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Do Households Vote With Their Feet?

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ABSTRACT

We investigate the relationship between within-community heterogeneity in observed household

1. INTRODUCTION

Forty five years ago Charles M. Tiebout (1956) proposed his well known hypothesis that "voting with one's feet" will reveal citizens' preferences for local public services and lead to the efficient provision of local public goods. In response to Samuelson's (1954) argument that the market can not correctly identify demand for collective goods, Tiebout proposed a model under which a market analog could lead to optim

the demand for local public services[1]. Household income is believed to be one of the most important determinants of the local demand. A reliance on income as the only measure of individual preferences for community services (Eberts and Gronberg, 1981; Grubb, 1982; Schmidt, 1992; Aaronson, 1999) is, however, questionable.

Income defines a household's budget constraint for public services. However, the level of income tells us very little about the specific content of a household's preferences. For example, two families with the same income, but with different backgrounds and numbers of school-aged children will probably demand different bundles of local public services. Moreover, empirical investigations of the degree of homogeneity of municipalities with respect to different determinants of public-service demand have found that local communities are rather income-heterogeneous.

Pack and Pack (1977), analyzing data from the metropolitan areas of Pennsylvania, show that only 11 per cent of all suburban towns can be rated homogeneous by household income. They also find that there is substantially more homogeneity with respect to occupation, education, and household type. Stein (1987) looks at data from municipalities in MSA's from 41 states. Confirming Pack and Pack (1977), Stein's findings show that suburban localities exhibit very heterogeneous income distributions. His results also indicate that the residential composition of municipalities within the same metropolitan area is highly heterogeneous with respect to age, housing, and occupation. The diversity scores for only two of Stein's six measures (education and race) show a homogeneous sorting of residential populations.

[1] See for instance papers by Goldstein and Pauly (1981), Rubinfield, D. L., P. Shapiro, and J. Roberts (1987), and Reid (1990) where authors consider the econometric consequences of the Tiebout sorting behavior on the parameter estimates in public service demand studies.

Therefore, if the Tiebout model catches some truth about actual residential choice behavior of households, we should expect to find more sorting in the areas where there are more local governments and where local governments supply more diverse set of bundles of local public goods.

The purpose of this paper is to tests the following two sorting implications of the Tiebout model:

1. The larger is the number of competing jurisdictions the more homogeneous each jurisdiction will be.
2. The presence of exogenous factors that reduce the ability of the local government to differentiate its public service bundle from the service bundles of competing governments decreases the homogeneity of local jurisdictions.

Theoretical models of the Tiebout equilibrium (Epple, Filimon, and Romer (1984), Epple and Romer (1991), Epple and Platt (1998)) also imply homogeneous sorting. In these models a necessary condition for equilibrium is stratification: each community is formed of families with incomes in a single interval. Thus, increasing the number of jurisdictions should reduce the length of each interval and, therefore, heterogeneity within each community.

Previous studies of the relationship between the homogeneity of local jurisdictions and their number have produced mixed results (Schmidt (1992), Stein (1987), Munley (1982), Eberts and Gronberg (1981)). Most of them tested the relationship between the number of school districts (single purpose local governments) in the area and income heterogeneity of each school district.

as a proxy for the average population of the jurisdiction. Holding MSA's population constant, changing the number of local municipalities effectively changes the average population.

The presence of factors, such as grants from upper levels of governments, tax and expenditure limitations (TELs), etc., that can reduce the ability of local government to provide a bundle of public services that is differentiated from the bundles provided by competing governments should decrease the degree of homogeneous sorting. This implication of Tiebout's model has received some empirical support. Both Eberts and Gronberg (1981) and Stein (1987) include state aid as a determinant of population heterogeneity in their models. Eberts and Gronberg find that an increase in the percentage of school revenue per student received from the state increases within district income inequality. Stein, however, does not discover statistically significant effect of compensating state aid on any of his six measures of within community heterogeneity.

In the next section we describe the proposed empirical test and the departure of the present study from previous papers. Data issues related to the empirical test are discussed in Section 3. The results of the test are in Section 4. Section 5 contains a brief summary of our study.

there are more communities in the area. Take the population of some region, say MSA. Other mechanisms, unrelated to the demand for local public goods (zoning, racial and class antipathies, available housing stock, etc.)[2], imply that within MSA households do not locate randomly. Instead they form groupings that to some extent share similar characteristics: income, race, education, occupation. These are also the traits that we use to proxy for the demand for public services.

Given this nonrandom location of households, the division of MSA into smaller communities is likely to result in jurisdictions with populations that do not replicate the distribution of the population of the entire MSA. Such communities will be more homogeneous. The more jurisdictions we divide the MSA into the more homogeneous each jurisdiction is likely to be. Thus, the same relationship between the number of jurisdictions in the area and the degree of homogeneity of each jurisdiction may hold even if the Tiebout mechanism does not work. Therefore, disentangling the Tiebout sorting effects from 'statistical sorting' effects become

has the same population. It also seems to be more difficult to find statistical sorting if metro area, that has more jurisdictions per capita, has smaller and, therefore, more disperse population, than in the case when MSA with more communities per capita has the same and, therefore, more dense population.

Roughly speaking, to find Tiebout sorting and statistical sorting we compare metropolitan areas with different populations. Everything else being equal, if statistical sorting is present, then MSA with larger population will have fewer jurisdictions per capita, larger average population and, therefore, more heterogeneous communities. Everything else being equal, if Tiebout sorting is pr 570.9l 0 0 12 363.733.s65e626.1599 TmM91.0808 6

services. Households living in such jurisdictions demand similar levels of public goods. Of course, the inability to measure the households' demand directly forced researchers to choose observable proxies. The majority of previous studies of the relationship between hom

Ideally we would like to have a measure which assumes a value of zero, absolute homogeneity, if all households fall into one category and a value of 1 if no two households are alike.

Lieberson's (1968) diversity-in-population measure possesses such a property and also has a very appealing interpretation. This measure computes the probability that randomly paired members of a jurisdiction will be different on a specified characteristic. In the simplest case of only one population trait, such as, for example, education, this measure, A_w, is equal to one minus the sum of squares of the proportions of the total population affiliated with each category, such as high school diploma, college degree,

all of the variables. Now we interpret A_w in the following way: if all households in a city are randomly paired, Lieberson's measure indicates the average proportion of mi

defined on the cumulative frequency distribution of the population across variable categories: denoting the index value by C, it is defined as:

$$C \quad 2 \quad d_i \Big/ n \quad 1$$

where $d_i \quad CF_i$ if $CF_i \quad 1/2$ and $d_i \quad 1 \quad CF_i$ if $CF_i \quad 1/2$; $CF_i \quad 1/N \quad f_j$ (cumulative relative frequency); N = the number of observations; n = the number of categories. When all observations fall into one category, CF_i equals 0 until that category and 1 afterwards, making every d_i equal to 0 and C equal to 0. On the other hand, when all observations are divided between extreme categories $d_i \quad \frac{1}{2} n \quad 1$ and C = 1. When population is equally divided across all categories the value of index depends on the number of categories. For example, C is equal to 2/3 in case of three and four categories, and it is equal to 3/5 when there are 5 categories. The value of the index is a function not only of the number of intervals into which the population is divided but also of relation of the intervals to each other.

It has been shown that the factors that affect the degree of within-community heterogeneity, such as metropolitan area wide heterogeneity, also affect the number of local governments in the area. Fisher and Wassmer (1998) and Alesina, Baqir and Hoxby (2000) find that after controlling for political, historical, and institutional factors, variations in the characteristics that affect demand for local government services do influence the number of local governments.

To deal with endogeneity of the number of local jurisdictions Eberts and Gronberg (1981) applied the instrumental variables technique. As instruments they used state dummies. State dummies, however, do not satisfy the property of good instruments, because they also affect the within-community homogeneity.

In order to address the endogeneity problem instruments that are unlikely to correlate with the homogeneity of jurisdictions should be employed. Legal and physical barriers to the creation of local governments represent such instruments. Legal institutions that allow the number of local communities to change represent the primary means by which local government structure can respond to changes in economic and other factors.

Annexation is the main instrument by which existing jurisdictions expand their boundaries. Incorporation is the procedure that produces new jurisdictions. Fisher and Wassmer (1998) have shown that the differences in annexation and incorporation laws do affect the number of local governments. Since these laws are most probably not correlated with the sorting behavior of households, they represent the instruments we need.

Fifth, instead of using single purpose governments (school districts), as a unit of analysis we use multiple purpose governments (municipalities and townships)[5]. Although most of the previous empirical tests have investigated school districts, in terms of local spending municipalities are equally important. For example, the 1990 issue of "Significant Features of Fi

Sixth, to see if the sorting is less effective in the areas where governments face exogenous constraints on their ability to set tax and expenditure limits, we include two measures of such constraints in our analysis: grants from upper levels of governments and tax and expenditure regulations.

To empirically test the premise that the greater is the number of local jurisdictions in the metropolitan area (*ceteris paribus*) the more homogeneous each jurisdiction will be with respect to demand for local public goods, we must control for regional, economic, demographic, and size characteristics. Our empirical model is:

$$
\begin{aligned}
H_i^k = H [&(\#\text{ of local governments})^k, (\text{geographical size of MSA})^k, \\
&(\#\text{ of local governments per capita})^k, (\text{tax and expenditure limitations})^k, \\
&(\text{grants from upper level governments})^k, \\
&(\text{metro-wide heterogeneity})^k, \\
&(\text{economic characteristics})^k, (\text{demographic characteristics})^k, \\
&(\text{state dummies})]
\end{aligned}
\qquad (1)
$$

where $\mathbf{H_i^k}$ is the degree of heterogeneity of local jurisdiction **i** in metropolitan area **k**.

3. DATA ISSUES

We consider multiple purpose local governments: municipalities and townships. Our dependent variables are the Leik's indices of within-jurisdiction heterogeneity for education, household income, and occupation, and Lieberson's diversity in population measures for race, household type, and all five characteristics combined. For the most part, independent variables are measured at the MSA level.

Table 1 lists variables and their sources.

Table 1

Descriptive Statistics

Variable	Mean	Std Dev
Person's mea household	0.708	0.046
s index edu n	0.37	

entire MSA represents one labor market and the residential choice of any household within the MSA does not affect employment opportunities of that household. This assumption rests upon the fact that the Bureau of Census defines MSA as “a large population nucleus, together with adjacent communities that have a high degree of economic and social integration with that nucleus”, and economic integration is measured, in part, by the level of commuting.

To separate Tiebout sorting effects from “statistical sorting” effects we include the number of jurisdictions, MSA area, and the number of jurisdictions per capita among regressors. . Holding the number of local governments per capita and the area of MSA constant, the changes in the number of communities represent the changes in the Tiebout choice. Holding the number of communities and the area constant, the changes in the number of communities per capita represent the effects of “statistical” sorting.

The presence of grants from upper government levels equalizes the spending opportunities of jurisdictions, impairing their ability to provide differentiated public service bundles. Therefore, we expect less sorting in metropolitan areas where governments have greater reliance on grants. We measure grants as the share of the sum of grants received by all municipal and township governmxp583

Joyce and Mullins (1991) separate state-imposed TELs into two categories: “nonbinding” and “ potentially binding”, based on the probability a TEL will restrict overall local taxing and spending power.

Given the diversity of TEL laws and the variation in their restrictive power, we classify TEL states in three ways. First, following Poterba and Rueben (1995) and Shadbegian (1998) this study treats all potentially binding limits uniformly. Our TEL variable is equal to one for all states that had potentially binding TELs in 1987, it equals zero otherwise[6].

Second, we follow Shadbegian (1998) by classifying TELs as stringent and nonstringent according to how fast they allow property taxes to grow. The state is classified as having stringent TEL (STRT=1) if it allows property tax levies to grow by

costs of living there may be too high. Theref

squares procedure to address the endogeneity problem. As instruments for the first stage we employ dumm

Table 2

Estimates of the Sorting Equation using Two-Stage Least Squares

Dependent variables: Lieberson's heterogeneity measure (household type, race, and combined five) and Leik's heterogeneity indices (education, occupation, and household income)

	Household type	Education	Occupation	Household income	Race	Combined
	1	2	3	4	5	6
Constant	27.68*** (6.993)	4.714 (3.533)	52.92*** (3.329)	21.20*** (3.502)	12.50** (5.268)	41.22*** (2.834)
# of governments[1]	-0.025*** (0.006)	0.049*** (0.009)	-0.084*** (0.009)	-0.067*** (0.008)	-0.068*** (0.019)	-0.026*** (0.005)
The area of SMSA[2]	-0.007 (0.016)	-0.032 (0.024)	0.098*** (0.023)	0.021 (0.021)	0.084** (0.042)	0.032*** (0.012)
# of governments per capita[3]	-0.382 (1.517)	-7.717*** (2.127)	-9.856*** (1.956)	-6.364*** (1.978)	-1.513 (3.581)	-4.644*** (1.061)
Tax and expenditure limitations (TEL)	0.326 (1.725)	0.726 (2.682)	-0.327 (2.633)	-0.829 (2.227)	-6.628 (4.759)	-1.690 (1.352)
Stringent TEL	0.871 (1.838)	-0.992 (2.861)	-0.856 (2.808)	1.470 (2.370)	2.761 (5.075)	0.908 (1.442)

Lieberson's measure is also used for combined heterogeneity with respect to all five characteristics.

The results reported in table 2 provide persuasive evidence that within community heterogeneity with respect to the demand for local government services partly reflects the variation in the number of communities in the area.

As expected, the heterogeneity of a jurisdiction with respect to household type, occupation, income, race, and five characteristics combined relates negatively and significantly to the number of communities in the MSA. This finding supports the hypothesis that households sort themselves among local communities and sorting is more efficient in the areas with better relr86 Tm(tion in -045 0 .085 0 0 12.00l085 0 0 12.007.86 Tm(tion ocahoer

forces. People with different education levels might find it beneficial to live together. This result is consistent with the predictions of the model developed by de Bartolome (1990), where peer group effects may cause communities to become more heterogeneous.

(1994), where complementarities in human capital investment induce occupational segregation and stratification.

The index of land concentration significantly influences heterogeneity by household type, education, occupation, and income. Only in the case of education and income it has the expected influence on sorting. MSAs with greater land concentration presumably have larger costs of exercising residential choice. Therefore, they exhibit less educational and income sorting.

Demographic variables – the share of SMSA population age 65 or older, the share of SMSA population under 18 years, and mean household income – we use as indicators of how much people desire the local public goods. Mean household income is negatively associated with within-community heterogeneity in five regressions. Our interpretation is that higher income households have greater demand for public goods and have more incentives to gather information on fiscal bundles offered by different jurisdictions. Also, for these households it is less costly to gather such information and to exercise residential choice. However, contrary to our expectations, municipalities in SMSAs with high mean income exhibit less sorting by education.

The number of jurisdictions in a metropolitan area is an important determinant of within-community heterogeneity. Two different forces can cause the increase in within-community homogeneity, as the number of local communities rises. One is Tiebout sorting. Another is “statistical” sorting. We found that, after controlling for statistical sorting, there is evidence that households actively sort themselves into communities that are relatively homogeneous with respect to the demand for local public goods. This finding has important practical implications. Since households sort themselves among local communities, state and federal programs that encourage the variation of fiscal emselves

socio-economic characteristics of residents can be used as proxies for their demand for local public services. Future research that will use more direct measure of the demand for local public goods may provide additional evidence on the sorting behavior of households.

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