CHAPTER 26

URBAN EDUCATION: LOCATION AND OPPORTUNITY IN THE UNITED STATES

ERIC A. HANUSHEK AND
KUZEY YILMAZ

Much of the educational story of the United States can be summarized by economic status and race. In turn, there is a locational aspect to much of this story. In simplest terms, poverty, race and schooling are very highly correlated with location. Individual economic circumstances combined with the institutional structure of public decision making in the United States lead to a very close link of location, housing, and education. As a result, residential decisions have added implications for households. Moreover, the reliance on the local tax for a large portion of school funding implies that the governmental grant system has an important effect on both locational decisions and educational outcomes. This chapter provides a theoretical and empirical discussion of the interaction of location and schooling.

Education in the United States is provided by local school districts that operate with considerable autonomy. Funding is provided by a combination of local, state, and federal revenues with the level of spending and the performance of schools varying significantly across school districts. Matched against this institutional backdrop is a process of locational decisions by households that have an outcome of residential location (and implicitly school district) being closely related to the race and income of families. While accepting this outcome of individual locational decisions, governments—through financing of districts and other approaches such as

providing broadened school choice to families—pursue interventions that at least in part represent an effort to ameliorate the adverse effects of location on minority and low-income families. Whether or not these interventions are successful depends partly on whether they correctly anticipate the behavior of individuals, since individuals respond to the incentives set up by governmental policies.

In order to understand the nature of the U.S. locational environment, we begin with a description of both housing markets and schools in the United States. We then provide an overview of the relevant theoretical arguments on both location and local public good provision. The two primary relevant models involve urban location theory and Tiebout choice of governmental services. While each has strengths, neither provides a clear picture of the underlying individual choice or of the outcomes of policy interventions. Following a presentation of the evidence for these models and of the shortcomings of them, we discuss several areas of the interaction of policy with locational decisions. In the schooling area, the form of government finance of local schools, the interventions to prevent segregation of schools, and the movement to consolidate local school districts represent perhaps the largest and most significant governmental interventions that involve the intersection of schools and location. Finally, a different set of governmental interventions—those involving increased school choice—can be thought of as methods of reducing the linkage of location and schooling.

The objective throughout is identifying the state of the art in both theoretical and empirical analyses of schools and location. A key element is identifying areas where currently relevant modeling and evidence are insufficient.

Some Facts of U.S. Urban Education

From rural beginnings, the United States rapidly urbanized through the twentieth century. But the nature of development was quite distinctive. Demographic change of the United States has been characterized by metropolitization in general and suburbanization within metropolitan areas. Figure 26.1 shows total U.S. population by metropolitan status from 1910 to 2000. In 1910, less than a third (28 percent) of the population lived in metropolitan areas. The metropolitan area population grew quickly during the early part of the twentieth century. By 1950, the U.S. population became predominantly metropolitan for the first time, and the metropolitan area population exceeded the nonmetropolitan population by 18.3 million people. The U.S. population became increasingly more metropolitan in each subsequent decade since the 1950s. By 2000, the metropolitan population (226 million) was four times the size of the nonmetropolitan population (55 million).

The growth of metropolitan areas essentially was a growth of the suburban population with little change in the percentage of the total population living in central cities after 1930. Throughout the twentieth century, suburbs accounted for

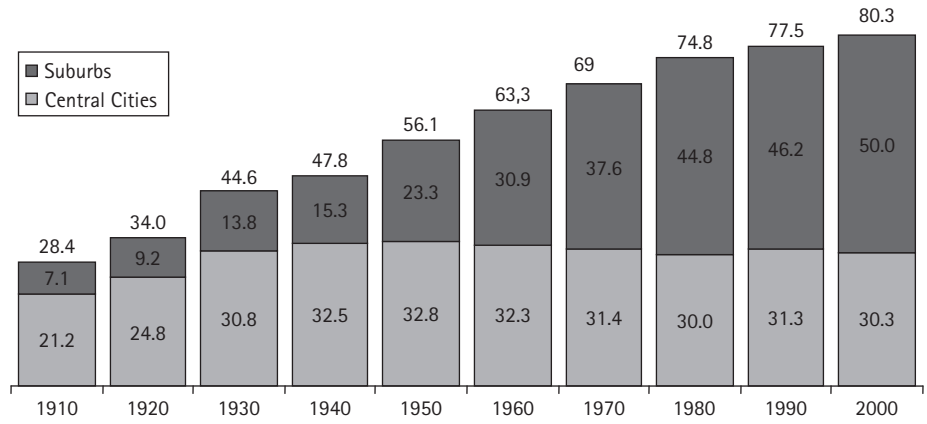

Figure 26.1 Percentage of Total Population Living in Metropolitan Areas and in Their Central Cities and Suburbs, 1910 to 2000

Source: Hobbs and Stoops (2002).

most of the growth of metropolitan areas. After 1960, the proportion of the total U.S. population living in the suburbs was larger than the proportion living in central cities. By 2000, half of the entire U.S. population lived in the suburbs of metropolitan areas.

The aggregate story of population shifts masks some of the important underlying compositional changes. The locational decisions of families are systematically related to income and race. Cutler, Glaeser, and Vigdor (1999) assembled a comprehensive data set on segregation from 1890 to 1990. From 1890 to 1940, blacks migrated to urban areas, and as a result, ghettos were born. As the migration continued between 1940 and 1970, ghettos expanded and racial segregation increased continuously. Since 1970, there has been a modest decline in segregation as blacks have moved to suburban areas and central cities became less segregated. Despite these large changes in segregation over time, segregation across cities remains very persistent and is strongly related to city size.

Iceland and Weinberg (2002) examined residential segregation in metropolitan areas for the four major racial and ethnic minority groups in the United States: American Indians and Alaska natives, Asians and Pacific Islanders, blacks or African Americans, and Hispanics or Latinos (table 26.1). Residential segregation is measured by the dissimilarity index, which ranges from 0 (complete integration) to 1 (complete segregation) and measures the percentage of a group's population that would have to change residence for each neighborhood (census tract) to have the same percentage of that group as the metropolitan area overall. It is clear from their high dissimilarity index in table 26.1 that blacks are the most residentially segregated of the four groups examined but that their segregation has declined some over time. Hispanics are the second-most-segregated group, and their overall concentration by neighborhood has not changed over the period examined. Asians and Pacific Islanders are more residentially segregated than

Table 26.1 Dissimilarity Indices by Race/Ethnicity in Metropolitan Areas, 1980–2000

Index and Race/Ethnicity	All Metropolitan Areas		
	1980	1990	2000
American Indians and Alaska Natives	0.373	0.368	0.333
Asians and Pacific Islanders	0.405	0.412	0.411
African Americans	0.727	0.678	0.640
Hispanics	0.502	0.500	0.509

Source: Iceland and Weinberg (2002).

American Indians and Alaska natives, but this partly reflects the fact that the latter are less located in metropolitan areas. It is also clear that African Americans had the biggest declines in the index. American Indians and Alaska natives are the second group with a substantial decline in segregation, while there has been a slight increase in the segregation levels for Asian and Pacific Islanders and Hispanics over the twenty-year period.

These comparisons, while common and useful for many purposes, do not accurately set the proper backdrop for education, however. There is some variation in schools by local neighborhoods, but in tracing the interactions of location and education the most significant differences occur across districts. As discussed later, the major policy movements follow district lines.

The study by Swanstrom et al. (2006) analyzes economic segregation among municipalities for fifty major metropolitan areas. Instead of studying segregation based on neighborhoods defined as census tracts, these researchers look at how people with different incomes are sorted among political jurisdictions, that is, central cities and their suburbs. They conclude that economic segregation among municipalities is rising, but the trends vary significantly across time and in different regions of the country. Moreover, middle-class suburban places are being squeezed by the growth of affluent and poor suburban places, and the gap between rich and poor suburbs is wider than ever.

Fischer et al. (2004) study trends in residential segregation in the United States from 1960 to 2000 along several social dimensions, including race, income, and family status, and across several geographic levels: region, metropolis, the center-city–suburb division, municipality, and tract. Substantively, they report that the segregation of blacks decreased considerably after 1960, largely because neighborhoods became more integrated. While the central-city–suburb barrier lessened for blacks, suburbs themselves became more segregated. The foreign-born became more segregated, largely because they concentrated in particular metropolitan areas. The segregation of Hispanics, however, changed little.

Class (economic) segregation increased between 1970 and 1990 mainly because the affluent were clustered more both in specific metropolitan areas and in specific municipalities within metropolitan areas. An important element, however, is that

class segregation is significantly less than racial segregation. Thus, while most of the modeling discussed later in this chapter concentrates on economic factors in location and school choice, the dimension of race and ethnicity is generally left out even if it may be more important.

Urban Schooling Outcomes

The educational distribution of metropolitan areas must be considered within the context of overall changes in schooling within the United States. Clearly, educational attainment increased dramatically between 1960 and 2009. The percentage of the adult population (25 years old and over) with a high school diploma or more rose from 41.1 to 86.7 percent; the percentage of the adult population with a college degree or more rose from 7.7 to 29.5 percent. These increases in educational attainment were found for all races.

By standard calculations, the educational attainment of blacks increased at a faster rate than that of whites, and by 2009, the attainment gap between blacks and whites appeared to have decreased substantially. The gap between Hispanics and whites remained large and unchanged at every attainment level. But part of these trends simply represents measurement issues. In an attempt to get the true picture, Heckman and LaFontaine (2009) use multiple data sources and better measures to estimate U.S. high school graduation rates. Their study is unique in its care in addressing various data problems, which in large part include using alternative diplomas (specifically GED certificates) as substitutes for secondary school completion. It demonstrates that, when comparable measures are used on comparable samples, (1) the true high school graduation rate is substantially lower than the official rate, (2) the rate has been declining over the past forty years, and (3) majority/minority graduation rate differentials are substantial and have not converged over the past thirty-five years.

Nonetheless, the level of achievement, or actual knowledge, is by many accounts more important than school attainment in assessing educational outcomes.[1] Here there is a mixed message when student performance is viewed by location or by race/ethnicity. By age seventeen, the average black student is performing at around the 20th percentile of the white distribution (National Center for Education Statistics 2005). Studies of National Assessment of Education Progress (NAEP) scores document a lessening of the black-white gap during the 1980s and early 1990s and a roughly constant gap thereafter (see, e.g., Hanushek 2001; Neal 2006).

Table 26.2, which displays mathematics results by ethnicity over the period 1973 through 2004, are drawn from the NAEP. These results provide a consistent comparison of performance over time. The pattern of mathematics achievement

1. Hanushek and Woessmann (2008).

Table 26.2 Average Mathematics Scale Score by Ethnic Origin: Selected Years, 1973–2004

	1973	1982	1992	2004
9-Year-Olds				
White	225	224	235	247
Black	190	195	208	224
Hispanic	202	204	212	230
13-Year-Olds				
White	274	274	279	288
Black	228	240	250	262
Hispanic	239	252	259	265
17-Year-Olds				
White	310	304	312	313
Black	270	272	286	285
Hispanic	277	277	292	289

Source: National Center for Education Statistics (2005).

indicates a significant improvement for children aged nine and thirteen between 1973 and 2004, but relatively smaller improvement for age seventeen. Moreover, significant gaps in performance continue to exist between racial subgroups. For black nine-, thirteen-, and seventeen-year-olds, average mathematics scores in 2004 were higher than in 1973. For white students, the average scores for nine- and thirteen-year-olds were also higher in 2004 than in 1973, but the average score at age seventeen was not measurably different from the average score in 1973. As a result, over the entire period, there has been a narrowing of the gaps, but it has not been anywhere near uniform. As with the other racial/ethnic groups, the average mathematics scores for Hispanic students at ages nine and thirteen were higher in 2004 than in any other assessment year. The scores for seventeen-year-old Hispanic students also increased between 1973 and 2004, but no measurable changes were seen between 1992 and 2004.

The other way to look at performance on NAEP focuses on differences among school districts. The NAEP mathematics assessment results for fourth, eighth, and twelfth grades in 2005 are reported by geographic location in table 26.3. The percentage of fourth graders scoring at or above the proficient level was larger in rural areas (36 percent) than in cities (29 percent) but was smaller than in suburban areas (41 percent). The percentages of eighth graders and twelfth graders scoring at or above the proficient level followed a similar pattern. These geographic patterns, which are correlated with racial patterns by locational choices, describe both a policy challenge (how can these gaps be reduced?) and an analytical challenge (what is the source of these gaps?).

Given the substantial increase in returns to skill over the past thirty-five years, many scholars—focusing on schools, family, and peers—have tried to uncover the

Table 26.3 Percentage Distribution of Public School Students across NAEP Mathematics Achievement Levels, by Grade Level and Locale, 2005

Grade Level and Locale	Below Basic	At Basic	At Proficient	At Advanced
4th Grade				
City	28.0	43.3	24.6	4.1
Suburban	16.7	42.7	34.4	6.3
Rural	17.3	46.7	31.9	4.1
8th Grade				
City	41.2	35.9	17.9	5.0
Suburban	27.6	38.9	26.1	7.3
Rural	28.2	42.9	24.2	4.6
12th Grade				
City	47.3	35.1	15.3	2.3
Suburban	37.6	37.2	22.8	2.5
Rural	40.4	39.0	19.0	1.6

Source: National Center for Education Statistics (2005).

underlying causes that drive the achievement differences. In the famous study of the mid-1960s, the "Coleman Report" (Coleman et al. 1966), concluded that, after family background factors were statistically controlled, school resource variation explained little of the differences in student achievement. Student background and socioeconomic status were much more important than school resources in determining student achievement. These findings have held up in many subsequent analyses (Hanushek 2003).

Among the many studies that followed the Coleman Report, Hanushek, Kain, and Rivkin (2009) and Hanushek and Rivkin (2009) consider how schools affect the black-white achievement gap by examining the changes in the gap as students progress through the school. Their findings suggest that the achievement gap is directly related to the racial composition of schools. Their results reveal substantial differences in the effects of high black enrollment share by initial achievement quartile, race, and schooling level. They report larger negative effects of racial concentration in middle school and for initially high-achieving blacks, and their story is also consistent with the beliefs that peer influences grow as students enter adolescence and that high-achieving blacks come under pressure not to achieve. These findings again bring into sharp focus the interaction of locational decisions and schooling outcomes, as racial concentration of schools today is driven in large part by residential location.

While a variety of factors enter into the observed achievement levels, the quality of schooling is also an obvious element. But the nature of schooling varies dramatically by location, and it is this geographic variation that is the focus of this chapter.

School Finance Arrangements

Trends in school finance show a different side of the demographic movements. At the beginning of the schooling movement within the United States, local jurisdictions assumed most of the responsibility for funding schools. This changed progressively over the twentieth century.

Figure 26.2 shows the distribution of revenues for public elementary and secondary schools by the source of funds (U.S. Department of Education 2009). At the beginning of the twentieth century, the unique feature of U.S. education was the degree of control (both fiscal and educational) that was granted to local governments. During the course of the century, states increased their role in financing, from 16.5 percent of revenues in 1920 to 49.5 percent in 2000, while the role of local governments shrank, dropping from 83.2 percent to 43.2 percent. The federal government has become a noticeable, though still a junior, partner. The largest increases occurred during the 1960s, when the federal government entered into the financing of education for disadvantaged students. Its share was 7.3 percent of revenues in 2000, up from virtually nothing in the early twentieth century, but it rose to over 9 percent by 2005 with the new federal interest in education through national accountability for educational outcomes.

Table 26.4 shows 2003–2004 academic year public school revenues that came from federal, state, and local resources in varying proportions by locale. Rural public schools tended to receive a greater proportion of their revenues from state resources, compared with city and suburban public schools. Specifically, 52 percent of rural schools' revenue came from state resources in comparison with 42 and 46 percent, respectively, for suburban and city schools. Conversely, a smaller percentage of rural schools' revenues come from local resources, especially local property taxes. The funding by poverty level shows that both federal and state funding is compensatory, with the local share of funding in all areas falling and the federal share rising with increased concentrations of poverty.

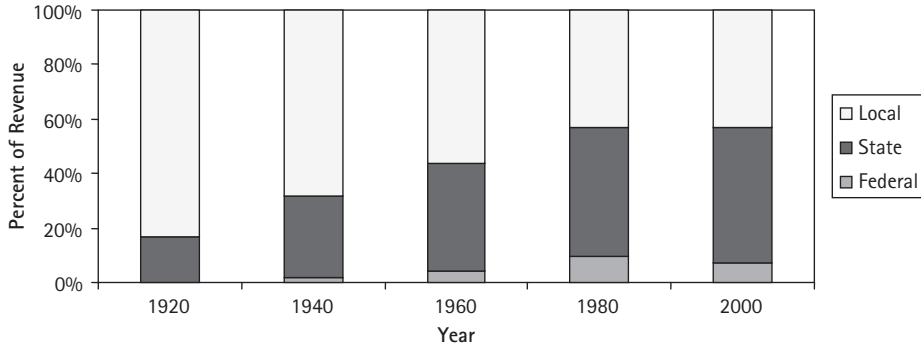

Figure 26.2 Revenues for Public Schools, by Source of Funds

Source: U.S. Department of Education (2009).

Table 26.4 Percentage Distribution of Public School Revenues, by Source of Funds, Locale, and District Poverty Level, 2003–2004

	City			Suburban			Rural		
	Federal	State	Local	Federal	State	Local	Federal	State	Local
Overall	10.9	46.3	42.8	5.7	41.9	52.4	8.9	52.0	39.2
Low	3.6	33.8	62.6	2.9	32.5	64.7	3.4	42.8	53.8
Middle low	6.5	38.8	54.7	5.1	42.4	52.6	5.6	48.9	45.5
Middle	8.3	44.9	46.9	8.0	48.0	44.0	8.0	54.8	37.2
Middle high	11.2	48.0	40.8	9.9	56.2	33.9	11.7	56.6	31.7
High	13.6	49.5	37.0	12.5	58.3	29.2	19.2	58.0	22.8

Source: Provasnik et al. (2007).

Table 26.5 Expenditures per Public Elementary and Secondary Student, Locale, and District Poverty Level, 2003–2004 (Adjusted for Geographic Cost Differences)

	City	Suburban	Rural
Overall	$8,149	$7,877	$8,432
Low	7,758	8,655	9,136
Middle low	7,394	7,602	8,506
Middle	7,174	7,053	8,231
Middle high	7,734	7,519	8,062
High	9,011	7,843	8,378

Source: Provasnik et al. (2007).

Table 26.5 shows expenditures per pupil, adjusted for geographic differences in 2003–2004. In the rural areas, overall adjusted expenditure per pupil was higher than in cities and suburban areas. Perhaps the most striking figure, however, is the fact that high-poverty city districts spent more in adjusted terms than did either rural or suburban high-poverty districts. These spending outcomes are, nonetheless, the result of locational choices on the part of citizens along with governmental policies. The interplay of these forces has implications for both the level and the distribution of educational outcomes.

Urban Location and Tiebout Models

Theoretical modeling of individual locational decisions has relied upon two distinct modeling traditions: urban location models and Tiebout models of community choice. In urban location models, a household's location is determined by the trade-off between accessibility and space, ignoring public goods. On the other hand, Tiebout models emphasize public goods and taxes and ignore accessibility. Some recent work provides initial efforts at a unified treatment of those two artificially separated streams of literature. Importantly, the issue of race is absent from the theoretical models, although it is partially captured by the correlations of race and income.

A key element of the theoretical models is the general equilibrium nature of locational decisions and schooling choice. With changed economic incentives, the level and distribution of educational services change along with the locational decisions of households. This has direct ramifications for a number of educational policy and finance decisions.

Urban Location Models

Urban economics has largely focused on household location and urban form as dictated by accessibility concerns. A variety of authors helped develop the basic urban location model, including Alonso (1964), Mills (1967, 1972), Muth (1969), and Kain (1975). The general structure is clearly developed in Muth's classic book, *Cities and Housing* (1969), in which he analyzes the workings of price systems in urban housing markets and investigates the determinants of the spatial structure of urban areas and the growth of cities. His book spearheaded a theory of the internal structure of a city emphasizing housing markets, accessibility, and land use and formalized a model of household locational choice.[2] In the most basic model, he assumes that the household consumes an aggregate commodity called housing services, works in a central business district, and resides in one of the series of residential contours that surround the central business district. A household chooses the location that provides the best trade-off between housing costs and commuting costs. The housing industry produces the housing service. In the Muth model, the price of housing space is an inverse function of distance from the central business district, and the cost of commuting varies directly with both distance from the central business district and wage income. Muth finds that a change in wage income will increase commuting distance if the income elasticity of demand for housing space exceeds unity, but a change in nonwage income will increase commuting distance if the income elasticity of demand for housing space is positive. His theory of income segregation suggests that central locations provide the best trade-off for the poor, while suburban locations provide the best trade-off for the wealthy. Muth and many researchers following him provide extensive empirical studies that help us understand the basic aspects of residential choice and location.

Nonetheless, the basic income location model does not completely match the empirical facts. In one recent paper, Glaeser, Kahn, and Rappaport (2008) find that the income elasticity for land is too low to explain much of the "poor in cities, rich in suburbs" equilibrium in the United States. Their explanation revolves around better access to public transportation in central cities. And none of the standard models can explain the segregation of blacks and other racial groups, concentrations that exceed income concentrations as discussed.

Public Goods and Tiebout Models

An alternative view of household location focuses not on accessibility but on the provision of local public goods. This line of research is emphasized here because it most directly indicates the interplay between location and schools. The key insight comes from Tiebout (1956). He developed a simple model in which a metropolitan

2. The suburbanization of metropolitan areas has drawn considerable attention from researchers (Mills 1972, 1992; Mills and Price 1984; Margo 1992; Mieszkowski and Mills 1993).

area with different communities could serve to permit households to satisfy differing demands for public goods through their choice of locations.

A variety of people have investigated this underlying structure as it relates to education, the most significant local public good (see, e.g., Oates 1969; Fischel 2006b; and Nechyba 2006). Epple, Filimon, and Romer (1983, 1984, 1993) develop a series of elegant general equilibrium models of local public good allocation in a system of jurisdictions. Individuals differ by income, and each individual must choose among a finite number of communities. Communities provide the public good through taxes on the amount of housing residents choose to consume. The tax rate and amount of public goods provided in the community are determined by a vote of residents of the community. An equilibrium has the properties that individuals maximize their utility, the housing market clears, the community budget is balanced, and no one can be better off by moving. An innovative feature of these models is that political processes for allocating local public goods are introduced.

Clearly, explicit modeling of the political process requires imposing more structure on the economics of the model, and the existence of equilibrium becomes problematic. Difficulties with existence of equilibrium that arise in models with discrete locations and in models with voting are compounded when both features are introduced into the same model. The series of papers by Epple, Filimon, and Romer develops conditions that involve restrictions on preferences and the technology of public good supply under which equilibrium exists. The papers, then, discuss the implications of the conditions, and their role in assuring existence of equilibrium. A series of computational examples provide illustrations of the way these conditions interact.

Combining Location and Public Goods

The locational models and the public goods models provide a simplified structure that can be used to guide empirical work and to assess a variety of policy proposals. At the same time both posit significant behavioral responses on the part of families to specific incentives while ignoring other incentives. In reality, both commuting costs and public goods are probably important to actual residential decisions in the real world, and there is no reason why these two models could not be integrated.

In an attempt to provide a unified treatment of those two separate streams of literature, Hanushek and Yilmaz (2007a, 2007b) incorporate both motivations simultaneously and find that the equilibrium outcomes are more consistent with empirical observation. The feature from urban locational models that is missing from the Tiebout models is that rents decline with distance from the employment center, providing incentives for the rich to live in big houses away from the center. The feature from Tiebout models not in urban location models is that the introduction of public good and taxes provides a different influence on location that leads to the capitalization of public service quality and fiscal attractiveness into housing prices. These modes are unique in the sense that they have both the trade-off between accessibility and space and local public goods and taxes. As a result, the

equilibrium of households has communities with mixed populations in terms of incomes and tastes for public goods—an outcome that matches the observed locational patterns of metropolitan areas. These results hold with both central employment and dispersed employment centers. Obtaining analytical results from such a model is, however, impossible, and the analysis must rely on simulation techniques to solve for the resulting household equilibrium.

Models with both centralized and decentralized employment (Hanushek and Yilmaz 2007b) permit analysis of current school finance proposals that involve multiple jurisdictions and individual responses to public policies about schools. The resulting structure, discussed more later, produces jurisdictions with mixed incomes and preferences for schools, a feature that the separate location and public goods models cannot.

Analytical Approaches

The models resulting from considering households' joint choices of a place to live and a place to work along with schools, parks, public safety, and a set of taxes to finance these public goods quickly become very complicated. Indeed, these are not the only issues because the household is also choosing a set of neighbors who provide opportunities for social interactions and send their children to the same schools—issues that become important, for example, if race is also included in the calculus. In many ways the underlying modeling choice is between theoretical models with a fairly simple structure that are solved analytically and those that can accommodate a more complicated structure but that require simulation-based modeling with more specific parameterization. In the case of schooling based upon specific geographic districts, it is difficult to ignore the interplay between household location decisions and the quality of schooling they obtain. Residential location choices are influenced by public school considerations, and residential choices result in nonrandom sorting of students across public schools that differ widely in both inputs and outputs.

Nechyba (2006) reviews the theoretical as well as simulation-based literature that focuses primarily on mechanisms related to the sorting of parents and children into schools and classrooms. The primary mechanisms that generate sorting reviewed were (1) residential location choices within housing markets that are linked to schools; (2) parental choices to send children to private rather than public schools; and (3) explicit tracking policies within schools. His thorough review suggests that much progress has been made in both the theoretical and the simulation literature.

A distinct advantage of the simulation literature is that it permits multiple jurisdictions with a range of attributes. Most metropolitan areas in the United States have dozens of municipalities, school districts, and other local governments. The simple Tiebout model involves a wide range of jurisdictions differentiated by just the level of public goods offered and suggests that people vote with their feet, choosing the local government that provides the best combination of taxes and

local public goods. The primary implication of the interjurisdictional mobility (voting with feet) in a local system of fragmented governments is that it increases the efficiency of the provision of the local public good. In equilibrium, households sort themselves into communities to reflect their preferences for schools and location. On the other hand, jurisdictions are typically more limited, people have preferences for multiple goods that are related to location, and schooling itself may not be efficiently provided. Epple and Nechyba (2004) provide an overview of stylized facts regarding fiscal decentralization around the world and summarize the progress that has been made in fiscal federalism literature, in both empirical and theoretical dimensions.

One promising area for future research involves recent efforts to use structural estimation techniques to estimate theoretical models (e.g., Bayer, Ferreira, and McMillan 2007). While this approach is still in its early stages, it suggests a strong basis for much future work because it directly includes household optimizing behavior into the estimation of household preferences for school quality.

Evidence on the Impact of School Choice

While many discussions of "school choice" relate directly to such things as vouchers or charter schools where parents can choose among alternative schools, the previous discussion emphasizes that the largest element of choice is the residential location decisions of households. Pursuing this, several lines of research have looked directly at the outcomes of residential choice.

Tiebout and Capitalization

One of the results of choice that is based on public good quality is that housing will tend to differ in price for more than just accessibility reasons. A jurisdiction that, other things being equal, provides more preferred tax and public service combinations will have a larger demand for housing than one with less preferred combinations. Thus, housing prices will be bid up in the more desirable location. Within the United States, such issues of fiscal federalism appear increasingly in both academic and public debates. Both the current and the future flow of public services and taxes that are capitalized into home values make homeowners watchful of what happens in local government.

Clearly, the efficiency in the decentralized system crucially depends on monitoring the quality of the local public good (education). A critically interesting question is how households/homeowners know which schools are good. Many studies on the determinants of school quality have tried to find a relationship between school inputs and school outputs. Unfortunately, the literature is inconclusive and failed to find a relationship (Hanushek 2003). Oates (1969) conducted an early study

that led to a series of recent studies that have used increasingly sophisticated methods to infer the value parents place on school quality (see the review in Black and Machin 2011). One particular line of research has removed the variation in neighborhoods, taxes, and school spending by considering houses located on attendance district boundaries (e.g., Black 1999; Figlio and Lucas 2004; Kane, Staiger, and Samms 2003; Weimer and Wolkoff 2001; Gibbons and Machin 2008). Even with neighborhood characteristics controlled in sophisticated ways, a good school (i.e., a school with higher test scores) raises housing prices by a substantial amount. There nonetheless remains some uncertainty about exactly how consumers get their information about schools (see Downes and Zabel 2002). For example, even with information about test scores at a school, the household would have trouble sorting out the "value-added" of schools, since test scores are affected by families and peers in addition to schools. Moreover, the structural equation results of Bayer, Ferreira, and McMillan (2007) suggest considerably less capitalization of school quality into housing prices.

The review of varying estimates of the degree of capitalization highlights both the empirical relevance of the theoretical models building on location and schools quality and the open issues in the area. The variation in results appears partly related to methodology, but the full reconciliation has yet to occur.

Impact of Tiebout Choice on School Efficiency

As is well known, the presence of a public good generally leads to market failure. The reason is that residents working in their own self-interest will not truthfully reveal their willingness to pay for the public good (more commonly known as the free rider problem). In the absence of any government involvement, it results in the general underprovision of the public good. The Tiebout model suggests that (under relatively strong assumptions) individual locational choices solve this free rider problem as people will have an incentive to choose the community that best satisfies their preferences, given the education and tax package for each community. While the full set of assumptions is unlikely to be met, the general presumption is that "Tiebout choice" produces a more efficient outcome to the general public choice problem for local public goods. The more school districts there are, the easier it is for households to sort themselves into communities that are relatively homogeneous in terms of both income and tastes. Moreover, it is natural to expect that Tiebout choice raises school productivity. From analysis across different metropolitan areas, it appears that competition among districts is an important contributor to the quality of public schools. Borland and Howsen (1992) first found that student achievement was directly related to the amount of district choice. This work was extended by Hoxby (2000) to consider the possibility that district performance could influence the number of districts in an area. To get around the potential endogeneity problem due to endogenous district formation, she derives instruments from the natural boundaries (streams and rivers) in a metropolitan area. She finds that Tiebout choice produces more productive schools, reduces expenditures per student, and results in less private

schooling. This issue is not without controversy, however, as different interpretations have been proposed by Rothstein (2006), and the analytical methods of Hoxby have been debated (Rothstein 2007; Hoxby 2007).

Interaction of Policy and Locational Decisions

The previous sections have described some key elements of the interaction of location and schooling, from both a theoretical and an empirical viewpoint. In contrast to this discussion that emphasizes the behavior of households in choosing a location, a range of policy decisions have explicitly been based on location but for the most part assume that households will not react to the policies. In other words, these policies aim to alter the attractiveness of a local school district but generally ignore any general equilibrium effects from household behavior. Here we review some of the more important policies affecting the location-schooling equilibrium.

State Funding of Schools and School Finance Court Cases

The funding of schools has been jointly determined by federal, state, and local decision making. It is useful to begin with an overall description of the funding of schools. There are in fact large variations across states in the pattern of funding of schools. Nonetheless, there are some generalizations across states.

While most governmental appropriation decisions are made by the relevant executive and legislative branches of government, school funding is one area where the courts have been heavily involved. This court involvement has frequently called for a redistribution of the funding of schools across districts within a state and as such has altered the fiscal (and possibly educational) attractiveness of districts.

As described earlier, the federal funding of schools has been relatively small and has focused on extra funds for disadvantaged children or for special education. Federal support of schools has increased in recent years, partially linked to greater funding under school accountability. Nonetheless, federal funds remain less than 10 percent of total revenues, and because they vary with the characteristics of students, they have much of the character of funding that follows the child, regardless of locational choice.

The U.S. education system is unique around the world in the degree of control that has been granted to local governments. This local control is seen in a variety of dimensions, but perhaps the most important is the ability of local school districts to raise funds for schools. In most states, local districts are given the ability to use the property tax, and thus the local property tax is a major source of funding for education. Not surprisingly, property tax bases vary from one district to another, and this

variation has contributed to an educational system characterized by enormous total spending variation across states and districts.

The character of state funding is, however, pivotal in determining the distribution of educational spending across districts. All states distribute state revenue for education to local school districts, both as basic support and, almost universally, as categorical grants for specific funding needs. An important element of state aid is helping to narrow the gaps in education spending across school districts. Flat grants are the oldest and simplest form of aid that provides a uniform amount of aid per student or teacher. As opposed to their objective to provide some minimum level of education expenditure, historically the grants were ineffective at reducing the variance in funding due to their small amounts. Foundation grants, the most common scheme, were aimed at guaranteeing a minimum level of spending, but they do so by providing larger state funding to districts with less fiscal capacity as identified by lower tax bases. The exact formula and level of funding differ significantly across states, but the formulas typically require local districts to contribute to the foundation spending level based in varying amounts on their capacity. Districts can then generally further supplement the basic funding with their own property tax receipts. District power equalization programs are matching-grant programs with the aim that the program makes it possible for any district, whatever its tax base, to spend the same amount of money from the same tax effort. The final grant scheme, categorical aid, is given for specific expenditure categories such as special education, transportation, buildings, textbooks, and equipment.

Clearly, the state funding program has direct implications for the geography of funding—and changes in state policies (which occur rather frequently) have immediate ramifications on the tax and spending polices of individual districts. Implicitly this means that state policies directly impact the fiscal and educational attractiveness of districts, leading, among other things, to changes in housing values through differential capitalization. While these general equilibrium effects are almost certainly substantial in the case of major funding decisions, little analysis of them exists. This lack of research is a major gap in the ability to evaluate school finance policies.

But, as suggested, the courts have also been significant actors in the determination of the level and distribution of school funding across districts. A variety of parties have instituted court proceedings claiming that the state legislated funding formula violates constitutional requirements for funding schools. While the division is sometimes fuzzy, these court cases fall into two major groupings: equity cases and adequacy cases. In simplest terms, equity cases are focused on the distribution of funding across districts, while adequacy cases are focused on the level of funding. (Some existing cases have, however, had elements of both.)

Equity Cases

In the early 1970s, parents began to file lawsuits against state governments to require states to equalize spending per pupil among districts, reasoning that the quality of

education a child receives should not be a function of the wealth of the community in which he or she resides (the principle of wealth neutrality).[3] *Serrano v. Priest* (1976) was the first successful court case related to state school finance equity.[4] John Serrano complained about the low quality of the local high school's education program. Serrano cited the very large difference between two school districts in the Los Angeles area, Beverly Hills and Baldwin Park. Beverly Hills used its large property tax base to spend more per student while charging a low property tax rate. In ruling in favor of Serrano, state court judges in California overturned the state's existing system of school finance. The court ruled that the existing property tax system violated the equal protection clause of the state's constitution.

San Antonio Independent School District v. Rodriguez (1973), filed on behalf of some children living in districts with low per pupil property valuations in Texas, was a similar case to *Serrano*.[5] It differed, however, in that it was brought in a federal court and relied on the equal protection clause of the U.S. Constitution alone. The U.S. Supreme Court ruled that education is not a fundamental right guaranteed to U.S. citizens by the federal Constitution. There are two major implications from the *Rodriguez* decision. First, the federal courts would do nothing to promote equalization of spending across states. Second, any fiscal reform of the school finance system must come from state governments and state courts. Following the *Serrano* decision, court cases were brought in thirty-six states, of which sixteen were found in favor of the plaintiffs who argued for change in the local financing of schools (see Hanushek and Lindseth 2009).

These court cases frequently led to dramatic changes in the distribution of funding across local districts. While changing the funding going to individual districts, these rulings also changed the fiscal attractiveness of individual districts by changing the benefits and tax costs of individual districts. As a result, these cases also had direct implications for the capitalization of schooling into the housing prices of districts. Nonetheless, this impact on housing prices has not been adequately researched.

Adequacy Cases

A different kind of court case followed the "equity" cases epitomized by *Serrano*. The Kentucky Supreme Court took the dramatic and unprecedented step in 1989 of declaring the entire state system of elementary and secondary school education unconstitutional under the state constitution for failing to provide all children with an adequate education.[6] Adequacy, as defined in Kentucky and a large number

3. A history and interpretation of the many legal cases can be found in Hanushek and Lindseth (2009).

4. *Serrano v. Priest*, 557 P.2d 929 (Calif. 1976).

5. *San Antonio Independent School District v. Rodriguez*, 411 U.S. 1 (1973).

6. *Rose v. Council for Better Education*, 790 S.W.2d 186 (Ky. 1989). The details and issues of these decisions are discussed in Hanushek and Lindseth (2009).

of subsequent court cases, involves both identifying desired educational outcomes required by a state constitution and setting a path to meet the standard. The typical court remedy for a finding that the state financing was inadequate was to require states to increase their funding of schools, sometimes very dramatically. These court cases proved to be very successful, with a string of victories for plaintiffs between 1989 and 2005 in many state courts, including New York, New Jersey, and Wyoming.

Interestingly, after 2005, the pattern of state court rulings completely reversed, leading to plaintiff losses in more than a dozen cases through 2009.[7] Thus, there appears to be a recent reluctance of the courts to intervene in school funding.

For our purposes, it is less clear that these cases had a very different impact on location and schooling. Unlike the equity cases that were designed to change the geographic pattern of funding of schools, these cases were more aimed at the level of funding rather than the distribution. Nonetheless, in rewriting finance laws, the distribution of funding is invariably affected along with the level of funding.

A large body of research has investigated the impact of school finance reforms on the distribution of school resources. In his work, Fischel (1989, 2006a) finds that California's *Serrano* decision equalizing school spending contributed to the property tax limitation of Proposition 13 and subsequently to relative declines in California spending on education (compared with other states). Later, Murray, Evans, and Schwab (1998) found that successful litigation reduced inequality in the amount spent per student by raising spending in the poorest districts while leaving spending in the richest districts unchanged. It thereby increased aggregate spending on education. States accomplished this by providing less state funding to property-rich districts and more funds to property-poor districts, while allowing property-rich districts to increase their local contributions. Moreover, reform led states to fund additional spending through higher state taxes. More generally, Hoxby (2001) demonstrates that school finance equalization schemes can level spending up or down, depending on the price and income effects they impose. Strikingly, it appears some students from poor households in states such as California or New Mexico would actually have better-funded schools if their states did not attempt such complete equalization.

The relationship of court actions and student outcomes is generally different. The few investigations of the effects of expenditure equalization from the courts generally do not find implications for the equalization of outcomes.[8] Clark (2003) finds that, while Kentucky's Education Reform Act did have a significant equalizing effect on school spending, it did not have an equalizing effect on student achievement between rich and poor school districts. An exception is Card and Payne (2002),

7. These court cases are ongoing, so it is difficult to predict the future path. Further, some of the lower court decisions remain on appeal. See Hanushek and Lindseth (2009).

8. Downes (1992); Hanushek and Somers (2001); Flanagan and Murray (2004); Downes (2004); Cullen and Loeb (2004); Duncombe and Johnston (2004). See also Greene and Trivitt (2008).

who find evidence that the equalization of educational expenditures across school districts narrows the distribution of education spending, and correspondingly narrows the distribution of SAT scores among children of diverse socioeconomic backgrounds.

An alternative approach to studying the impact of these fiscal changes is the general equilibrium simulation modeling by Hanushek and Yilmaz (2007a, 2007b), who consider how households respond to various funding policies including funding equalization across districts and district power equalization and find that welfare and achievement generally can be reduced by these policies. After governmental involvement, the rich are pushed to subsidize more households, and the marginal price for a better education rises. Moreover, due to the redistribution of school resources, the quality of education in the community with a better education goes down, and the gap with the other community becomes smaller. The rich have to go with a relatively lower quality of education, even though they have a demand for a community with a better education. As a result, they are worse off. The poor side of the story is interesting and actually justifies why a general equilibrium model provides a better framework to study issues in educational finance. Due to the higher marginal price for a better education, more rich move to the poorer community, causing an increase in rents. The poor are worse off due to higher rents and the fact that their preferred level of quality of education would be less than what they have after the policy. Individual incentives respond to the policies set up by the government, and the distortion created by incentives cannot be ignored.

School Desegregation

Perhaps the largest social policy of the United States in the second half of the twentieth century was the racial desegregation of schools, which had direct ramifications for both urban location and schools. In *Brown v. Board of Education of Topeka* (1954), the U.S. Supreme Court declared that explicit racial segregation was unconstitutional. Before then, a number of states maintained legal segregation of schools by race.[9] But, over the late 1950s and early 1960s, the progress in desegregating schools was not substantial. In 1964, empowered by the Civil Rights Act, the Department of Health, Education, and Welfare had the power to withhold federal funding from school districts that discriminated on the basis of race. The following year, with the passage of the Elementary and Secondary Education Act of 1965, the department issued its first desegregation guidelines for receipt of federal funds, requiring school districts to submit a court order or a voluntary desegregation plan as evidence of nondiscrimination.[10] The federal courts also became more active in desegregation in 1968, when the U.S. Supreme Court decision in *Green v. County School Board of New Kent County* finally called for dismantling the dual school system. This Supreme

9. *Brown v. Board of Education of Topeka*, 347 U.S. 483 (1954).
10. See Cascio et al. (2010) on the impact.

Court ruling set desegregation guideline standards for voluntary desegregation and for court-ordered plans.[11] The decisions required the desegregation of schools in areas where local governments pursued a policy of explicit segregation. Court cases also moved from areas that had segregation laws (de jure segregation) to ones where the existing patterns of housing and schools led to segregation (de facto segregation). In its 1973 decision in *Keyes v. School District No. 1* (Denver), the U.S. Supreme Court extended the obligation to desegregate to school districts with de facto rather than de jure segregation. The policies of courts toward desegregation clearly affect the interaction of housing and schools (e.g., see Boustan 2010; Baum-Snow and Lutz 2008).

The policies toward desegregation have actually changed dramatically over time. While the courts were expansive in their rulings through the 1970s, they began to retreat on requiring added desegregation after that.[12] At the height of court involvement, hundreds of districts in the United States were under court orders or had a voluntary agreement on various actions to reduce racial segregation, and these often required extra funding of districts under desegregation orders.

Two trends, however, directly impacted the force of these orders. First, in a series of U.S. Supreme Court rulings (notably *Milliken* and *Jenkins*), it became established that desegregation orders applied within districts but not across them.[13] Second, some of the court decisions accelerated the suburbanization of the white population—a situation often dubbed "white flight."[14] Thus some of the suburbanization trends identified previously were actually reinforced by court actions.

Finally, the federal courts moved away from desegregation orders. Perhaps the end of the era of court involvement was the decision of the U.S. Supreme Court in 2007 that banned voluntary race-based policies.[15] At the same time, remaining aspects of prior agreements and court orders have also been disappearing. In his work, Lutz (2005) finds that dismissal of a court-ordered desegregation plan results in a gradual, moderate increase in racial segregation and an increase in black dropout rates and black private school attendance.

Court orders clearly had a big impact on the character of schools after *Brown* in 1954. Schools became substantially less segregated (Welch and Light 1987; Clotfelter 2004; Reber 2005; Baum-Snow and Lutz 2008). Almost all school segregation in the

11. For a history and analysis of court interventions to desegregate schools, see Armor (1995).

12. See the history of court involvement in desegregation through the mid-1990s in Armor (1995).

13. The *Miliken* decision in Michigan restricted interdistrict remedies to situations where the surrounding districts were parties to the segregative acts (*Milliken v. Bradley*, 418 U.S. 717, 744–746 (1974)). This was extended in *Jenkins* (*Missouri v. Jenkins*, 515 U.S. 70 (1995)), where interdistrict funding in the case of Kansas City, Missouri, was eliminated because the other districts and the state were not party to the segregation itself. See Hanushek and Lindseth (2009).

14. See Coleman, Kelley, and Moore (1975); Clotfelter (1976, 2001); Fairlie and Resch (2002); Boustan (2010).

15. See Linn and Welner (2007) for a discussion of various aspects of this.

most recent period has come from residential segregation across districts, as discussed earlier (see Rivkin and Welch 2006).

The larger question is the educational impact of school segregation. A mounting body of evidence suggests that school segregation has negative impacts on black achievement (Guryan 2004; Angrist and Lang 2004; Hanushek and Raymond 2005; Hanushek, Kain, and Rivkin 2009; Hanushek and Rivkin 2009).

School District Consolidation

The twentieth century saw a dramatic consolidation of school districts. In 1937 there were 119,000 separate public school districts in the United States. Today there are about 14,000.[16] There has been some work considering the reasons for consolidation (e.g., Kenny and Schmidt 1994; Brasington 1999 Gordon and Knight 2009) and the impact of consolidation on costs (Duncombe and Yinger 2007). On the benefit side of consolidation, large districts have economies of scale because they can provide libraries, sport facilities, administration, and so forth on a districtwide basis. On the cost side, large districts combine different individuals with different preferences (heterogeneity) who must compromise to share a school district and agree on common educational policies. Specifically, Tiebout sorting is based on the notion that individuals prefer to interact with people similar like themselves in tastes for public goods. Now, they must interact with people different from themselves. A trade-off between economies of scale and heterogeneity helps to explain the consolidation pattern of local jurisdictions in the United States.

For our purposes, however, it is important to point out the implications of this and other trends for the operations of schools and for the interaction with families. Over the same period, funding of education also changed dramatically, as described previously. In 1930 less than 0.5 percent of revenues for elementary and secondary schools came from the federal government, and less than one-fifth came from states, leaving more than 80 percent to be raised locally. By 2000 the local share was down to 43 percent, and both federal and state shares were rising.

Taking these trends together, it is reasonable to assume that parents were much closer to what was going on in the schools seventy-five years ago than they are today. Likewise, school administrators in the small districts of the past, supported largely by local funds, almost certainly paid closer attention to the needs and desires of the families they served. School district consolidation has effectively moved decision making and management of education away from the local population. Moreover, larger districts with larger populations mean that there are more diverse preferences among parents for what they want in their schools. Thus, the administration of any district necessarily requires compromises among the various interests.

The influence of parents and local administrators has also changed because of the overall centralization of decision making that has been occurring over the past

16. U.S. Department of Education (2008).

century. As states have become more prominent in the funding of schools, they have also moved toward more centralized decision making about the operations of schools. That is understandable because, if states are going to fund schools, they have responsibilities not to waste their (or the federal government's) funds. The overall result of the trends in government revenue and administration of education is that school decisions have migrated away from parents and local voters and toward state bureaucracies.

Tiebout suggested that parents could satisfy their desires for local governmental services by shopping for the jurisdiction that provided the services that best met their individual desires. Thus, by living in the same area, parents with similar desires could group together to ensure more homogeneous demands. Moreover, since one aspect of schools involves how effectively they use their resources, competition for consumers could put competitive pressures on school districts to improve their performance and efficiency. The idea of shopping across alternative jurisdictions does, however, require that there be a large number of districts so that there is a sufficient range of choice. It also becomes very complicated when parents have multiple interests. For example, some parents may, in addition to schools, have desires with respect to welfare payments, hospital coverage, police, and safety or with respect to accessibility to jobs. Selection of place of residence on the basis of school districts may compete with or fail to satisfy the other interests of the family. Particularly, much of the consolidation of districts occurs across relatively rural districts, where the range of choice is limited by population density.

A significant percentage of housing decisions involves finding a location that meets demands for commuting to work, the standard location model. With decentralized workplaces, different jurisdictions become more or less attractive, and that makes parents' choices much more complicated than simply selecting a school (Hanushek and Yilmaz 2007b).

Finally, for a variety of reasons, the public schools in adjacent jurisdictions may not look too different from one another. Central state restrictions; the limited viewpoints of school personnel in terms of curricula, pedagogy, and effective administration; and other factors could lead schools to be quite similar in approach, curricula, and goals. The contraction of choices of different school districts when subsumed by the other choice aspects of residential location thus puts natural limits on how widespread any version of school choice such as Tiebout's might be.

School Choice Options

A final element of location and schools is the availability of school choice options. One of the direct implications of allowing broader selection among schools by families is that the closeness of the relationship of location and school quality is reduced. Choice options follow the ideas originally set out by Friedman (1962) when he

argued for using vouchers to fund schools. Individuals would have the ability to shop among schools using a government voucher.

Recent U.S. experiences with school choice include the introduction of a limited voucher program in Milwaukee, the introduction of a more broadly accessible program in Cleveland, the U.S. Supreme Court's affirmation of such policies, the use of vouchers in Washington, D.C., and the introduction of a variety of private voucher programs. These experiences have been discussed and analyzed in a variety of places and are under fairly constant revision.[17] While these voucher programs have generally found positive achievement effects and have been very popular with parents, they have not greatly expanded over time.

Other forms of choice have, however, been much more significant.

Homeschooling

To begin with, there has been a considerable surge in homeschooling. A significant number of parents have simply withdrawn their children from the regular public schools and taken personal responsibility for their education. Estimates put the number of homeschoolers at 1.5 million children, or almost 3 percent of all schoolchildren in 2007, although there is some uncertainty about the numbers involved.[18] Unfortunately, however, little is known about this in terms of movements of children in and out of homeschool environments or of their performance trends.

Intradistrict Open Enrollment

A particularly popular version of public school choice involves an open-enrollment plan, under which, for example, students can apply to go to a different school in their district rather than the one to which they are originally assigned. In a more expansive version, no initial assignment is made at all, and students apply to an ordered set of district schools. A common version of this has been the use of magnet schools that offer a specialized focus such as college preparatory or the arts. Forms of open-enrollment plans were the response of a number of districts in southern states to the desegregation orders flowing from *Brown v. Board of Education*. In general, simple open-enrollment plans were not found to satisfy the court requirements for desegregation of districts, but magnet schools (with racial balance

17. Evaluations of Milwaukee vouchers and others can be found in Rouse (1998) and Peterson et al. (2002). The District of Columbia voucher program in particular has been the subject of considerable political turmoil, since it comes under the jurisdiction of the U.S. Congress. The most recent evaluation of District of Columbia vouchers finds improvements in parental satisfaction but not in student achievement through the introduction of vouchers; see Wolf et al. (2010).

18. National Center for Education Statistics (2008).

restrictions) became a reasonably common policy approach.[19] In 2001–2002, 3 percent of all students attended magnet schools.[20]

These programs do not, however, offer much school competition. First, the flow of students is heavily controlled. For example, the first caveat is always "if there is space at the school," but the desirable public schools virtually never have space. Second, large urban school systems where there is a natural range of options frequently face other restrictions, such as racial balance concerns, that severely constrain the outcomes that are permitted. Third, and most important, these plans seldom have much effect on incentives in the schools. The competitive model of vouchers envisions that schools that are unable to attract students will improve or shut down. That threat provides an incentive to people in the schools to perform well or to potentially lose their jobs. In a district with open enrollment, personnel in undersubscribed schools generally still have employment rights and simply move to another school with more students, diminishing the effect of competitive incentives.

Interdistrict Open Enrollment

Another variant of open-enrollment plans permits students in a city to attend any public school in the state. Conceptually, this could offer some competitive incentives. If a district lost sufficient students through out-migration, it could be left with less funding and could be forced to reduce its workforce. Again, however, the reality does not bring to bear many of the potentially positive effects of competition. In the first instance, voluntary interdistrict enrollment typically requires the approval of the boards of the schools a student is exiting and entering, meaning that the parents can face significant hurdles in making choices. The "if there is space at the school" clause generally stops all but some token movement. In addition, because of complicated formulas for school funding that mix federal, state, and local dollars, the funding following the choice student is typically less than the full funding for a student in the receiving district, meaning that any district accepting students is asking its residents to subsidize the education of students whose families reside and thus pay school taxes outside the district. The funding of transfers is also complicated by the common practice of basing current-year funding on prior-year enrollment or attendance figures, or both.

Charter Schools

The rise of charter schools has introduced an element of choice in schooling that promises to better mimic a genuine voucher program. Because they are creatures of the separate states and operate in different ways according to state rules, there is no

19. Armor (1995).
20. Hoffman (2008).

common model of a charter school. The essential features are that they are public schools but ones that are allowed to operate to varying degrees outside of the normal public school administrative structures. To the extent that they survive through their ability to attract sufficient numbers of students, they are schools of choice. They differ widely, however, in the rules for their establishment, in the regulations that apply to them, in the financing that goes with the students, and in a host of other potentially important dimensions.[21] Some states, for example, impose a variety of requirements about teacher certification, curriculum, acceptance of special education students, and the like—advertised as "leveling the playing field"—to ensure that charter schools do not offer any true innovation and competition. Other states, however, remove a substantial amount of regulation and truly solicit innovation and competition.[22]

Despite the regulatory diversity surrounding them, charter schools can nonetheless offer true competition to the traditional government schools because they can draw students away from poorly performing schools. Employment rights typically do not transfer between charters and existing school districts. so there potentially is pressure on school personnel to attract students. Moreover, we see that charters are truly susceptible to the necessary downside of competition in that a substantial number of attempted charters do not succeed in the marketplace.[23]

Since the nation's first charter school legislation was enacted into law in Minnesota in 1991, some forty-one states and the U. S. Congress, on behalf of the District of Columbia, have enacted legislation that provides for charter schools, although some had yet to open any schools by 2004. In the nation as a whole, charter schools increased from a handful in 1991 to more than 4,000 schools serving an estimated 1.2 million students, or approximately 2.4 percent of the public school population, in 2007.[24]

In some places, charters have become quite significant. For example, in the 2006–2007 school year, 21 percent of students in the District of Columbia, 9 percent of students in Arizona, 6 percent of students in Michigan, and 4 percent of students in California attended charter schools.[25]

What do we know about the performance of charter schools? In a study that assessed the quality of charter schools, Hanushek et al. (2007) find that the average quality in the charter sector is not significantly different from that in regular public schools, but there is considerable heterogeneity in terms of performance. In a similar study, Bifulco and Ladd (2006) find that the students make considerably smaller gains in charter schools than they would have in public schools. Moreover, they also find suggestive evidence that about 30 percent of the negative effect of charter

21. Finn, Manno, and Vanourek (2000).
22. Center for Education Reform (2003).
23. Center for Education Reform (2002).
24. Hoffman (2008).
25. Hoffman (2008).

schools is attributable to high rates of student turnover. This heterogeneity of achievement impact across states is consistent with a national study, the largest to date of charter schools (CREDO 2009), which finds that 17 percent of charter schools perform significantly better than the traditional public schools while 37 percent perform significantly worse.[26]

Conclusion

The study of location and schooling has become a vibrant area of research in recent years. The institutional structure of U.S. schools—where local districts have considerable fiscal and policy autonomy—highlights the importance of the joint consideration of location and education.

On the theoretical side, the area has been marked by the historic development of distinct treatments of household decisions. Urban locational models focus on household choices that are driven by accessibility and housing prices. Tiebout models of public good choice, on the other hand, have households focusing exclusively on the public services offered by different jurisdictions. The separation of these models is in part the result of a desire to have models that yield analytical solutions. But recent advances in more complex models solved by simulation techniques have expanded this work to incorporate more realistic household behavior.

Two of the strong lines of empirical analysis growing out of this locational modeling are the investigation of how the attractiveness of different locations is capitalized into housing prices and how the competition among districts affects the efficiency of school provision. Natural and productive extensions exist for both of these lines of research.

With the overview of models that link location and schooling, it is possible to consider some of the major policy changes that have occurred over the past half century. First, state governments—often driven by the courts—have made some dramatic changes in the financing of local schools. These changes alter the fiscal attractiveness of different areas, which the previous locational models suggest will lead to individual behavioral changes. Unfortunately, the existing literature on the impacts of these policy changes has seldom considered these behavioral changes and their resulting impact. Second, perhaps the largest policy change in U.S. schools has been their desegregation. These actions, largely driven by the federal courts,

26. Some locations do, however, develop much better-performing charter schools. More specific analyses of New York City charter schools find consistently better performance of students in charter schools (CREDO 2010; Hoxby, Murarka, and Kang 2009). Importantly, because these studies use different methodologies while finding very similar results, the reliability of the findings is enhanced.

have distinct locational impacts. The existing empirical work focuses on family movements, largely "white flight" from central cities. The impact on the subsequent patterns of education has been much less studied. Indeed, the theoretical models discussed here focus almost exclusively on income and do not adequately treat race and location. Third, the United States has seen the dramatic consolidation of local school districts over the twentieth century. While work has helped to understand the forces behind this consolidation, there is virtually no existing work on the educational impacts.

Finally, within the context of how schools and locations are determined, a number of policy actions have been aimed directly at lessening the impact of residential location. These actions generally fall under the heading of school choice, where expanded options of choosing specific schools help to break the link between residential location and schooling opportunities. In this area, our knowledge is rapidly expanding in large part because the policies have been moving quickly.

In sum, recent work has greatly expanded our understanding of how household locational choices impact the educational opportunities that are available. At the same time, this work has highlighted a variety of areas in which research is missing but vital to policy decisions that are currently being made.

REFERENCES

Alonso, William. 1964. *Location and Land Use*. Cambridge, MA: Harvard University Press.

Angrist, Joshua D., and Kevin Lang. 2004. "Does School Integration Generate Peer Effects? Evidence from Boston's Metco Program." *American Economic Review* 94:1613–1634.

Armor, David J. 1995. *Forced Justice: School Desegregation and the Law*. New York: Oxford University Press.

Baum-Snow, Nathaniel, and Byron Lutz. 2008. "School Desegregation, School Choice and Changes in Residential Location Patterns by Race." Federal Reserve Board Finance and Economics Discussion Series 2008-57.

Bayer, Patrick, Fernando Ferreira, and Robert McMillan. 2007. "A Unified Framework for Measuring Preferences for Schools and Neighborhoods." *Journal of Political Economy* 115:588–638.

Bifulco, Robert, and Helen F. Ladd. 2006. "The Impacts of Charter Schools on Student Achievement: Evidence from North Carolina." *Education Finance and Policy* 1:50–90.

Black, Sandra E. 1999. "Do Better Schools Matter? Parental Valuation of Elementary Education." *Quarterly Journal of Economics* 114:577–599.

Black, Sandra E. and Stephen Machin. 2011. "Housing Valuations of School Performance." In *Handbook of the Economics of Education*, Vol. 3, ed. Eric A. Hanushek, Stephen Machin, and Ludger Woessmann, 485–519. Amsterdam: North Holland,

Borland, Melvin V., and Roy M. Howsen. 1992. "Student Academic Achievement and the Degree of Market Concentration in Education." *Economics of Education Review* 11:31–39.

Boustan, Leah P. 2010. "Was Postwar Suburbanization 'White Flight'? Evidence from the Black Migration." *Quarterly Journal of Economics* 125:417–443.

Brasington, David M. 1999. "Joint Provision of Public Goods: The Consolidation of School Districts." *Journal of Public Economics* 73:373–393.

Card, David, and A. Abigail Payne. 2002. "School Finance Reform, the Distribution of School Spending, and the Distribution of SAT Scores." *Journal of Public Economics* 83:49–82.

Cascio, Elizabeth, Nora Gordon, Ethan Lewis, and Sarah Reber. 2010. "Paying for Progress: Conditional Grants and the Desegregation of Southern Schools." *Quarterly Journal of Economics* 125:445–482.

Center for Education Reform. 2002. *Charter School Closures: The Opportunity for Accountability*. Washington, DC: Center for Education Reform.

———. 2003. *Charter School Laws across the States: Ranking Score Card and Legislative Profiles*. Washington, DC: Center for Education Reform.

Clark, Melissa. 2003. "Education Reform, Redistribution, and Student Achievement: Evidence from the Kentucky Education Reform Act." Mimeo, Mathematica Policy Research.

Clotfelter, Charles T. 1976. "School Desegregation, 'Tipping,' and Private School Enrollment." *Journal of Human Resources* 22:29–50.

———. 2001. "Are Whites Still Fleeing? Racial Patterns and Enrollment Shifts in Urban Public Schools." *Journal of Policy Analysis and Management* 20:199–221.

———. 2004. *After Brown: The Rise and Retreat of School Desegregation*. Princeton, NJ: Princeton University Press.

Coleman, James S., Ernest Q. Campbell, Carol J. Hobson, James McPartland, Alexander M. Mood, Frederic D. Weinfeld, and Robert L. York. 1966. *Equality of Educational Opportunity*. Washington, DC: U.S. Government Printing Office.

Coleman, James S., Sara D. Kelley, and John A. Moore. 1975. "Trends in School Integration, 1968–73." Urban Institute Paper 722-03-01.

CREDO. 2009. *Multiple Choice: Charter School Performance in 16 States*. Stanford, CA: Center for Research on Education Outcomes, Stanford University.

———. 2010. *Charter School Performance in New York City*. Stanford, CA: Center for Research on Education Outcomes, Stanford University.

Cullen, Julie B., and Susanna Loeb. 2004. "School Finance Reform in Michigan: Evaluating Proposal A." In *Helping Children Left Behind: State Aid and the Pursuit of Educational Equity*, ed. John Yinger, 215–249. Cambridge, MA: MIT Press.

Cutler, David M., Edward L. Glaeser, and Jacob L. Vigdor. 1999. "The Rise and Decline of the American Ghetto." *Journal of Political Economy* 107:455–506.

Downes, Thomas A. 1992. "Evaluating the Impact of School Finance Reform on the Provision of Public Education: The California Case." *National Tax Journal* 45:405–419.

———. 2004. "School Finance Reform and School Quality: Lessons from Vermont." In *Helping Children Left Behind: State Aid and the Pursuit of Educational Equity*, ed. John Yinger, 284–313. Cambridge, MA: MIT Press.

Downes, Thomas A., and Jeffrey E. Zabel. 2002. "The Impact of School Characteristics on House Prices: Chicago 1987–1991." *Journal of Urban Economics* 52:1–25.

Duncombe, William, and Jocelyn M. Johnston. 2004. "The Impacts of School Finance Reform in Kansas: Equity Is in the Eye of the Beholder." In *Helping Children Left Behind: State Aid and the Pursuit of Educational Equity*, ed. John Yinger, 148–193. Cambridge, MA: MIT Press.

Duncombe, William, and John Yinger. 2007. "Does School District Consolidation Cut Costs?" *Education Finance and Policy* 2:341–375.

Epple, Dennis, Radu Filimon, and Thomas Romer. 1983. "Housing, Voting, and Moving: Equilibrium in a Model of Local Public Goods with Multiple Jurisdictions." In *Research in Urban Economics*, ed. J. V. Henderson, 59–90. Greenwich, CT: Jai Press.

———. 1984. "Equilibrium among Local Jurisdictions: Toward an Integrated Treatment of Voting and Residential Choice." *Journal of Public Economics* 24:281–308.

———. 1993. "Existence of Voting and Housing Equilibrium in a System of Communities with Property Taxes." *Regional Science and Urban Economics* 23:585–610.

Epple, Dennis, and Thomas Nechyba. 2004. "Fiscal Decentralization." In *Handbook of Regional and Urban Economics*, ed. J. Vernon Henderson and Jacques-François Thisse, 2423–2480. Amsterdam: Elsevier.

Fairlie, Robert W., and Alexandra M. Resch. 2002. "Is There 'White Flight' into Private Schools? Evidence from the National Educational Longitudinal Survey." *Review of Economics and Statistics* 84:21–33.

Figlio, David N., and Maurice E. Lucas. 2004. "What's in a Grade? School Report Cards and the Housing Market." *American Economic Review* 94:591–604.

Finn, Chester E., Jr., Bruno V. Manno, and Gregg Vanourek. 2000. *Charter Schools in Action: Renewing Public Education*. Princeton, NJ: Princeton University Press.

Fischel, William A. 1989. "Did Serrano Cause Proposition 13?" *National Tax Journal* 42:465–474.

———. 2006a. "The Courts and Public School Finance: Judge-Made Centralization and Economic Research." In *Handbook of the Economics of Education*, ed. Eric A. Hanushek and Finis Welch, 1277–1325. Amsterdam: North Holland.

———, ed. 2006b. *The Tiebout Model at Fifty: Essays in Public Economics in Honor of Wallace Oates*. Cambridge, MA: Lincoln Institute of Land Policy.

Fischer, Claude S., Gretchen Stockmayer, Jon Stiles, and Michael Hout. 2004. "Distinguishing the Geographic Levels and Social Dimensions of U.S. Metropolitan Segregation, 1960–2000." *Demography* 41:37–59.

Flanagan, Ann E., and Sheila E. Murray. 2004. "A Decade of Reform: The Impact of School Reform in Kentucky." In *Helping Children Left Behind: State Aid and the Pursuit of Educational Equity*, ed. John Yinger, 195–214. Cambridge, MA: MIT Press.

Friedman, Milton. 1962. *Capitalism and Freedom*. Chicago: University of Chicago Press.

Gibbons, Stephen, and Stephen Machin. 2008. "Valuing School Quality, Better Transport, and Lower Crime: Evidence from House Prices." *Oxford Review of Economic Policy* 24:99–119.

Glaeser, Edward L., Matthew E. Kahn, and Jordan Rappaport. 2008. "Why Do the Poor Live in Cities? The Role of Public Transportation." *Journal of Urban Economics* 63:1–24.

Gordon, Nora, and Brian Knight. 2009. "A Spatial Merger Estimator with an Application to School District Consolidation." *Journal of Public Economics* 93:752–765.

Greene, Jay P., and Julie R. Trivitt. 2008. "Can Judges Improve Academic Achievement?" *Peabody Journal of Education* 83:224–237.

Guryan, Jonathan. 2004. "Desegregation and Black Dropout Rates." *American Economic Review* 94:919–943.

Hanushek, Eric A. 2001. "Black-White Achievement Differences and Governmental Interventions." *American Economic Review* 91:24–28.

———. 2003. "The Failure of Input-Based Schooling Policies." *Economic Journal* 113:F64–F98.

Hanushek, Eric A., John F. Kain, and Steve G. Rivkin. 2009. "New Evidence about *Brown v. Board of Education*: The Complex Effects of School Racial Composition on Achievement." *Journal of Labor Economics* 27:349–383.

Hanushek, Eric A., John F. Kain, Steve G. Rivkin, and Gregory F. Branch. 2007. "Charter School Quality and Parental Decision Making with School Choice." *Journal of Public Economics* 91:823–848.

Hanushek, Eric A., and Alfred A. Lindseth. 2009. *Schoolhouses, Courthouses, and Statehouses: Solving the Funding-Achievement Puzzle in America's Public Schools*. Princeton, NJ: Princeton University Press.

Hanushek, Eric A., and Margaret E. Raymond. 2005. "Does School Accountability Lead to Improved Student Performance?" *Journal of Policy Analysis and Management* 24:297–327.

Hanushek, Eric A., and Steven G. Rivkin. 2009. "Harming the Best: How Schools Affect the Black-White Achievement Gap." *Journal of Policy Analysis and Management* 28:366–393.

Hanushek, Eric A., and Julie A. Somers. 2001. "Schooling, Inequality, and the Impact of Government." In *The Causes and Consequences of Increasing Inequality*, ed. Finis Welch, 169–199. Chicago: University of Chicago Press.

Hanushek, Eric A., and Ludger Woessmann. 2008. "The Role of Cognitive Skills in Economic Development." *Journal of Economic Literature* 46:607–668.

Hanushek, Eric A., and Kuzey Yilmaz. 2007a. "The Complementarity of Tiebout and Alonso." *Journal of Housing Economics* 16:243–261.

———. 2007b. "Schools and Location: Tiebout, Alonso, and Government Policy." NBER Working Paper 12960.

Heckman, James J., and Paul A. LaFontaine. 2009. "The American High School Graduation Rate: Trends and Levels." *Review of Economics and Statistics* 92:244–262.

Hobbs, Frank, and Nicole Stoops. 2002. *Demographic Trends in the 20th Century*. Washington, DC: U.S. Bureau of the Census.

Hoffman, Lee. 2008. *Numbers and Types of Public Elementary and Secondary Schools From the Common Core of Data: School Year 2006–07*. Washington, DC: National Center for Education Statistics.

Hoxby, Caroline Minter. 2000. "Does Competition among Public Schools Benefit Students and Taxpayers?" *American Economic Review* 90:1209–1238.

———. 2001. "All School Finance Equalizations Are Not Created Equal." *Quarterly Journal of Economics* 116:1189–1231.

———. 2007. "Does Competition among Public Schools Benefit Students and Taxpayers? Reply." *American Economic Review* 97:2038–2055.

Hoxby, Caroline M., Sonali Murarka, and Jenny Kang. 2009. *How New York City's Charter Schools Affect Achievement*. Cambridge, MA: New York City Charter Schools Evaluation Project.

Iceland, John, and Daniel H. Weinberg. 2002. *Racial and Ethnic Residential Segregation in the United States: 1980–2000*, *Census 2000 Special Reports*. Washington, DC: U.S. Bureau of the Census.

Kain, John F. 1975. *Essays on Urban Spatial Structure*. Cambridge, MA: Ballinger.

Kane, Thomas J., Douglas O. Staiger, and Gavin Samms. 2003. "School Accountability Ratings and Housing Values." *Brookings-Wharton Papers on Urban Affairs*, 83–137. Washington, DC: The Brookings Institution.

Kenny, Lawrence W., and Amy B. Schmidt. 1994. "The Decline in the Number of School Districts in the U.S.: 1950–1980." *Public Choice* 79:1–18.

Linn, Robert L., and Kevin G. Welner, eds. 2007. *Race-Conscious Policies for Assigning Students to Schools: Social Science Research and the Supreme Court Cases*. Washington, DC: National Academy of Education.

Lutz, Byron. 2005. "Post *Brown vs. the Board of Education*: The Effects of the End of Court-Ordered Desegregation." Federal Reserve Board Finance and Economics Discussion Series 2005-64.

Margo, Robert A. 1992. "Explaining the Postwar Suburbanization of Population in the United States: The Role of Income." *Journal of Urban Economics* 31:301–310.

Mieszkowski, Peter, and Edwin S. Mills. 1993. "The Causes of Metropolitan Suburbanization." *Journal of Economic Perspectives* 7:135–147.

Mills, Edwin S. 1967. "An Aggregate Model of Resource Allocation in a Metropolitan Area." *American Economic Review* 57:197–210.

———. 1972. *Studies in the Structure of the Urban Economy*. Washington, DC: Resources for the Future.

———. 1992. "The Measurement and Determinants of Suburbanization." *Journal of Urban Economics* 32:377–387.

Mills, Edwin S., and Richard Price. 1984. "Metropolitan Suburbanization and Central City Problems." *Journal of Urban Economics* 15:1–17.

Murray, Sheila E., William N. Evans, and Robert M. Schwab. 1998. "Education-Finance Reform and the Distribution of Education Resources." *American Economic Review* 88:789–812.

Muth, Richard F. 1969. *Cities and Housing: The Spatial Pattern of Urban Residential Land Use*. Chicago: University of Chicago Press.

National Center for Education Statistics. 2005. *NAEP 2004: Trends in Academic Progress, Three Decades of Student Performance in Reading and Mathematics*. Washington, DC: U.S. Department of Education.

———. 2008. *1.5 Million Homeschooled Students in the United States in 2007*. Washington, DC: Institute for Education Sciences.

Neal, Derek. 2006. "Why Has Black-White Skill Convergence Stopped?" In *Handbook of the Economics of Education*, ed. Eric A. Hanushek and Finis Welch, 511–576. Amsterdam: North Holland.

Nechyba, Thomas J. 2006. "Income and Peer Sorting in Public and Private Schools." In *Handbook of the Economics of Education*, ed. Eric A. Hanushek and Finis Welch, 1327–1368. Amsterdam: North Holland.

Oates, Wallace E. 1969. "The Effects of Property Taxes and Local Public Spending on Property Values: An Empirical Study of Tax Capitalization and the Tiebout Hypothesis." *Journal of Political Economy* 77:957–971.

Peterson, Paul E., William G. Howell, Patrick J. Wolf, and David E. Campbell. 2002. "School Vouchers: Results from Randomized Experiments." In *The Economics of School Choice*, ed. Caroline M. Hoxby, 107–144. Chicago: University of Chicago Press.

Provasnik, Stephen, Angelina KewalRamani, Mary McLaughlin Coleman, Lauren Gilbertson, Will Herring, and Qingshu Xie. 2007. *Status of Education in Rural America*. Washington, DC: National Center for Education Statistics.

Reber, Sarah J. 2005. "Court-Ordered Desegregation: Successes and Failures Integrating American Schools since *Brown versus Board of Education*." *Journal of Human Resources* 40:559–590.

Rivkin, Steven G., and Finis Welch. 2006. "Has School Desegregation Improved Academic and Economic Outcomes for Blacks?" In *Handbook of the Economics of Education*, ed. Eric A. Hanushek and Finis Welch, 1019–1049. Amsterdam: North Holland.

Rothstein, Jesse M. 2006. "Good Principals or Good Peers? Parental Valuation of School Characteristics, Tiebout Equilibrium, and the Incentive Effects of Competition among Jurisdictions." *American Economic Review* 96:1333–1350.

———. 2007. "Does Competition among Public Schools Benefit Students and Taxpayers? Comment." *American Economic Review* 97:2026–2037.

Rouse, Cecilia Elena. 1998. "Private School Vouchers and Student Achievement: An Evaluation of the Milwaukee Parental Choice Program." *Quarterly Journal of Economics* 113:553–602.

Swanstrom, Todd, Colleen Casey, Robert Flack, and Peter Dreier. 2006. "Pulling Apart: Economic Segregation among Suburbs and Central Cities in Major Metropolitan Areas, 1980–2000." In *Redefining Urban and Suburban America: Evidence from Census 2000*, ed. Bruce Katz, Alan Berube, and Robert Lang, 143–165. Washington, DC: Brookings Institution.

Tiebout, Charles M. 1956. "A Pure Theory of Local Expenditures." *Journal of Political Economy* 64:416–424.

U.S. Department of Education. 2008. *Digest of Education Statistics, 2007*. Washington, DC: National Center for Education Statistics.

———. 2009. *Digest of Education Statistics, 2008*. Washington, DC: National Center for Education Statistics.

Weimer, David L., and Michael J. Wolkoff. 2001. "School Performance and Housing Values: Using Non-contiguous District and Incorporation Boundaries to Identify School Effects." *National Tax Journal* 54:231–253.

Welch, Finis, and Audrey Light. 1987. *New Evidence on School Desegregation*. Washington, DC: U. S. Commission on Civil Rights.

Wolf, Patrick, Babette Gutmann, Michael Puma, Brian Kisida, Lou Rizzo, Nada Eissa, and Matthew Carr. 2010. *Evaluation of the DC Opportunity Scholarship Program: Final Report*. Washington, DC: Institute for Education Sciences.