DIVERSITY AND SCHOOL DISTRICT SPENDING

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ABSTRACT

This paper is an empirical investigation of the hypothesis that the degree of homogeneity within a school district affects the mix of funding that the school district receives. The changing mix of school district finance has received a great deal of attention recently (Murray et al 1998, Hoxby 1998,1996, Hanushek 1986, Card and Krueger 1996). While there has been a great deal of work on the equity and efficiency of funding types, there has been little inquiry into the nature of the variance in the mix of school district financing. In this paper we develop a framework that investigates the variance in the mix of output based on the relative homogeneity of the school district population. More specifically we hypothesize that the more homogeneous the population, the more likely the funding will come from local property tax base while the more heterogeneous populations will receive more financing from higher level governments.

INTRODUCTION

There is an extensive body of literature in economics regarding the relationship between school district resources and outcomes, the interdependence between income and education, equalization spending, and demographic effects on school outcomes and finance. However, only recently has attention been turned to the issue of the mix and source of school district financing as both an efficiency issue.

Hoxby (1996) notes that changes in the financing affects the fundamental incentives that schools face, and thus changes the long term goals that they pursue, regardless of a consensus on a "preferred" system of school finance. It is these incentives that support our hypothesis and are explored in Section three. Pointing out the many 'reforms' that attempt to either reduce local control or extend it with regards to school finances reinforces the relevance of this issue. Hoxby also points

out that one of the most important trends in school finance funding is the decreased reliance on local property tax-based financing in favor of higher-level government finance, specifically state level equalization aid.[1] However, the primary focus of her work is on the efficiency-equity problem of school finance, and contends that local finance resolves much of this problem. Hoxby (1996) argues that the level of Public Schooling is allocatively efficient when the primary source of funding is local property taxed based financing because of the Tiebout process. More importantly, Hoxby notes that in these districts that there was a high degree of homogeneity among households. We contend that it is the degree of homogeneity in the district that leads to more local property tax based finance, thus leading to allocative efficiency. It also begs the question: when the primary source of funding is not reliant on the local property tax base is allocative inefficiency the necessary outcome?

The issue of the source and mix of school finance is also addressed by Murray et al. (1998). They investigate the impact of school finance equalization reform on the distribution of resources and find that these reforms have increased the aggregate level of spending on education and reduced the within-state inequalities in school districts by 19 to 34 percent. This is accomplished primarily through state funding by means of higher state taxes. Also, they find that from 1972-1992 that the share of local spending was rising while the federal shares were dwindling. They attribute the increased percentage in state and local spending shares to recent legislation and the resulting change in behavior. However, this work does not address why there were differences in the mix of these shares to start with.

Hanushek (1986) extensively reviews the economics of education and schooling and focuses on the production and efficiency aspects of schooling. This deviates from the traditional inquiries into the ultimate uses of education. Hanushek also points out that federal funding jumped during the 60's and then slowed in growth during in the 70's and declined during the 80's. Hanushek, like Murray et. al., attribute much of the changing trend in the financing of local to the extensive legislation that restricted the use of local property tax on education funding. One key issue that this paper addresses is why these restrictions were put into place to begin with.

We posit that there need not be a "preferred" system of finance for all school districts. We believe that the "preferred" system or mix of finance by the school district is influenced by the relative homogeneity of the jurisdiction. The hypothesis is that school districts are more likely to seek more federal or state funding when the

locality is more heterogeneous. The combination of the notion that agents for the school districts engage in rent seeking behavior and the increased costs for heterogeneous groups to engage in collective decision making (reflecting a more diverse set of preferences) support this hypothesis. The question then becomes: Is the locality "financing with the feet?" In other words, do Public Schools behave like club goods and if so, does it hold to the standards of the Tiebout model?

We begin by assuming that the agents for school district are utility maximizing bureaucrats whose ultimate goal is to stay elected (Romer and Rosenthal 1978). If so, then the agent(s) would stay elected by maximizing the utility of the median voter in the jurisdiction. We assume that the distribution of preferences in the heterogeneous community will more uniform and the distribution of preferences in the homogeneous distribution to be more centralized around the mean.

Given the above assumptions, we can now examine the dilemma that the agents of the districts face. When the agent is faced with a heterogeneous distribution of tastes and preferences, it becomes more difficult for the agents to provide a bundle of services that will satisfy the desires of the local constituency. In attempting to satisfy a more diverse group, the bundle of services that must be offered will be more costly. This will make some of the constituents less willing to pay for the bundle of services. The Tiebout model suggests that those people who are not satisfied with the services or price will vote with their feet. This means that exiting individuals either change public schools (leaving the tax base) or move to a private school (reducing the perceived benefits of local taxes). This implies that we would likely see more private schools in the more heterogeneous jurisdictions than we would in the more homogeneous districts. These relationships assume that the primary source of funding is from the traditional property tax base. The model changes when the agent can seek alternative sources of funding.

With the existence of alternative sources of funding, the agent does not have to be as sensitive to the taste and preferences of the local population. The agent can substitute away from local property tax based financing to state and federal sources. The introduction of intergovernmental aid also provides the agent with the incentive to create fiscal illusion. The existence of intergovernmental aid can alter the perceived price of the bundle of services by the median voter. By controlling the amount of information the voters have about the level and type of aid, the median voter's perceived price of public schools would be less than the true marginal cost of provision (Mitias and Turnbull 2001). This lower perceived price, caused by fiscal illusion, will allow for more schooling to be provided and satisfy more of the

diverse community, thereby providing an incentive for the agent to seek alternative sources of financing.

When examining the situation faced by voters in a heterogeneous district, we adhere to the notion that the job of school finance is to create an environment that induces people to invest for schooling that is socially optimal (Hoxby 1996). Also, we accept that allocative efficiency arises in those districts that are primarily financed by a local property tax because of the Tiebout process capitalizing the value of local schools into local housing prices. However, this does not imply that allocative efficiency does not exist when the school district is not financed primarily through the local property tax base. The reason for this is that the voters have the option not only to vote with their feet (leave the Club) but also 'finance' with their feet.

If constituents are not happy with the bundle of services provided some will leave and some will end up substituting away from public to private schooling. Those who are paying for private schooling are not likely to vote for any increases in the local property tax base to finance public schools, since they are paying twice. It is the notion that 'I am only willing to pay the Public Schools if I can get what I want'. If this alienated segment of the population is disenchanted then this leaves the tastes and preferences of the remainder of the local population for the agent to satisfy. The constituents of the school district are more likely to demand that the agents seek state and federal funding sources in order to provide a bundle of services that will satisfy them.

Our empirical task is to investigate the relationship between measures of the heterogeneity of the population and different types of funding by school districts within those counties. At the county-level of analysis, we were able to obtain data on several characteristics of the population for which measures of heterogeneity could be constructed: income, education, race, and age. To do so, we generated Herfindahl-type index numbers for each variable by summing the squares of the percentage of the population that fell into each category. For example, there were six categories for income. A perfectly homogeneous population with respect to income would be obtained when everyone in the population reported income in the same category. The Herfindahl index would achieve a value of 1. A completely heterogeneous population would consist of 1/6 of the population falling into each of the six income categories, which would give the Herfindahl index a value of 0.167. There were three education categories: (1) over 25 years of age without a high school diploma, (2) over 25 years of age with a HS degree, and (3) over 25 years of age with a college degree. Again, a perfectly homogeneous population

would be characterized by Herfindahl index of 1; a perfectly heterogeneous population would have a value of 0.33. Race was calculated using 5 categories: white, black, native American, Asian/Pacific Islander, and Other. This gives a range of Herfindahl values between 0.2 and 1. Finally, the age variable contained 9 categories, with a Herfindahl Index between 0.11 and 1.

School district information was obtained from the Digest of Education Statistics 2000. From this source, revenues by source and expenditures by type were obtained and the school district data is for school districts with 15,000 or more students. The remaining data were obtained from the U.S. Census.

The specific model we estimated is:

$$FUNDING_j = \alpha_0 + \alpha_1 INC_{ij} + \alpha_2 EDUC_{ij} + \alpha_3 RACE_{ij} + \alpha_4 AGE_{ij} + \varepsilon_{ij}$$

Where

$FUNDNG_j$	=	the level of funding by type, j= federal, state, and local.
INC_i	=	the Herfindahl-based measure of the dispersion in per capita income in 1992.
$EDUC_i$	=	the Herfindahl-based measure of the dispersion in educational attainment in 1992.
$RACE_i$	=	the Herfindahl-based measure of racial diversity across a county in 1992.
AGE_i	=	the Herfindahl-based measure of the dispersion in age groups in 1992.

We expect dispersion in per capita income, education, race, and age to be positively correlated with a greater demand for federal funding in a school district. Since the Herfindahl measures achieve higher values with homogeneous populations and lower values with heterogeneous ones, the measured relationships are expected to be negative.

How sensitive are education expenditures to Federal State and Local government funding. Which is more elastic? Does the elasticity change with respect to whether the jurisdiction is more or less homogenous?

Our estimation procedure was Ordinary Least Squares regression. Our results for the 179 coterminous school districts and counties across the U.S. are presented in Table 1 and discussed below.

Table 1: Federal Funding				
	Coefficients	Standard Error	t stat	P-value
Intercept	274613.30	59621.81	4.61	8.2E-06
Age	-71.83	37.08	-1.94	5.4E-02
Educ	-11.60	11.30	-1.03	3.1E-01
Income	-24.82	14.65	-1.69	9.2E-02
Race	-10.03	3.02	-3.32	1.1E-03

We observe that the income, race, and age measures of population homogeneity all exert a significant impact on the level of federal funding received by the school district.[2] As the measure of dispersion increases (indicating greater homogeneity), the estimated level of federal funding declines, ceteris paribus. The effect is most pronounced with respect to race. The f-statistic of 8.64 is also significant and suggests the coefficients jointly explain the changes in federal funding. As a school district's heterogeneity increases in these categories we see a pronounced move towards more federal funding. This may be the result or rent-seeking behavior by school officials, or a way for the school to reduce the price local price while still increasing the bundles of services offered. Given the previous assumption that schools are club goods, greater heterogeneity will lead to a more diverse bundle to be offered. Consequently, if the necessary conditions for voting-with-the-feet exist, federal funding is a way to finance the current bundle, when the median voter may prohibit an increase in local taxes (an increase in the club fees). The education variable is not significantly different than 0. This may result from the lack of variation associated with only three categories of dispersion.

A second model was run to estimate if the effects of dispersion hold on the level of state funding demanded by a county. The results are presented in Table 2. As the table demonstrates, state funding is equally explained by changes in dispersion. The magnitudes are smaller, which corresponds to the smaller contributions given by states. Further, the dispersion on the income variable is much more pronounced at the state-level. This suggests that state legislators where revenue is generated by an income tax are much more likely to seek financing control when the chance of redistribution locally is greater (as would be the case with increased levels of heterogeneity).

Table 2: State Funding				
	Coefficients	Standard Error	t Stat	P-value
Intercept	1321315.50	330660.48	4.00	0.00
Age	-334.63	205.62	-1.63	0.11
Educ	-3.97	62.67	-0.06	0.95
Income	-193.84	81.25	-2.39	0.02
Race	-57.60	16.73	-3.44	0.00

In this paper we demonstrate that there is evidence to suggest that dispersion among groups in a school district leads to greater levels of external funding. This further suggests that schools behave like 'clubs' and where heterogeneity exists in communities, the school system has to offer an increasingly diverse bundle of goods. This investigation has given rise to several new testable hypotheses. The evidence implies that further theoretical and empirical investigation of these relationships is warranted.

ENDNOTES

1. Equalization aid is revenue aid that is directed toward districts with low property value per student (Hoxby, 1996).
2. The education variable is not significantly different than 0. This may result from the lack of variation associated with only three categories of dispersion.

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