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Intradistrict equity of public education resources and performance

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Abstract

This paper presents empirical evidence on input and output equity of expenditures, teacher resources, and performance across 840 elementary and middle schools in New York City. Historically, researchers have studied interdistrict distributions, but given the large numbers of pupils and schools within many urban districts, it is important to learn about intradistrict distributions as well. The empirical work is built on a framework of horizontal, vertical, and equal opportunity equity. The results show that the horizontal equity distributions are more disparate than what would be expected relative to results of other studies, vertical equity is lacking, especially in elementary schools, and equality of opportunity is at best neutral but more often absent. Middle schools exhibit more equity than elementary schools. The paper is one of the first to measure output equity, using levels and changes in test scores to do so.

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1. Introduction

Most US states organize their K-12 school system into a large number of districts that vary greatly with respect to enrollment and numbers of schools.[2] While data on resources and performance across districts are generally plentiful, such information within districts is scarce. This lack of intradistrict resource and performance data is a significant shortcoming considering that large urban districts account for a sizable proportion of students, education spending, and low performing schools in many states.[3]

Until recently researchers interested in school finance equity have relied on district-level data and analyses, focusing primarily on the relationship between fiscal capacity and educational needs on the one hand and

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[2] Twenty-three of the states have more than 250 school districts (National Center for Education Statistics, 2000).

[3] For example, New York City's 1.1 million students account for about one third of New York State's public school population, while its $11 billion in spending across 1100 or so schools accounts for roughly 33% of education spending across the entire state. In fact, New York City educates more pupils than 38 states (U.S. Census Bureau, 2000). Although New York City represents one extreme it is by no means the only such case. States with sizable numbers of districts some of which are quite large include: Illinois (Chicago), California (Los Angeles and San Diego), Texas (Houston and Dallas), Pennsylvania (Philadelphia and Pittsburgh), and New York State (New York City, Buffalo, Rochester, Syracuse, and Yonkers).

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resources on the other hand. They find that inter-district resource disparities within states decreased from the 1980s to the 1990s, but between-state differences in per-pupil resources remained large, and relative rankings of states changed little (Hussar & Sonnenberg, 2000; Parrish & Hikido, 1998; Wyckoff, 1992). Rubenstein and Moser (2002) find that the distribution of resources is more equal in states with fewer districts relative to students and in states with higher proportions of revenues provided by state governments, while Evans, Murray and Schwab (1997) and Murray, Evans and Schwab (1998) show that court ordered education finance reforms have contributed to decreases in dispersions in the states where they took place by increasing spending in poor relative to less poor districts.

With the advent of school-level resource data in the early 1990s, researchers have been able to analyze school-level resource distributions, often ignoring district boundaries and using all schools in a state. These school-level analyses reveal wide disparities (Betts, Reuben & Dannenberg, 2000; Burke, 1999; Hertert, 1996; Nakib, 1996; Owens & Maiden, 1999; Schwartz, 1999). Researchers focusing on school-level data within large urban districts find significant disparities in resources and in some cases in the relationship between resources and poverty (Berne & Stiefel, 1994; Rubenstein, 1998; Stiefel, Rubenstein & Berne, 1998).

School finance equity researchers often focus exclusively on the input or resource side of the educational process, ignoring issues of output equity. A notable exception is the volume edited by Berne and Picus (1994), which consists of 12 papers all devoted to exploring ways to analyze output equity. In more recent years, the attention of state courts to the goal of adequacy in school finance has led economists such as Reschovsky and Imazeki (1998) and Duncombe and Yinger (2000) to estimate district cost functions that can be used to predict the amount of resources needed to produce adequate outcomes. Even with these adequacy studies, however, little has been documented on the distribution of outputs within large urban areas.

This paper adds to our knowledge by analyzing the distribution of resources and performance across New York City elementary and middle schools.[4] Particularly notable is our inclusion of performance measures along with traditional measures of spending and resources. The paper is organized as follows. In Section 2, we develop a conceptual framework for measuring intradistrict equity, while in Section 3 we describe the data and variables. In Section 4, we present empirical results and in Section 5 we conclude.

2. Measuring equity in intradistrict resource allocation and performance

While there are a variety of ways to conceptualize and measure *intra*district equity in school financing, here we adapt Berne and Stiefel's (1984) *inter*district framework in which three equity concepts are analyzed: horizontal equity, vertical equity, and equal opportunity. Horizontal equity specifies that equally situated students should be treated equally and, therefore, in our analyses of spending, we study general education operating revenue, separating it from categorical revenue, which is directed to specific student groups (English language learners, immigrants, poor, low performers, special education students etc.).[5] The operating revenue is intended to be allocated as a base upon which resources for special needs are added or supplemented and, as such, we expect the base to exhibit a high degree of horizontal equity across students. Many statistical measures can be used to identify the degree of horizontal equity in resources per pupil; here we present the range and coefficient of variation (with other possibilities yielding the same general conclusions).[6]

Vertical equity focuses on the treatment of differently situated students, implicitly assuming that students require different amounts of resources to achieve set levels of performance. In order to measure vertical equity in spending, we include categorical revenue with general education operating revenue and we specify school and student characteristics that have been identified with higher costs of learning, such as poverty status, limited English proficiency classification, high mobility, and learning disability status. (See Coleman et al., 1966, for one of the first studies to document some of these associations and Betts et al., 2000, for a more recent study with similar findings.) We use multiple regression analysis, with total spending per pupil as the dependent variable and characteristics of pupils as the independent variables, to measure vertical equity.

We conceptualize equal opportunity in resource allocation in two ways. A neutral formulation posits that equal opportunity exists if there is a *lack* of association between per pupil resources and characteristics associa-

[4] High schools are not included because comparable performance measures across the schools are not available. This will change after 2005 when passing grades on five Regents examinations will be required to graduate from New York State high schools.

[5] General education operating revenue accounts for the largest portion of most school financing and, in New York City specifically, it is approximately two-thirds of total funding.

[6] For example, other measures include the 95th to 5th percentile range, the Gini coefficient, the Theil coefficient, Atkinson's Index, and the McCloone Index (see Berne and Stiefel, 1984 for details).