristics. These characteristics determine

the per capita quantity of each directed good, such as education, that an individual receives. For good k , a member of group i receives g_{ik} . The vector of g_{ik} 's directed at members of group i is denoted G_i ; the matrix of all g_{ik} 's is denoted simply G .

Assume that there are n_i individuals in group i , all with identical preferences. Each of these individuals has the utility function

$$u_i = U_i(y_i - t_i, G_i, c_i),$$

where y_i is income, t_i is the tax burden, and c_i is the value of the community welfare function as evaluated by a member of group i . For that individual, the community welfare function is $c_i = C_i(N, G)$, where N is the vector of n_i 's. With even-handed community preferences, the C_i function would not differ across groups. With discriminatory community preferences, the C_i function would differ across groups; hence, the weight given to each g_{ik} would depend on both the n_i 's and the individual forming the preferences. The tax burden for an individual in group i is defined as

$$t_i = \left(\frac{s_i}{\sum_j n_j s_j} \right) * G_T,$$

where s_i is the tax weight of individual i and G_T is total government spending.

We distinguish between the alternative hypotheses of demand for public spending on the basis of the structure of the utility function. The selfish public choice hypothesis omits c_i from the utility function. In this case, individual i 's desired level of spending on good k is determined by the condition:

$$U_y * \left(\frac{s_i}{\sum_j n_j s_j} \right) = U_{g_{ik}}.$$

This condition says simply that the marginal value of the private income foregone by an additional dollar of public spending should equal the marginal value of that dollar of public spending. This individual prefers no spending on goods that he or she does not consume, and the demographic composition of the community does not enter the equation.

In the community preference hypothesis, by contrast, the demographic mix of the population serves as an important component of preferences. The condition for the optimal level of spending on good k is now:

$$U_y * \left(\frac{s_i}{\sum_j n_j s_j} \right) = U_{g_{ik}} + \sum_j U_c C_{g_{jk}}.$$

In this case, the benefits to other groups do count in each voter's valuation of public spending.

We can pursue the implications of the community preference model in several directions. For concreteness, let us assume that the community preference function c_i has the form

$$C_i(N, G) = \sum_j w_{ij} f(n_j) v_j(G_j).$$

Here $v_j(G_j)$ is the benefit to each member of group j who receives spending of G_j , $f(n_j)$ aggregates the welfare of individual members of group j into the total welfare of the group, and w_{ij} is the weight that each member of group i places on the welfare of group j . With even-handed preferences, w_{ij} is the same for all i ; with discriminatory preferences, it is not. Three aspects of the community preference model deserve comment: 1) the implication of different $v_j(\cdot)$ functions for spending in communities with different demographic compositions; 2) the implication of discriminatory preferences for spending in communities with different demographic compositions; and 3) the effects of community size on spending. We consider these issues in turn.

First, as indicated by its subscript, the $v_j(\cdot)$ function may vary across groups. For example, older people may obtain more health benefits from a \$1,000 per capita health care expenditure than younger people would. If members of group i place the same weights on the welfare of each elderly person and each young person, then they would want to spend more on health care in an older community.

Second, consider a situation of discriminatory preferences, where people weight the welfare of different groups differently in their community preference functions. Assume that individuals in different groups must receive the same amount of spending (as discussed in footnote 4) and, contrary to the discussion in the previous paragraph, value that spending the same. In this case, each individual would have her personal weighted average of the welfare of the recipients, and her overall valuation of spending would differ from community to community depending on the demographic composition of those communities.

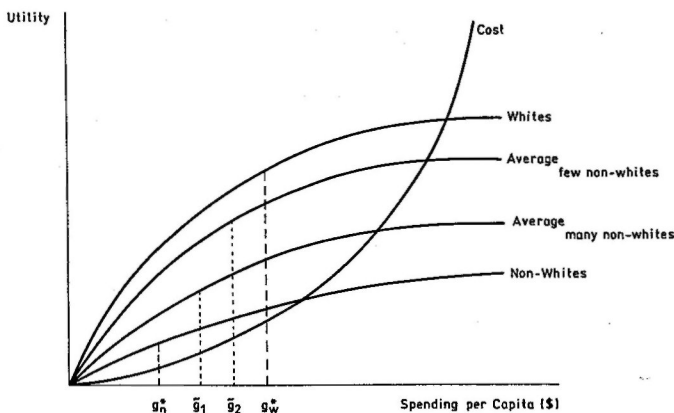
To illustrate this point, Figure 1 shows the benefits and cost of education spending for a hypothetical white individual with a discriminatory community preference function.⁷ We analyze spending per capita and assume that the individual does not receive any of this spending. The upward-bending curve shows the utility cost of additional spending, based on the increasing tax burden. The concave curves indicate the utility benefit of additional spending. These benefit curves are drawn to reflect the notion that the number of people belonging to a certain group in the county influences the individual's valuation of the welfare of each person in the group; for example, as the number of white children in the county increases, the per capita value of spending on them falls.

The equilibrium condition for spending is of course that the marginal value of spending equals its marginal cost. The hypothetical white individual would like to spend

g_n^* per non-white child and g_w^* per white child, expenditure levels where the relevant benefit and cost curves are parallel to each other. This is not a feasible outcome, however, as spending on whites and non-whites must be the same. Therefore, the individual would compute a weighted average of the two relevant value curves. If there

FIGURE 1

Benefits and Cost of Education Spending for a White Individual



were many non-white children in the county, the individual would have the optimal level of spending called $\tilde{g}_1$. With fewer non-white children in the county, the optimal level of spending would increase to $\tilde{g}_2$.⁸

Finally, the community preference model has implications for the effect of community size on public spending. Suppose that the number of people belonging to a certain group in the community had no effect on individuals' valuation of the welfare of each person in that group. In this case, individuals would care only about the total benefit being received, and $f(n_j)$ would simply equal n_j . Now consider doubling the size of the community, holding its demographic composition fixed. In the larger community, the same level of spending by each member of group i would raise the welfare of twice as many members of group j by the same amount. This would greatly increase the value of this spending to each individual in group i , implying that individuals in larger communities should support more public spending per capita than individuals in smaller communities.

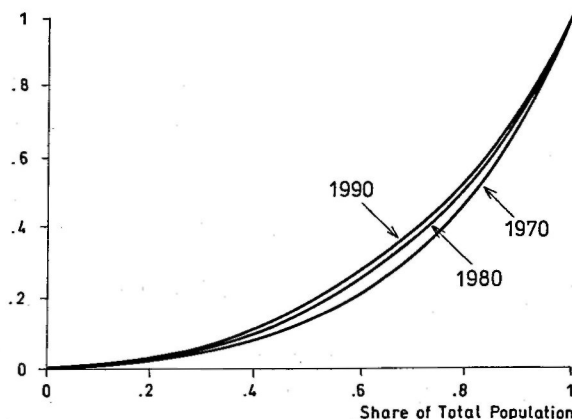
On the other hand, there may be greater anonymity in large political units than in small ones. Individuals in a small town may feel a stronger allegiance to other people in their community than do individuals in a large city. This suggests that $f(n_j)$ may be diminishing in total population, again holding demographic composition fixed. If this anonymity effect is sufficiently strong, individuals in larger communities may actually want to spend less per capita than individuals in smaller ones.

To conclude this section, we want to demonstrate the potential importance of understanding the relationship between demographic characteristics and public spending. As we noted at the outset, demographic heterogeneity in the United States is increasing rapidly. Our concern in this paper is with spending within smaller political units, however, so we care primarily about the *local* intermixing of different groups. The metric that we employ to assess the degree of local heterogeneity works in the spirit of the Lorenz curve. First, we rank counties in order of the share of their population that belongs to a particular age or ethnic group. Moving through the counties, we then plot the cumulative share of the nation's population of that group against the cumulative share of the nation's total population. If racial groups were perfectly mixed, the curve would lie along the 45-degree line; if racial groups were strictly segregated, the curve would run along the bottom of the box.

Figure 2 shows these "Lorenz curves" for the non-white population in 1970, 1980, and 1990. Although there is substantial disparity across counties in the non-white share

FIGURE 2

Lorenz Curves for Minority Population



of the population, there is also increasing intermixture over time. The Gini coefficient in 1970 is .530; in 1980, it is .468; and in 1990, it is .437. The segregation of non-whites by county, although still significant, has fallen by 18 per cent in the past twenty years. We also formed Lorenz curves for the elderly and for people below age 18, who tend to be beneficiaries of local expenditures. Geographic segregation of the elderly is significant but well below that of non-whites, and it has declined slightly over time.⁹ On the other hand, the distribution of children across counties is remarkably equal and has remained so over time.¹⁰

In the following section we review previous research on demographics and public spending; in the third section we present new results on the topic.

II. Demographics and Public Spending: Previous Research

Most previous research on the demand for public spending focuses on estimating the income and price elasticities of demand. Many studies include some demographic variables as controls in these demand functions, but few focus on the estimated coefficients on the demographic variables or on their interpretation. We briefly review a number of past studies in this section. Unfortunately, they paint an inconsistent picture of the relationship between demographic characteristics and public spending. Although there are some common elements in previous results, there are also many inconsistencies and contradictions.

Table 1 provides an overview of previously reported effects of demographic variables on public spending. The table reviews two types of studies: the first, far more prevalent in the literature, examines equilibrium spending levels; the second investigates explicit votes for public spending based on referenda outcomes or voter surveys. We report two studies that compare spending levels across states and nine studies that compare spending levels across counties, towns, or school districts. The type of spending considered varies across studies as well, although education is by far the most common. We report four studies of voting - one that compares votes across school districts, and three based on surveys of individual voters. Most of these results pertain to education spending as well.

The surveys include measures of both individual characteristics and community characteristics, so Table 1 includes coefficients both for the per cent of a community belonging to a certain demographic group and for a dummy variable indicating that the survey respondent belongs to a certain group. A "+" sign in the table indicates that a variable has a statistically significant positive effect, a "-" sign indicates a statistically significant negative effect, a "0" indicates no significant effect, and a blank means that the variable was not included in the study.¹¹

The most notable feature of Table 1 is the great variation across studies in the estimated effect of the demographic characteristics. Almost every characteristic seems to raise spending, lower spending, and have no effect on spending in some specification. This may be due partly to differences in the types of spending considered, but even among the studies focusing on education, substantial differences are found.

Despite this general confusion, however, some patterns appear in these results. The share of young people in a community seems to have no effect on spending, although the surveys indicate that parents with children at home seem to prefer more spending. A larger share of older people in a local community appears to raise spending, although older individuals report in surveys that they are content with current spending. In contrast to the local results, a greater share of older people in a state seems to lower

spending. A greater share of non-white people in a local community appears to raise spending, and non-white individuals themselves report that they would prefer more spending. As with the elderly, however, a different effect appears at the state level, where a greater non-white share in the population seems to lower spending. In the following sections we find confirming evidence for this contrast between the effects of demographic variables at the state and local levels.

Table 1

Previous Results on Demographic Characteristics and Public Spending

Jurisdiction Author(s)	state			local (county, town or school district)						
	Case, Hines & Rosen		Craig & Inman	Bogart	Berg- strom & Goodman		Denzau	Denzau & Grier	Romer, Rosen- thal & Munley	Megdal
log (Population)	0	0		0	+	+				
Below 18 ¹ your kids per cent in area	0	-			0	0	0			0
Above 65 ² yourself per cent in area	-	-	0	+	+	0			0	0
Non-White ³ yourself per cent in area	-	-	+	+	+	+	0	+	+	
Owner- Occupier yourself per cent in area				0	-	-	0	-		-
Poverty ⁴ yourself per cent in area			0	0	0	0		+		
Population Change ⁵					-	-	-			+
Tax Price included?	no	no	yes	yes	yes	yes	some	yes	yes	yes
Type of Spending	total per cap.	educ. per pupil	educ. per pupil	fire ⁷	⁸	police	educ. per pupil	educ. per pupil	educ. per pupil	educ. per pupil
Sample		panel 1970-85 ⁶	panel 1966-80	cross- sect. 1980		cross-sect. 1980 ⁹	cross- sect. 1969	cross- sect. 1970-1	cross- sect. 1975-6	cross- sect. 1970-7

Table 1 (cont.)

Previous Results on Demographic Characteristics and Public Spending

Jurisdiction	state	local (county, town or school district)							
Author(s)	Ladd	Inman	Lovell	Neufeld	Rubinfield		Gramlich & Rubinfield	Bergstrom, Rubinfield & Shapiro	
log (Population)							+		
Below 18									
your kids					+		0	+	your kids:
per cent in area	0			0	0				age 1-11+
Above 65									age 12-16 0
yourself					0	0			0
per cent in area		-		0	-				
Non-White									
yourself							0	+	+
per cent in area				+	+				+
Owner-Occupier									
yourself									
per cent in area		0	-	0	-				
Poverty									
yourself									0
per cent in area	0	+	+						
Population Change									
Tax Price included?	yes	yes	yes	no	no	yes	yes	yes	yes
Type of Spending	educ.	educ.	educ.	educ.	educ.	educ.	total	educ.	educ. per
	per	per	per	ref. ¹⁰	ref. ¹⁰	ref. ¹⁰			pupil
	pupil	pupil	pupil						
Sample	cross-	cross-	cross-	cross-sect.	survey	survey	survey 1978 ¹¹		survey
	sect.	sect.	sect.	1959-61	69-71	1973 ¹¹	1978 ¹¹		
	1970	1969	1970						

Notes to Table 1:

¹ CHR, D and M use percent between 5 and 17 instead. Ladd uses percent in private school and percent in public school instead; both coefficients are small and insignificant. R uses separate dummies for number of kids; all are significant. GR use separate dummies for kids in public school and kids in private school; neither is significant.

² CI and M use percent of households with head over 65 instead. N uses percent of population above 61 instead.

³ CHR, B, RRM, N, and BRS use percent black instead. GR use separate dummies for black and other non-white; neither is significant.

⁴ BRS use recipient of AFDC or food stamps instead.

⁵ BG use the percent population change from 1950 to 1960; D is not specific.

⁶ The dependent variable includes both state and local spending. We report their results without the so-called "neighbor effects."

⁷ The dependent variable includes spending by special districts.

⁸ The dependent variable is total spending less spending on education and welfare.

⁹ We report their results for all cities pooled.

¹⁰ The dependent variable for referenda equations is the logarithm of the ratio of yes votes to no votes.

¹¹ The survey included homeowners only.

III. Demographics and Public Spending: New Evidence

This section presents new results relating state and county spending to demographic variables. We find that the estimated effects of demographic characteristics in the state equations are strikingly different from the estimated effects in the county equations; we then explore some possible explanations for those differences.

We assume that community i 's demand for public spending is of the form:

$$\log(\text{Spending per capita})_i = \beta_0 + \beta_1 * \log(\text{Income per capita})_i \\ + \beta_2 * \log(\text{Grants per capita})_i + Z_i * \Gamma + \varepsilon,$$

where income and grants per capita capture the budget constraint for the community, and the vector Z_i represents relevant demographic variables. Unfortunately, we do not have a measure of the price of government-purchased goods for the communities that we study, so we omit price from the analysis. Under the selfish public choice model, this equation can be interpreted as the median voter's demand for public spending. Under the community preference and sorting models, there is a more complex link between the financial and demographic variables and the preferences of the median voter.

We estimate this equation for two samples of data. The first is a panel of the 48 contiguous states from 1970 to 1985.¹² The data for each state include both spending by the state government and spending by all local governments (counties, municipalities, and school districts) within the state. The second set of data is for 3092 counties for which we match spending data from the 1972 and 1982 Censuses of Government to demographic and financial data from the 1970 and 1980 Population Censuses. The data include spending by all local governments within each county.¹³

Table 2 reports our basic estimates. The first three columns present results for the state sample. The dependent variable is the total of state and local spending in the state. The last three columns present results for the county sample. The dependent variable is local spending in the county. For each sample we show cross-section results for 1970 and 1980, as well as panel results using the full data sets.¹⁴ The panel results control for fixed features of the jurisdictions, such as political variables, social factors, regulatory differences, and so on. The state panel includes annual observations from 1970 to 1985; the county panel uses the 1970 and 1980 data.¹⁵ Because the cross-sections give different results from the panels, we will focus on the panel results that include the jurisdictional fixed effects.¹⁶

Table 2 indicates that the income elasticity of public spending is similar for states and counties (.39 and .41), as is the grant elasticity (.17 and .27). These coefficients are positive, economically important, and statistically significantly different from zero. At both the state and county level, there is evidence for the "flypaper effect," the tendency of a dollar of grant income to "stick," and thereby to result in more spending than a dollar of private sector income. In the county data, for example, on a per capita basis, mean income in 1979 is \$6,046, mean spending is \$980, and mean grants are \$431. Evaluated at these means, a \$100 increase in income would increase spending per capita by \$7, while a \$100 increase in grants would increase spending by \$62.

The demographic variables have important effects on public spending at both the state and county level, but the directions of the effects are different in the two samples.

Table 2
Demographic Characteristics and Public Spending
Dependent Variable: log(Total spending per capita)

Independent Variable	State Sample			County Sample		
	1970	1980	1970-85 Panel	1970	1980	1970-80 Panel
County Demographics						
log(Population)	---	---	---	-.032** (.004)	-.056** (.005)	-.047* (.026)
Per Cent Below 18	---	---	---	.978** (.137)	-.034 (.184)	.680** (.191)
Per Cent Above 65	---	---	---	.329** (.150)	-.221 (.160)	.961** (.295)
Per Cent Non-White	---	---	---	.091** (.035)	.275** (.042)	.229** (.074)
State Demographics						
log(Population)	-.015 (.016)	.000 (.015)	.003 (.035)	---	---	---
Per Cent Below 18	3.785** (1.312)	1.007 (1.823)	.255 (.366)	---	---	---
Per Cent Above 65	1.538 (1.057)	-.452 (.922)	-1.922** (.484)	---	---	---
Per Cent Non-White	.009 (.196)	-.041 (.154)	-1.402** (.310)	---	---	---
Financial Variables						
log(Income per capita)	1.106** (.125)	.757** (.135)	.387** (.045)	.610** (.027)	.787** (.035)	.410** (.034)
log(Grants per capita)	.304** (.057)	.472** (.065)	.171** (.021)	.359** (.014)	.482** (.017)	.271** (.012)
State Effects	No	No	Yes	Yes	Yes	No
County Effects	No	No	No	No	No	Yes
Year Effects	No	No	Yes	No	No	Yes
N	48	48	768	3096	3102	3092
R ²	.782	.792	.948	.717	.634	.188

Note: The table shows regressions of the logarithm of spending per capita on the area's mean financial variables and demographic characteristics. Spending in the state regressions is state and local spending; spending in the county regressions is local spending. The state panel is annual from 1970 to 1985. The county panel is the two years of 1970 and 1980. In the state data, the per cent below age 18 is actually the per cent between ages 5 and 17.

* Statistically significantly different from zero at the 10 per cent level.

** Statistically significantly different from zero at the 5 per cent level.

In the state data, both the share of the population that is aged and the share that is non-white are associated with lower spending per capita. The effects are statistically

significant and substantively large. The share of children is unrelated to total state spending, as is the state population.

In the county data, however, the results are completely different. In this setting, increases in all of the demographic shares increase total spending. Such effects for the elderly and non-white shares of the population - positive locally but negative statewide - are consistent with the pattern that we noted in our summary of previous research. Table 2 also shows that the number of people in a county is negatively related to local spending per capita in that county. As we explained earlier, however, the community preference model suggests that population size should be positively related to spending. Evidently, the greater anonymity of larger communities more than offsets the value of providing the same per capita benefits to a larger number of people for the same level of personal expenditure.¹⁷

Why do the state and county results differ so much? We explore two possible explanations.¹⁸ The first potential explanation is that public spending may involve a different bundle of goods at the state level than at the county level. In fiscal year 1989-90, for example, 31 per cent of direct state government spending was for social services and income maintenance, compared to only 11 per cent of local government spending. And only 19 per cent of state spending was for education, compared to 38 per cent of local spending. Even the educational goods are different at the two levels - 81 per cent of state education spending was for higher education, compared to only 6 per cent of local education spending.

To investigate this potential explanation for our results, Table 3 reports regressions analogous to the panel estimates in Table 2, but divides spending in each state into spending by the state government (the first column) and spending by all local governments within the state (the second column). The third column repeats the panel results for local spending from Table 2.

The only demographic variable with a significant effect on the spending of state governments is the non-white share, which has a positive and substantively large effect.¹⁹ The elderly share also exerts a positive influence, although not statistically significantly different from zero. Local spending is affected by all of the demographic variables, however, with the elderly and non-white shares having statistically significant and substantively large negative effects, similar to the results in Table 2 for state and local spending together. This implies that the effects of demographic composition on spending that were reported for the state panel in Table 2 apply predominantly to local spending rather than state spending. Thus, this finding accentuates the contrast between our initial state and county results, as it appears that the determinants of local government spending aggregated to the state level are very different from the determinants of local spending aggregated only to the county level.²⁰

The second potential explanation for the divergence between the state and county results is that a jurisdiction's spending is affected differently by its own demographic characteristics and by the characteristics of the surrounding area, what we might think of as a surroundings hypothesis. The next section proposes several hypotheses for why

surroundings might affect spending. Table 4 examines the surroundings hypothesis empirically. The table reports more panel results for the county sample, adding as

Table 3
Demographic Characteristics and Spending
by Different Levels of Government
Dependent Variable: log(Total spending per capita)

Independent Variable	State Sample 1970-85 Panel state Spending	Local Spending	County Sample 1970-80 Panel Local Spending
County Demographics			
log(Population)	---	---	-.047* (.026)
Per Cent Below 18	---	---	.680** (.191)
Per Cent Above 65	---	---	.961** (.295)
Per Cent Non-White	---	---	.229** (.074)
State Demographics			
log(Population)	-.311** (.057)	.169** (.044)	---
Per Cent Below 18	-.345 (.0593)	1.405** (.459)	---
Per Cent Above 65	1.083 (.783)	-5.525** (.606)	---
Per Cent Non-White	2.791** (.502)	-4.343** (.389)	---
Financial Variables			
log(Income per capita)	.527** (.073)	.281** (.056)	.410** (.034)
log(Grants per capita)	.242** (.034)	.092** (.026)	.271** (.012)
State Effects	Yes	Yes	No
County Effects	No	No	Yes
Year Effects	Yes	Yes	Yes
N	768	768	3092
R ²	.915	.963	.188

Note: The table shows regressions of the logarithm of spending per capita on the area's mean financial variables and demographic characteristics. The state panel is annual from 1970 to 1985. The county panel is the two years of 1970 and 1980. In the state data, the per cent below age 18 is actually the per cent between ages 5 and 17.

* Statistically significantly different from zero at the 10 per cent level.

** Statistically significantly different from zero at the 5 per cent level.

independent variables the population and demographic composition of the state to which each county belongs.²¹ The results show that state demographic variables have

important effects on local spending, but those effects are strikingly different from the effects of the county demographic variables. In the first column, for example, increases

Table 4

Tests of the Surroundings Hypothesis - County Spending
with State Demographic Composition

Dependent Variable: $\log(\text{Total spending per capita})$

Independent Variable	County Sample 1970-80 Panel	
County Demographics		
log(Population)	-.116** (.030)	-.113** (.030)
Per Cent Below 18	.363* (.211)	.350* (.211)
Per Cent Above 65	.530* (.319)	.467 (.320)
Per Cent Non-White	.305** (.083)	.303** (.083)
State Demographics		
log(Population)	.306** (.046)	.342** (.049)
Per Cent Below 18	.202 (.532)	.523 (.555)
Per Cent Above 65	-2.033** (.807)	-2.199** (.811)
Per Cent Non-White	-.743** (.143)	-.790** (.145)
Financial Variables		
log(Income per capita)	.349** (.034)	.344** (.035)
log(Grants per capita)	.250** (.012)	.250** (.012)
log(State spending per capita)	---	.080** (.040)
County Effects	Yes	Yes
Year Effects	Yes	Yes
N	3092	3092
R ²	.208	.209

Note: The table shows regressions of the logarithm of spending per capita on the county's mean financial variables and demographic characteristics and the state's demographic characteristics. The state demographic characteristics are for the other counties in the state.

* Statistically significantly different from zero at the 10 per cent level.

** Statistically significantly different from zero at the 5 per cent level.

in the shares of young people, older people, and non-whites in a local area all raise total local spending per capita. On the other hand, increases in the shares of older people or non-whites in the state lowers local spending per capita. Further, these effects of the

state demographic characteristics are larger than the corresponding effects of the county demographic characteristics, so a *statewide* increase in the share of non-whites or older people lowers local spending in the state. These are precisely the effects on local spending aggregated to the state level that we reported in Table 3.

The second column of Table 4 examines whether these effects are attributable solely to changes in spending at the state level. To test this hypothesis, we add the additional explanatory variable of state government spending. We find that state spending has a moderately positive impact on local spending, but our demographic results are unchanged. A substantial discrepancy persists between the effects of demographic variables at the county level and at the state level.²²

IV. Implications for Theories of Demographics and Public Spending

Now we discuss the implications of our empirical results for theories of demographics and public spending. We turn first to the effects of state demographic characteristics on local spending, and then to the effects of county characteristics on local spending.

The initial question concerning the state demographic characteristics is why they matter at all for local spending. The first model that we considered, the Tiebout or sorting model, provides no explanation for the role of these variables. Neither does the selfish median voter model, which we discussed at greater length. In particular, after controlling for the demographic composition of a county, the composition of the surrounding state should have no effect on the identity of the median voter in that county. Thus, we conclude that the community preference model plays at least some role in explaining local spending, but the determination of community preference may be quite complicated.²³ We propose two possible explanations for our results.

First, people may form their opinions about government and public spending based not solely on their local communities but on their surroundings more broadly. Suppose, for example, that most voters have discriminatory community preferences and are less receptive to public spending when they feel that more of the benefits are directed to people of a different race. If people's impressions of the recipients of public spending are formed by the state in which they live, then white people in a state with many non-whites may be less supportive of redistribution, and this attitude may carry over to local spending. A second reason why surroundings may matter is that citizens may worry about migration into their communities. Generous spending on redistribution might encourage "less desirable" people to move into a local area. Some individuals may not want to lure more children into their county, for example, because that would require greater expenditures on schools. Further, if the children are from a different ethnic or religious group, attracting them with higher spending may substantially change the nature of the community, which might be considered a disadvantage quite apart from any effects on the public fisc. In a state that has many children or non-whites, such "deterrence" concerns may be more important.²⁴

The other set of effects to be discussed is the influence of the county demographic characteristics on local spending. These effects are similar to those reported by previous authors, and we briefly suggest a few interpretations here. Once again, the sorting model does not seem to adequately describe the relationship between demographic composition and public spending. The standard Tiebout logic is that communities with higher permanent levels of spending may attract different types of people than communities with lower permanent levels of spending. We find this reasoning quite plausible, but we control for these fixed features of jurisdictions by using panel data. In order to explain our panel results with a sorting model, one would need to argue that different changes in spending attract different types of people, and we find this story far less compelling. This leaves us with the selfish median voter model and the community preference model, both of which can account for the effects of county demographics that we find.²⁵

There are two interpretations of the county demographic results that are consistent with the selfish median voter model. The first and most straightforward interpretation is that the identity of the median voter is affected by the share of the population belonging to certain demographic groups. If non-white individuals prefer more public spending (perhaps because their tax share is below their share of the population), then the presence of many non-whites may shift the median voter toward those individuals, possibly white themselves, who favor greater spending.

Another, more cynical, interpretation of the results that is consistent with the selfish public choice model stresses the potential personal gain to local spending. Individuals may prefer higher public spending in a community with more non-whites because the spending is perceived to reduce crime and public disorder. They may also prefer higher spending in a community with more children because of the beneficial externalities of a well-educated populace.

Three different interpretations of the county demographic results are consistent with the community preference model. The first such interpretation is simply that the share of the population belonging to certain demographic groups may affect the perceived need for public spending. The second such interpretation is that different demographic groups may have different degrees of concern for the welfare of the community. For example, older people may be more likely to be long-time residents of a community and may feel stronger ties to its other residents. And the third interpretation is that people may value directed spending more highly at the local level than they do at the state level. Tip O'Neill, former Speaker of the House of Representatives, once famously remarked that "all politics is local." A natural corollary of this comment is that the perceived value of transfers may be greater at the local level than at the state level.

V. Concluding Remarks

Significant demographic shifts are a salient feature in most developed nations. In a pure public welfare theory of government, where marginal benefits and marginal costs are equated in expenditure decisions, such shifts would have important effects on the

public bundle. For example, a community with more older people would spend noticeably more on health care.

Governments are elected by majorities, however, and intense preferences by minorities may be overridden. If voters were strictly selfish, we would conjecture that there would be relatively little spending on schools in communities where families with children were in the minority, or on chronic-care facilities in locales where the elderly were few. Looking at the United States, however, we find quite high levels of public expenditure on directed goods, predominantly private goods that are consumed by certain members of the community but not by others. Citizen preferences appear to contain a significant concern for the well-being of the larger community. Although our data are drawn from the United States, we expect that the lessons from our work will prove important for any nation facing significant demographic heterogeneity or change.

The formation of community preference is much more complicated than any simple theory would suggest, however. The striking result of our empirical work is that state demographic characteristics and county demographic characteristics have opposite effects on local spending. For example, county expenditures decrease with the number of elderly in the state but increase with the number of elderly in the county. These findings are consistent with a surroundings hypothesis, namely that local governments respond not only to local conditions but also to political attitudes that are strongly influenced by the larger areas around those local jurisdictions. Demographic composition plays a central role in determining the size and makeup of the public bundle, albeit in some unexpected ways. Developing an understanding of this relationship will help us to understand one of the most fundamental questions in public economics: how do individuals value the welfare of others?

Notes

1. The United States Census asks citizens to indicate their race in the following categories: white, black, American Indian, Asian and Pacific Islander, and "other" (most of whom are individuals of Spanish origin). The non-white share of the population rose from 12.4 per cent in 1970 to 19.8 per cent in 1990.

2. One additional reason, which we do not emphasize, is that demographic characteristics may affect the cost of providing public services. The relationship between demographics, cost, and public spending is explored by Schwab and Oates (1991), Schwab and Zampelli (1987), and Schwartz (1992), among others. As we explain below, the effect of demographics on costs does not adequately explain all of the influences of demographics on public spending that we find.

3. Logrolling and other phenomena in the political process mean that the median voter's desires may not be reflected in actual spending. If logrolling accounts perfectly for intensities of preference, then the average of voters' desires would dictate the outcome.

4. The *Wall Street Journal* recently provided anecdotal evidence that discriminatory attitudes play a role in local funding decisions. The *Journal* reports that in Holyoke, Massachusetts, "the town's mostly white, working-class voters, mainly aged and childless, are alienated from its mainly Puerto Rican public-school children. ... Services for older people get funded. Those for children, such as parks and recreation programmes, the library and the schools, don't" (November 25, 1991, p. A1). Note that discriminatory preferences affect the demand for education spending because the spending generally cannot be separated into spending for non-minority children and spending for minority children. When education spending must be distributed equally among all schoolchildren, a dollar of such spending will have greater value to an individual with

discriminatory preferences in a town with more non-minority schoolchildren relative to minority schoolchildren. We return to this example later in this section.

5. For example, in the context of Congressional voting on the 1978 Tax Reform Act, Jackson and King describe constituent preferences for income redistribution as a function of their own and their county's demographic characteristics.

6. For a more complete description and analysis of directed public spending, see Cutler, Elmendorf and Zeckhauser (1993).

7. We let the weight on white children equal 1, the weight on non-white children equal $1/2$, $f(n_j) = (n_j)/2$, and $v_j(G_j) = \ln(G_j)$.

8. On the other hand, as the number of non-white children in the county increased, the number of non-white voters would generally increase as well, and the median voter would shift toward individuals who viewed non-white children more favorably.

9. The elderly Gini coefficient in 1970 is .165; in 1980, it is .159; and in 1990, it is .156.

10. The children Gini coefficient in 1970 is .058; in 1980, it is .088; and in 1990, it is .068.

11. We do not report the coefficient estimates themselves for two reasons. First, the estimates are not directly comparable due to important differences in the specification of the equations (for example, some equations are estimated in logarithms, and some are not). Second, our main point is that previous results reveal a variety of inconsistencies, a conclusion that is adequately supported by the signs of the variables alone.

12. The state data were kindly supplied to us by Anne Case, Jim Hines and Harvey Rosen, who use these data to examine the effect of interstate competition on public spending (1989).

13. Counties are the smallest political units for which one can obtain a consistent measure of all local spending. When school districts include more than one municipality, for example, school district spending is not allocated to the municipalities involved.

14. To control for differences across states in the share of state and local spending that takes place at the local level, we include state dummy variables in our cross-section county equations. Including region dummy variables in the state cross-sections has no substantive effect on the results.

15. Note that the R^2 's for all of the county panel estimates that we report look very small because we estimate the equations in differences. The R^2 's for the state panel estimates are much larger because they include the portion of the variation in spending attributable to the fixed effects. The third column of Table 2 is close to the first column in Table 2 in Case, Hines, and Rosen (1989). The only difference is that we measure the financial variables in logarithms, while they use levels. The conclusions about the effects of the financial and demographic variables are quite similar.

16. The cross-sections for different years also look somewhat different from each other, an intriguing issue which we do not pursue.

17. Because these estimates are based on changes in the variables, an alternative interpretation is that areas experiencing fast growth in population fail to keep pace in their expansion of public services, thus reducing spending per capita.

18. A third possible explanation is that individuals' preferences for spending in small political units (like many U.S. counties) may be substantially different from their preferences for spending in large ones (like many U.S. states). Specifically, population may matter not only for the level of spending directly, as our specification allows, but also for the effect of various demographic characteristics on spending. To test this hypothesis, we estimated the equation separately for counties with populations above and below 50,000 (on average for 1970 and 1980). If the hypothesis were valid, one would expect the results for larger counties to be substantially closer to the results for states. That was not the case. The estimated demographic coefficients for small counties were very close to the coefficients reported in Table 2 for all counties together. The estimated coefficients for large counties were somewhat different from those for small counties, but still sharply different from the coefficients for the state sample. In particular, the share of children in the population was even more strongly related to spending, although the minority share was less so.

19. Although the significant presence of non-white individuals surely shifts the location of the median voter within the white community, no states in our sample have a majority of non-white voter.

20. There is also the question of why a state's demographic composition has very different effects on spending by the state government and spending by local governments within the state. One potential explanation is that federal mandates for state welfare spending (particularly Medicaid, which helps the poor

and elderly) have increased the positive link between certain demographic characteristics and state government spending. Future research could usefully address this question.

21. More precisely, the state demographic characteristics that we include for each county refer to the other counties in the state.

22. We also experimented with including interactions of the demographic variables, but we found no significant or consistent effects.

23. The possible effects of demographic composition on the cost of providing public services (see footnote 2) also cannot explain the role of out-of-county demographics.

24. This explanation does not seem particularly convincing for the effect of the state elderly share, however, because the elderly are not primarily beneficiaries of local spending.

25. There are at least three other reasons why the demographic composition of a county may be correlated with public spending in that county. The first, noted in footnote 2, is that demographics may affect the cost of providing public services. The second is that the federal or state governments may mandate certain spending that is correlated with demographic composition. The third is that certain groups may gain control of specific elements of the resource allocation process when they represent a larger share of the local population or of the beneficiaries of particular programs. We do not pursue these explanations here.

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