The Draw of Home: How Teachers' Preferences for Proximity Disadvantage Urban Schools

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Abstract

This paper explores a little-understood aspect of labor markets, their spatial geography. Using data from New York State, we find teacher labor markets to be geographically very small. Teachers express preferences to teach close to where they grew up and, controlling for proximity, they prefer areas with characteristics similar to their hometown. We discuss implications of these preferences for the successful recruitment of teachers, including the potential benefits of local recruiting and training. We also discuss implications for the modeling of teacher labor markets, including the possible biases that arise in estimates of compensating differentials when distance is omitted from the analyses. This study contributes to the literature on the geography of labor markets more generally by employing data on residential location during childhood instead of current residence, which may be endogenous to job choice. © 2005 by the Association for Public Policy Analysis and Management

INTRODUCTION

School districts across the country are finding it increasingly difficult to recruit new, well-qualified teachers. This is especially true for urban schools with high concentrations of poor, non-white, and low-performing students. States and school districts have responded with a variety of policies to attract and retain more qualified teachers in these difficult-to-staff schools. Some states and districts employ signing bonuses; others have mounted aggressive, often far-reaching, recruitment campaigns to attract prospective teachers. Still other efforts focus on broadening entry to the profession through alternative certification programs.

Policies to attract and retain teachers develop with little guidance from research. The nature of the labor market for teachers is complex, involving the interaction of a wide variety of institutions, policies, and practices, the result of which affects both supply and demand for teachers. In this paper, we explore a little-understood, but potentially important, feature relating to the recruitment of more qualified teachers to schools: the geographic scope of teacher labor markets. We are particularly interested in how prospective teachers delineate the geography of their job search. How broadly are teachers dispersed from prior places of residence and what attributes of teachers affect this geographic span? We find that teachers delineate their job

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searches to relatively small geographic areas, very close to where they grew up. While preferences vary somewhat by the characteristics of the individual teachers, distance appears important for all groups of teachers that we analyze.

The preference for geographic proximity has implications for policies regarding the training and recruitment of teachers, suggesting potential benefits of local recruitment and training. It also has implications for how models of teacher labor markets are conceptualized, given that the omission of distance as a factor in teachers' choices may bias estimates of compensating differentials and, more generally, of teachers' preferences for various job characteristics.

BACKGROUND

Lankford, Loeb, and Wyckoff (2002), using several measures of teacher characteristics, find that there is wide variation in the qualifications of teachers across schools. Urban schools and those with lower performing students are much less likely to employ highly qualified teachers.[1] In schools where more than 20 percent of the students performed at the lowest level on the 4th grade English Language Arts (ELA) exam, 35 percent of the teachers had failed the general knowledge portion of the certification exam at least once compared to 9 percent among teachers in schools in which none of the students had scored at the lowest level on the 4th grade ELA exam. Correlations between school achievement and teacher characteristics tell a similar story; the proportion of a school's students who achieve at the lowest level has a 0.63 correlation with the proportion of that school's teachers who are not certified to teach any of their current courses. The correlations for the proportion failing either the National Teacher General Knowledge Exam or the New York State Teacher Certification Liberal Arts and Science exam are both 0.50, and the correlation of student achievement with teacher graduation from a less competitive college is 0.41. The results are similar if we use the 4th grade mathematics exam or the 8th grade ELA and math exams. Similar results also hold if students are partitioned by race or poverty status. The results of these analyses are clear. There is strong evidence that students in difficult-to-staff schools are taught by the least qualified teachers.

What accounts for this extraordinary sorting of teachers? It could result from either sorting of teachers in their first job placements or from differential exits and transfers that cause more qualified teachers to leave low-performing schools and transfer to higher performing schools. Boyd, Lankford, Loeb, and Wyckoff (2004a) find that although both explanations account for substantial sorting of teachers, first job placements that match less-qualified teachers with lower performing schools are often more important than the effects of quits and transfers. Because of this, we focus our analysis on the location of job search behavior of entering teachers.

There is a large and rapidly growing literature on job search and labor market segmentation (see Martin, 2000, for a review). Much of the recent research has concentrated on issues of market segmentation and spatial mismatch. That work focuses on the extent to which differential access to employment is related to residential segregation (spatial mismatch) and social networks (market segmentation).

[1] See Lankford, Loeb, and Wyckoff (2002) for a full discussion of these results. Also see Clotfelter, Ladd, and Vigdor (2003) for a similar analysis regarding the sorting of teachers in North Carolina. Murnane, Singer, Willett, Kemple, and Olsen (1991) examine the structure of teacher labor markets in detail.

Although distance can be an important component to hypotheses concerning spatial mismatch and market segmentation, much of this research embeds distance in a discussion of interpersonal relationships and institutional access. This research frequently employs two alternative approaches—analyses of distance from current residence to work and surveys of employees and/or residents concerning their job search activities.

Market segmentation research relies on relatively small-scale surveys to better understand how personal and social networks affect employment outcomes (Hanson & Pratt, 1992). This research documents the importance of social networks in connecting individuals to employment opportunities. Labor markets are found to be "local," although local is more complex than distance. Nonetheless, this research also finds that labor markets are often geographically small, either because distance is an important component of the theory (spatial mismatch) or because distance is negatively correlated with development of networks that underlie market segmentation.

As Martin (2000) observes, workers frequently exhibit a strong attachment to place, which results in the "spatial fixity" of local labor and the accompanying potential for differences in wages and other attributes across local labor markets. Additionally, residential immobility and sorting create segmented labor markets even within what would be considered typical travel to work areas. Thus, the emerging literature on local labor markets suggests that labor market segmentation creates the potential for markets within markets where differences in wages, working conditions, and worker qualifications can be maintained over extended periods of time.

Gregory and Borland (1999) review the literature on public sector labor markets and suggest that markets for teachers may reflect restricted geographic scope and exhibit little interdependency with private-sector labor markets, which could lead to differences in the qualifications and terms of employment for teachers within relatively small geographic areas. Notably, however, Gregory and Borland do not identify any studies that examine the geographic scope of labor markets.

The empirical literature examining the geography of labor markets provides evidence on the importance of the spatial and social interactions of employers and employees within relatively small geographic areas. The underlying assumption of most of this work is that individuals have chosen to live in particular locations and explore their employment opportunities conditional on that residential location. One potential problem with this approach is the endogeneity of residential location. Workers may choose their residence with a view toward employment prospects. In this paper we are able to avoid this problem by using data on residential location during high school. A second potential problem with assessing preferences for geographic proximity to home is separating employers' preferences from employees' preferences. In this paper, we reduce this difficulty by assessing the choice of region of work, instead of the choice of specific jobs. We, thus, do not assume that employees have choice over all jobs but instead maintain the much weaker assumption that employees are able to find employment in one or more schools in every region. As reported below, we find substantial evidence that distance plays an important role in job choice. These preferences can explain some of the relative disparities in employee qualifications across schools and the relative difficulty urban schools face in attracting teachers.

DATA

We examine the geography of teacher labor markets by linking the locations of New York teachers at several points during their lives. We observe where individuals take their first public school teaching position. For a majority of these teachers we know their residential location during high school (hometown) and for most of them we know where they attended college before taking their first job. Based on this information, we examine the relationship between the region of a teacher's first teaching job and the locations of his/her hometown and college. We also explore how other attributes of teachers (for example, gender or the qualifications of teachers) and of place (for example, urbanicity) affect the geographic scope of teacher labor markets.

Our database links six administrative datasets and various other information characterizing districts, communities, and local labor markets. For this analysis we employ information for every new teacher hired in a New York public school from 1998–1999 through 2001–2002 (1999 to 2002). Several other databases that contain a range of information about the qualifications of teachers, as well as the environments in which these individuals make career decisions, substantially enrich these core data. Based on records from the College Board, the State University of New York, applications for teacher certification, and current employment information, we know the locations of teachers at various points during their lives. We also know the attributes of students, schools, and, as described above, the qualifications of teachers. See Appendix A for a description of the administrative datasets that we have linked together for this analysis.

We identify the distance from first job to hometown based on the location of the school district where individuals first taught and either the location of the high school they attended or the address given when they applied to college.[2] The high school location is known for all those who attended a New York secondary school and took the SAT anytime since 1980. The address information is known for all those who attended or applied to any of the 64 colleges or universities in the State University of New York system anytime since 1990.[3] These data yield measures of the distance from hometown to first job for 59 percent of the first-year teachers hired during 1999 through 2002.

Given that distance from hometown to first job is central to our analysis and is missing for approximately 40 percent of the sample, it is important that we understand the relative importance of various reasons data are missing and the extent to which this might affect the paper's conclusions. It is possible that the observations missing distance from hometown to first job bias the results—individuals who did not take the SAT in New York or did not apply to a SUNY college may be more likely to have hometowns farther from their first job compared to those for whom we observe hometown. However, we do not believe this is a problem for two reasons. First, by examining why this information is missing and other attributes of those observations having missing values, we conclude that few of the observations missing hometown to first job distance are likely to have larger distances than those for whom we observe this variable. Ten percent of the teachers with missing observations received their BA from a City University of New York college, where SATs are not required and whose graduates are mostly from New York City and overwhelmingly take first teaching jobs there. Eight percent attended other colleges in New York City, most of which draw very heavily from New York City residents and whose first teaching job is usually in New York City. Having information for these 18 percent of the observations likely would reduce the mean distance from hometown to first job.

[2] Distance is calculated as the straight line distance between the centroid of the zip code of the hometown and the centroid of the zip code of the school district.
[3] We employ address information when address and high school location data both were available but conflicted.

For 68 percent of the observations with missing data, it is likely that they resemble those for whom we have distance. Thirty-eight percent are too old to be in our sample of SAT takers, and thus these observations are missing the location of their hometown.[4] An additional 13 percent did not take the SAT and attended college outside New York City. For a variety of reasons, we believe these individuals are most likely to resemble those in our sample. In addition, 10 percent of the observations have no information on college attended.

Only 14 percent of the observations missing hometown to first job distance attended college outside of New York State. These individuals could have relatively large values for distance from hometown to first job, although half of them attended college in states contiguous to New York.

Second, we can gain information about those for whom hometown to first job is missing by examining proximity of first job to college attended. We observe distance from college to first job for 73 percent of the first-year teachers for whom we do not observe hometown. The teachers who are missing hometown information actually are more likely to have first jobs closer to college than are those for whom hometown is not missing. Seventy-two percent of those missing hometown take a job within 40 miles of where they attended college compared to 63 percent of those where hometown is observed. Furthermore, when hometown is not missing, over 75 percent of the teachers who travel more than 40 miles from college to first job take that job within 40 miles of their hometown. While it is possible that teachers for whom home town is missing attended college far from home and took jobs close to where they attended college, it is more likely that they attended college close to home and took jobs close to college and home. We have duplicated all of the analyses presented in this paper using the expanded sample substituting college location and distance from college to first job for information based on hometown. Doing so does not change any of the substantive conclusions presented. Thus, while some of the missing observations may well have traveled long distances to take their first job in New York, most do not; and there is no evidence that the missing observations are different in this regard than observations for which we know distance from hometown to first job.

Our approach to understanding teacher labor market geography is to examine descriptive relationships, and then develop a behavioral model of first-job location for newly hired teachers.

LABOR MARKET GEOGRAPHY

Descriptive Analysis

Most public school teachers take their first public school teaching job very close to their hometowns or where they attended college. Sixty-one percent of teachers entering public school teaching in New York from 1999 to 2002 first taught in schools located within 15 miles of their hometown. Eighty-five percent entered teaching within 40 miles of their hometowns. In each of the 17 regions teachers take first jobs very close to home; however, there are differences. For example, in New York City, 90 percent of teachers took first jobs within 40 miles of their hometowns while in the City of Rochester only 65 percent of novice teachers took their first jobs within 40 miles of home.

[4] That is, they were born before 1963 and thus were less than 17 in 1980, when our SAT data begins. However, among the observations for which we have data, older teachers are just as likely to take jobs close to home as are younger teachers (84.6 percent v. 84.8 take first jobs within 40 miles of home).

Table 1. Distance from home to most recent college, and home to first job, 1999–2002.

Distance from Home to Job		Distance from Home to College: 0 to 15 Miles	15 to 40 Miles	40 to 100 Miles	100 or More Miles	All
0 to 15 miles						
	% col total	75.6	55.2	49.4	48.0	61.0
	% row otal	51.0	17.8	12.3	18.8	100.0
15 to 40 miles						
	% col total	20.1	34.2	20.8	24.0	23.9
	% row total	34.7	28.1	13.2	24.0	100.0
40 to 100 miles						
	% col total	2.8	8.1	23.7	8.9	8.5
	% row total	13.8	18.8	42.3	25.1	100.0
100 or more miles						
	% col total	1.4	2.5	6.2	19.1	6.6
	% row total	8.9	7.6	14.2	69.4	100.0
All	Pct N	41.2	19.7	15.2	23.9	100.0
	N	15,891	7,598	5,861	9,238	38,588

Hometown has a somewhat greater pull than place of college (Table 1). For example, of those who received their most recent degree at least 100 miles from home (24 percent of all observations), 48 percent took jobs within 15 miles of their homes and 72 percent within 40 miles of home. These teachers went "away" to college but returned home to work. In contrast, of those teachers who took jobs at least 100 miles from home (7 percent of all observations), only 44 percent took jobs within 40 miles of college, and 42 percent took jobs at least 100 miles from college. Thus, teachers who took jobs far from home were about as likely to take jobs close to college as not.

These patterns may reflect more than just preference for proximity. For example, individuals may search for employment in regions with which they are familiar, independent of the distance from their hometown. These similarities may be specific to their hometown region, for example, familiarity with a specific school system, or more generically related to a type of situation, for example, familiarity with urban school environments. Over 90 percent of the individuals whose hometown is New York City and who entered public school teaching from 1999 to 2002 first taught in New York City (Table 2, row percentage). About 60 percent of those having hometowns in the New York City suburbs first taught in those suburbs. Other major metropolitan areas follow similar patterns.[5] Overall, 34 percent of new teachers took their first job in the school district in which they attended high school.[6] Teachers with hometowns in urban locations are more likely to take a first job in those urban districts relative to adjacent suburbs, and those whose hometown is in the suburbs are much more likely to initially teach in those suburbs, rather than the nearby urban district (Table 3). Eighty-eight percent of teachers whose hometown is in an urban district first teach in an urban district, although only 60 percent of

[5] A transition matrix including each of our 17 regions provides a similar conclusion to that presented in Table 2 where the smaller metropolitan statistical areas and the rural regions have been collapsed into the Other category. The full transition matrix is available from the authors on request.

[6] Strauss (1999) finds that about forty percent of Pennsylvania teachers teach in the district where they attended high school.

urban teachers come from urban hometowns.[7] Although distance may play a role in these results, it is also the case that apart from distance, the culture of schools or communities may play some role in the segmentation of teacher labor markets.

Urban districts typically are net importers of teachers from the suburbs. Urban districts in New York hired 6,530 teachers with suburban or rural hometowns. Only 1,353 teachers having urban hometowns took jobs in suburban or rural districts in New York. Even if all of the individuals with urban hometowns who became teachers had taken jobs in urban districts, these districts would still have had to hire 5,177 teachers from suburban or rural districts. These patterns hold to varying degrees in each of New York's major metropolitan areas (Buffalo, New York City, Rochester, and Syracuse). The need for urban schools to import teachers, in combination with preferences to be close to home or in areas with characteristics similar to home increases the difficulty of recruitment for urban districts.

Much has been made of the difficulty of recruiting math, science, and special education teachers. As a result, it is possible that the effect of distance and the pull of home could differ by field of specialization, as recruitment efforts would be more intense in difficult-to-staff subjects. When we examine the geography of first job location by primary teaching assignment, there is little evidence that patterns for difficult-to-staff teaching specialties differ from those for other teaching areas. For example, 87 percent of elementary teachers locate less than 40 miles form their hometown; the figures are 84 percent for math teachers, 81 percent for science teachers, and 84 percent for special education teachers.

Our descriptive analyses suggest that individuals typically take jobs very close to their hometowns, and to a lesser extent, close to the colleges or universities from which they obtained their most recent degree prior to their first jobs. The analyses also suggest that the urbanicity of the schools may play some role apart from distance. To gain a better perspective on the role that these and other factors might play in the identification of relevant labor markets for prospective teachers, we model these decisions employing a multivariate framework.

A Model of Teacher Job Search

Our multivariate analysis of job search analyzes how various factors affect teachers' choices regarding the region (local labor market) in which to first teach. Based on our understanding of labor markets and descriptive analysis examining the home school districts and school districts of first jobs, we subdivide New York State into 17 mutually exclusive and exhaustive regions—the urban or suburban regions of seven different Metropolitan Statistical Areas (MSAs), and three rural regions of New York State.[8]

[7] Again, patterns are similar when location of most recent college is substituted for hometown location. Eighty-four percent of individuals who obtained their most recent degree in New York City first taught there.

[8] Ultimately, we would like to know where each teacher applied for employment. Such information is not available in our database, nor are we familiar with data that examine the validity of this assumption. It could be violated in instances where teachers would prefer a job in a suburban area, but not finding one, settle for a position in the urban area of that same metropolitan area. To examine the sensitivity of the analysis to the definition of region, we also run the multinomial logit estimates for ten areas where each of the seven MSAs is defined as a single area (collapsing the urban and suburban portions of each). The results of this analysis, reported on Appendix Table B-1, are substantially the same as those for the 17 regions, as reported below. None of the major conclusions of the paper are altered.

Table 2. Region of home by region of first job, 1999–2002.

	Region of Job									
	New York City	New York City Suburbs	Buffalo City	Buffalo Suburbs	Rochester City	Rochester Suburbs	Syracuse City	Syracuse Suburbs	Other	All
Region of high school										
New York City										
% row total	91.8	6.1	0.1	0.1	0.2	0.1	0.1	0.1	1.4	100.0
% col total	65.4	6.3	1.9	0.5	2.4	0.3	3.3	0.4	1.5	24.1
New York City suburbs										
% row total	31.0	63.3	0.1	0.2	0.2	0.6	0.1	0.3	4.2	100.0
% col total	30.1	88.9	1.5	1.3	3.6	2.7	3.3	3.0	6.1	32.9
Buffalo city										
% row total	5.9	0.5	45.4	33.9	2.6	3.8	0.2	0.9	6.8	100.0
% col total	0.2	0.0	28.3	6.8	1.3	0.6	0.3	0.3	0.3	1.0
Buffalo suburbs										
% row total	1.2	1.1	13.4	59.2	1.8	10.6	0.1	0.7	11.9	100.0
% col total	0.2	0.3	55.9	79.6	6.2	10.9	1.2	1.5	3.6	7.0
Rochester city										
% row total	4.7	0.5	0.5	0.5	54.9	30.6	0.0	2.1	6.2	100.0
% col total	0.1	0.0	0.1	0.0	12.6	2.1	0.0	0.3	0.1	0.5
Rochester suburbs										
% row total	1.9	1.4	0.8	2.6	16.8	64.1	0.2	1.8	10.4	100.0
% col total	0.4	0.4	2.9	3.3	52.7	61.3	1.2	3.5	2.9	6.5
Syracuse city										
% row total	9.7	1.8	0.6	1.2	1.8	3.0	46.7	24.8	10.3	100.0
% col total	0.1	0.0	0.1	0.1	0.4	0.2	23.2	3.0	0.2	0.4
Syracuse suburbs										
% row total	2.3	1.8	0.9	0.9	2.5	8.9	11.0	51.6	20.1	100.0
% col total	0.3	0.3	2.2	0.8	5.1	5.6	57.5	65.9	3.7	4.3
Other										
% row total	4.8	3.7	0.5	1.7	1.4	4.7	0.3	3.1	79.8	100.0
% col total	3.3	3.7	6.9	7.6	15.7	16.2	9.9	22.1	81.6	23.4
All										
Pct N	33.9	23.4	1.7	5.2	2.1	6.7	0.8	3.3	22.9	100.0
N	13,826	9,564	681	2,113	839	2,752	332	1,359	9,359	40,825

Table 3. Urbanicity of home by urbanicity of first job, 1999–2002.

		Region of First Job			
Region of Home		Urban	Suburban	Rural	All
Urban					
	% row total	87.8	10.4	1.8	100
	% col total	59.9	6.4	2.9	27.1
	N	9760	1152	201	11113
Suburban					
	% row total	25.7	66.9	7.4	100
	% col total	36.1	85.7	24.6	55.8
	N	5886	15315	1693	22894
Rural					
	% row total	9.2	20.0	70.9	100
	% col total	4.0	7.9	72.4	17.1
	N	644	1404	4978	7026
All					
	Pct N	39.7	43.6	16.7	100
	N	16290	17871	6872	41033

Ultimately, the specific schools where individuals first teach reflect two-sided matches between employers and employees and, as a result, the preferences of both teachers and the administrators who hire them. We have modeled this two-sided, school-level matching process in a related paper that simultaneously estimates the preferences of decisionmakers on both sides of local labor markets (Boyd, Lankford, Loeb, & Wyckoff, 2004b). At this time that analysis is very complex and not very practical. The intent of this paper is different as we are interested in teachers' choices of geographic regions (for example, local labor markets) in which to first work. Here it is assumed that even though teachers alone cannot choose the specific schools in which to teach, they are able to freely choose among the regions as there are available jobs in every region for which they qualify. With numerous opportunities for prospective teachers to find jobs within each region, it is reasonable to assume that teachers can unilaterally choose to focus job search within one of these regions. Most of the urban areas contain only one school district, but each of these districts typically has many schools hiring numerous first-year teachers in any given year. On average, each region hired 1,235 novice teachers in more than 240 different schools in 2000–2001. The region with the fewest hires hired more than 50 teachers in 20 different schools. Thus, there are numerous opportunities for entering teachers within each region. In general, the number of districts and schools hiring and the number of positions filled have remained fairly stable across the years in our analysis. As is the case nationally, hiring increased in more recent years.

In choosing among the 17 mutually exclusive regions, we assume that teacher *m* chooses to teach in the region yielding the highest level of satisfaction. Let $U_{mj} = \beta\chi_{mj} + \varepsilon_{mj}$ represent the mth teacher's utility from teaching in region j. χ_{mj} is a vector of variables that include measures reflecting the distance from region k to the teacher's hometown, distance from the region to the college where the most recent degree was earned, and these distance measures interacted with the teacher's own attributes. The specification also includes region specific dummy variables so that the vector of parameters, β, includes region specific constant terms that will capture the effects of regional attributes which do not vary across teachers (for example, the total number of teaching positions filled in the region). Assuming that the unobserved error term is Gumbel-distributed, the probability that individual m chooses to locate in region k (that is, $U_{mk} > U_{mj}$ for all j ≠ k) is $P_{mk} = e^{\beta x_{mk}} / \sum_{j=1}^{17} e^{\beta x_{mj}}$.

The variables included in x_{mj} are as follows:

Distance from region j to home entered as a cubic function of log distance
Home distance interacted with:
- Female: equals 1 if the individual is female, 0 otherwise
- SAT: individuals combined math and verbal SAT scores
- Urban: equals 1 if individual's home region is urban, 0 otherwise
- Rural: equals 1 if individual's home region is rural, 0 otherwise
- Age < 30: equals 1 if the individual is less than 30 years old, 0 otherwise

Region is home: equals 1 if region j is the individual's home region; 0 otherwise
Region is home interacted with urban and rural
Region and home same type: equals 1 if region j and individual's home are of same urbanicity type
Region and home same type interacted with urban and rural
Region is other portion of home metro: equals 1 if region j is the other portion of an individual's home MSA, 0 otherwise
Distance from region j to college last attended expressed as a cubic function of log distance
Distance from college interacted with female, SAT, urban, rural and age < 30.
Graduated from college in region: equals 1 if the rural region j or the metropolitan area containing region j includes the institution from which the individual received most recent higher education degree, 0 otherwise.

The above specification allows teachers' evaluations of the importance of distance to vary with their own attributes. For example, higher-ability teachers may value distance from hometown differently than do lower-ability teachers. Note that variables characterizing a teacher not interacted with attributes of the region (for example, the person's SAT score entering x_{mj} for all j) will cancel out of the above probability expression so that such variables will have no effect on the probability of taking a job in a particular region.[9]

We estimate the model employing the 33,465 first-time teachers who took jobs in New York State public schools from 1998–99 to 2001–02 and had no missing values for the variables included in the model. Parameter estimates and odds ratios for the estimated model are shown in Table 4.[10] Distance from hometown is both statisti-

[9] Variables reflecting the teachers' own attributes could be included if the coefficients corresponding to those variables were allowed to differ for each region. We have not complicated the model in this way as entering the SAT, sex, and age variables would have added an additional 48 parameters to the model, estimates of which shed little, if any, light on the relationships of interest here.

[10] We have estimated other models to examine the robustness of the results presented. In order to test whether our results are sensitive to missing observations for the distance from hometown to first teaching job, we estimate models that omit the variables related to hometown for the sample of observations with hometown information and for the sample for which hometown was missing. See Appendix Table B-2. The results across these two samples are substantially the same. The elasticity of region choice with respect to distance from college is varies depending upon distance and is about 1.0 for a distance of 25 miles. The difference in the elasticities for the two samples averages 3 percent for distances between 5 and 100 miles and never exceeds 7 percent. This suggests that these two samples respond very similarly with respect to distance. We also estimated a model without New York City. Again the results with respect to distance are substantially the same.

cally and quantitatively important to teachers' location decisions.[11] As shown in Figure 1, an individual is twice as likely to teach in a region that is within five miles of his or her hometown as one 20 miles away and about four times as likely to teach in a region within five miles of his or her hometown as one 40 miles away. A beginning teacher is more than three times as likely to teach in a region 25 miles from

Table 4. Estimated multinomial logit model of employment location choice.

Variables	Coefficient	Odds Ratio	Z Statistics
Distance from home			
ln(distance)	–0.303	0.739	–5.91
ln(distance)^2	–0.076	0.927	–29.90
ln(distance)^3	–0.009	0.991	–15.30
ln(distance) *female	–0.011	0.989	–0.80
*SAT	0.0003	1.0003	8.31
*urban	–0.074	0.929	–2.60
*rural	0.047	1.048	1.37
*age < 30	–0.117	0.890	–7.69
Region is home	1.143	3.135	21.78
Region is home *urban	–1.150	0.317	–8.10
Region is home *rural	–0.298	0.742	–2.90
Region and home same type	0.341	1.407	3.31
Region and home same type *urban	0.672	1.958	5.65
Region and home same type *rural	–0.023	0.977	–0.17
Region is other portion of home metro	–0.084	0.920	–1.70
Distance from college			
ln(distance)	0.022	1.022	0.44
ln(distance)^2	–0.049	0.952	–17.91
ln(distance)^3	–0.006	0.994	–12.35
ln(distance) *female	–0.053	0.948	–3.56
*SAT	0.000	1.000	–0.55
*urban	–0.091	0.913	–4.81
*rural	–0.024	0.977	–1.37
*age < 30	0.060	1.062	4.05
Graduated from college in region	0.279	1.322	7.63
Log likelihood	–31,371		
Sample size	33,465		

[11] We calculate distance as the straight line from the centroid of the hometown zip code to the centroid of the nearest district zip code in each of the 17 regions. To examine whether our estimates are sensitive to the algorithm, we also calculate distance from the centroid of the hometown zip code to the centroid of each zip code for the district and employ the average distance for the counties in each of the 17 regions. By construction, this alternative approach yields larger values of distance. However, the results are similar to those presented in the paper, although, as would be expected, the estimated effect of distance changes somewhat. When we compare the elasticity of region choice with respect to distance using each of these methods, they differ by about 0.2 (1.4 compared to 1.2). So the algorithm employed does alter the magnitude of the effect of distance, but not substantially. These results are available from the authors upon request.

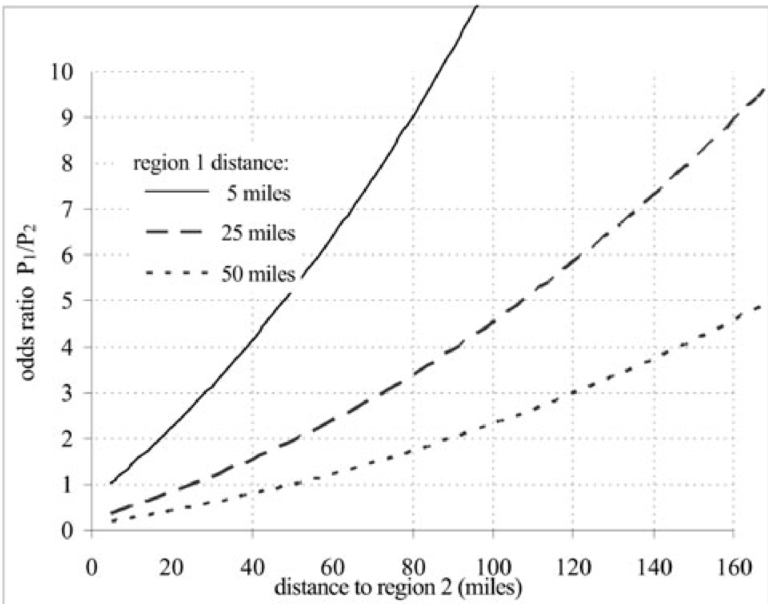

Figure 1. Likelihood of Locating in Two Non-Home Regions as a Function of Distance from Hometown to Employment Locations in Each Region (Region 1 Relative to Region 2).

her hometown as one 80 miles away. Teachers place a premium on searching for jobs close to their hometowns, other things equal, including distance from college.

First-year teachers also have strong preferences to locate in regions similar to that of their hometowns, other things (including distance) equal. For example, a new teacher whose hometown is in an urban area is three times as likely to locate in that urban area as he/she is to locate in the suburban portion of the same metropolitan area (Table 5). However, again holding distance constant, a teacher is just as likely to locate in his or her home region as he/she is to locate in the urban portion of another metropolitan area. Suburban teachers express a stronger preference for their home region. Controlling for distance, a teacher with a suburban hometown is 4.8 times as likely to locate there as in the urban portion of the same metropolitan area and three times as likely to locate in that suburban region as a suburban region in a different metropolitan area. Thus, a prospective teacher who grew up in a particular suburban area is much more likely to take a job in that suburban region, relative to urban and rural areas. Among suburban regions, they show strong preference for their hometown region relative to the suburban region of another metropolitan area (Figure 2 and Table 5). Prospective teachers whose hometown is in a rural region prefer to locate in other rural regions relative to urban or suburban locations, although this preference is not as strong as those having urban or suburban hometowns. The strong preferences of teachers for locating in the region of their hometown or, to a lesser extent, a region of similar urbanicity may reflect a variety of social and cultural factors, but these preferences have important implications for the recruitment of teachers to urban, low-performing schools.

Table 5. Effects of location similarity new of distance effects 1999–2002, odds ratio of first job being in home region v. various alternatives.

Individual having	Alternative Region: Other Part of Same Metropolitan Area	Another Metropolitan Area: Urban Portion	Another Metropolitan Area: Suburban Portion	Another Rural Area
Urban home	2.97	0.99	2.74	2.74
Suburban home	4.79	4.41	3.13	4.41
Rural home	n/a	3.20	3.20	2.33

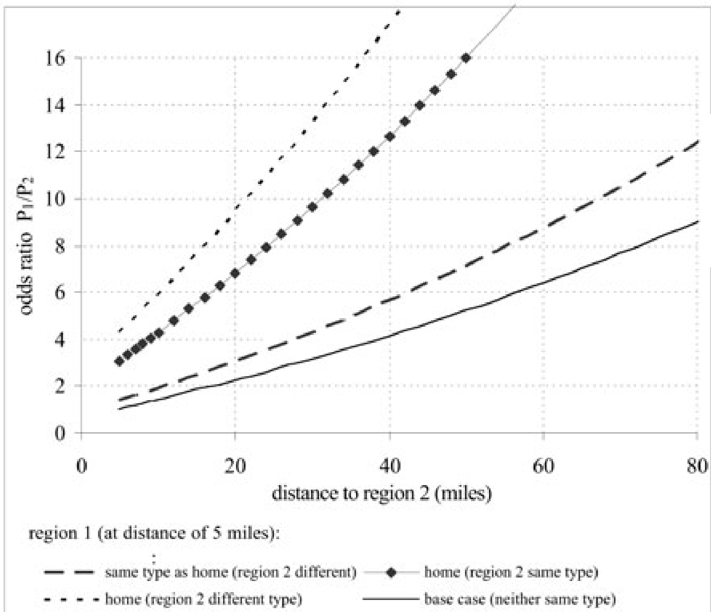

Figure 2. Likelihood of Locating in Two Regions as a Function of Similarity to Hometown and Distance (Region 1 Relative to Region 2 for Individual whose Hometown is a Suburban Region).

Both distance and hometown region have powerful effects on individuals' employment location decisions but what is the relative importance of these factors? In terms of the tradeoffs implied by the parameter estimates, an individual whose hometown was in a suburban region would be indifferent between locating in another suburban region that is 5 miles away and the hometown region if that region were 31 miles away. In other words, the value of working in their hometown region, relative to another suburban region, is worth traveling 26 miles farther.

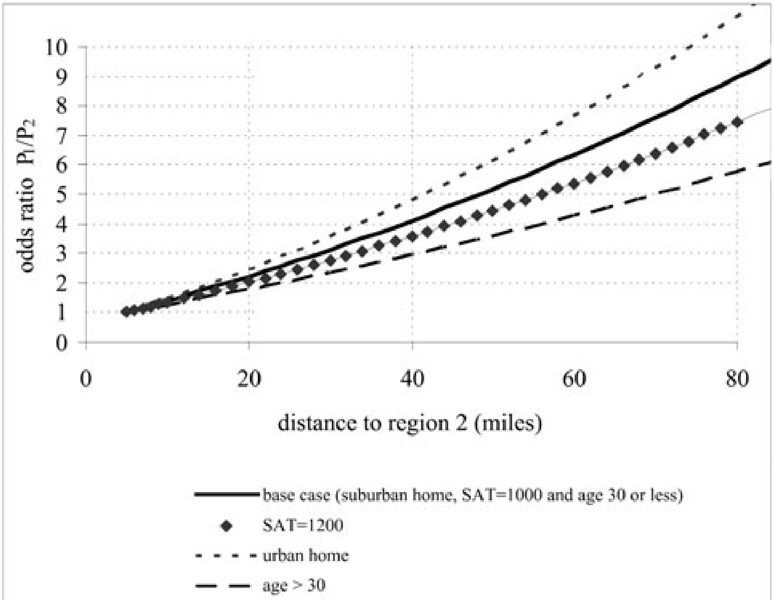

Figure 2. Likelihood of Locating in Two Regions with Alternative Distance from Hometown and Varying Teacher Attributes (Region 1 Relative to Region 2, Region 1 Distance Equals 5 Miles).

When comparing the hometown region and a region of a different type, the individual would be indifferent if the hometown region were 37 miles farther away. Finally, an individual would be willing to travel 6 miles farther to work in another suburban region rather than a different type of region. Recall that reasonably small differences in distance can lead to relatively large changes in the odds ratio of locating in a particular place; for example, an increase of 15 miles can lead to a doubling of the odds ratio. This implies that the effects of hometown region are substantial relative to distance, but that the effect of locating in a region of a similar type is much more modest.

The importance of distance to an individual varies only slightly by the individual's own attributes. For example, an individual with a total SAT score of 1,000, who is less than 30 years old, is three times as likely to locate in a region 5 miles from her hometown as one 29 miles from her hometown, other things equal (Figure 3, base case). An otherwise identical individual with a 1,200 SAT score would have the same odds ratio for a region 33 miles away, implying that more qualified teachers are slightly more willing to expand their job search. Similarly, individuals who begin their teaching careers when they are older are more likely to take jobs farther from where they grew up. A new teacher who is at least 30 years old would have the same odds ratio for a region 42 miles from home as an otherwise identical individual who is less than 30 years old does for a region 29 miles from home.

The model also suggests that holding distance to hometown constant, new teachers are sensitive to the distance from where they last obtained a college degree prior to starting their first job. New teachers are 36 percent more likely to locate in the region where they received their last degree relative to another region, other things equal. However, as shown in Table 6, proximity to hometown is substantially more influential than proximity to college location, except for individuals with urban hometowns. Female teachers who grew up in suburban regions but went to college in a different suburban location 20 miles away are 3.4 times as likely to teach in their hometown region as in the region where they attended college. Individuals with urban hometowns who attended colleges in urban regions are about as likely to teach in the region of their college as their hometown region.

DISCUSSION AND CONCLUSIONS

In seeking their first teaching jobs, prospective teachers appear to search very close to their hometowns and in regions that are similar to those where they grew up. Location of college plays an independent, although less important, role in teachers' employment location decisions. These conclusions are supported by descriptive statistics and our estimated behavioral model. Moreover, these results are robust to several alternative specifications.

The importance of distance in teachers' preferences particularly challenges urban districts, which are net importers of teachers. The number of teacher recruits whose hometown is in an urban area falls short of the number of positions being filled in urban districts, requiring that these districts attract teachers from other regions. Teacher candidates coming from suburban or rural hometowns strongly prefer to remain in those areas, rather than teach in the urban districts—both because of the importance of distance and because teachers have preferences with respect to urbanicity. Thus, urban districts must overcome these preferences in addition to addressing the considerations typically identified with recruiting teachers to difficult-to-staff urban schools, such as salary, working conditions, and the characteristics of the student population. In general, urban schools must have salaries, working conditions, or student populations that are more attractive than those of the surrounding suburban districts to induce sufficiently qualified candidates whose hometowns are in suburban regions to take jobs farther from home and in a different type of region. To the extent that they do not, teachers with suburban hometowns who take jobs in urban areas are likely to be less qualified than those who teach in the suburbs. Moreover, urban districts face a second disadvantage. If, historically, the graduates of urban high schools have not received adequate education, then the cities face a less-qualified pool of potential teachers even if they are not net importers. Preferences for proximity lead to the perpetuation of inequities in the qualifications of teachers. Inadequate education is a cycle that is difficult to break.

Table 6. Relative importance of proximity to home and proximity to college as determinants of first employment location.
(Odds ratio of home region v. college location for females)

Distance between Regions	Suburban Home & Alternatives	Urban Home & Alternatives	Rural Home & Alternatives
20 miles between regions	3.41	1.06	2.30
40 miles between regions	4.39	1.34	2.81

One strategy for attracting more qualified teachers from non-urban regions is to offer compensation for teaching in areas that are net importers of teachers. Boyd, Lankford, Loeb, and Wyckoff (2004b) estimate these compensating differentials.[12] A complementary strategy focuses on the recruitment of individuals living in the urban districts to teacher education programs and employment in urban schools—a "grow-your-own" strategy. Given the strong preferences for teaching close to home and the fact that most students attend college close to home, an important part of the solution is likely to be partnerships between urban schools and higher-education institutions in close proximity to the district. This then places a premium on teacher preparation and recruitment in urban areas, where the graduates are most likely to become the teachers in difficult-to-staff urban schools. Several school districts are experimenting with this strategy but little is known about its effectiveness or the attributes of teacher preparation programs that affect student outcomes. In addition to heightened recruitment efforts, increased compensation for urban teachers would increase the supply of urban residents to teaching.

The results have implications with respect to the geography of teacher labor markets more generally. The common practice of conceptualizing teacher labor markets as covering large regions, or the nation as a whole, can be quite misleading. Such a view leads to the conclusion that there is merely a mismatch in the geographical location of well-qualified teachers and the students who most need them. Our analysis implies that it may be more difficult than previously thought to create the incentives necessary to alleviate this mismatch. Rather, viewing teacher labor markets as geographically small focuses attention on the margins where incentives are most likely to be effective.

The small geographical scope of teacher labor markets also needs to be taken into account in empirical analyses. Proximity to home, home region, and similarity to home region are important in teachers' employment preferences. Research examining compensating differentials that does not account for these job attributes will likely mis-estimate the compensation necessary to successfully recruit teachers. A substantial body of research estimates teachers' decisions to enter teaching, quit, or transfer. Such research may also be misleading if it omits distance from the list of potential factors affecting teachers' choices.

Finally, many of the implications noted here may extend beyond public school teachers. Other street-level professionals, especially those in the public sector, share attributes of public school teaching. Labor markets for these occupations are likely to be small, as well. As a result, recruiting more qualified public safety, health care, and social service workers may follow many of the policy recommendations noted above.

There is little research on the geography of labor markets. The research that has been done has tended to look within metropolitan areas, addressing questions of spatial mismatch and market segmentation. This paper takes a different approach, assessing employment location decisions across regions and using residential location in high school instead of current residence to define measures of distance. By doing this, we are able to limit our behavioral model to a one-sided choice and reduce the potential that home residence is endogenous to employment opportunities. The results show the importance of proximity for teachers and suggest the need to consider local supply when designing policies to affect the recruitment and retention of teachers.

[12] For another examination of the factors relevant to teacher retention, see Hanushek, Kain, and Rivkin (2004).

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APPENDIX A

Table A-1. Workforce database.

	Personnel Data	Certification and Exam Data	SUNY Student Data	School and District Data	College Board Data
Universe	All public school teachers, superintendents, principals, and other staff	All individuals taking certification exams	All SUNY applicants (including non-teachers)	All public schools and districts	All students taking the SAT in New York schools
Elements	• salary • course subject and grade • class size • experience (district and other) • years of education and degree attainment • age • gender	• scores on NTE and NYSTCE (general knowledge, pedagogy, and content specialty) exams • college of undergraduate and graduate degrees • degrees earned • zip code of residence when certified • race	• high school attended • high school courses • high school GPA • SAT exam scores • college attended and dates • intended college major • actual college major • college GPA • degrees earned	• enrollment • student poverty (free and reduced lunch counts) • enrollment by race • limited English proficiency • student test results • dropout rates • district wealth • district salary schedule • support staff and aides	• SAT scores • zip code of address
Time period	1969–70 to 2001–02	1984–85 to 2001–02	1989–90 to 1999–00	1969–70 to 2001–02	1980 to 2001
Source	New York State Education Department	New York State Education Department	The State University of New York	New York State Education Department	College Board

APPENDIX B

Table B-1. Examination of estimation robustness: Employing metropolitan-wide alternatives.

	Primary Model (Urban and Suburban Alternatives)			Primary Model with Metro-wide Alternatives		
	Coefficient	Odds Ratio	Z Statistics	Coefficient	Odds Ratio	Z Statistics
Distance from home						
ln(distance)	–0.303	0.739	–5.91	0.362	1.436	3.35
$\ln(\text{distance})^2$	–0.076	0.927	–29.90	–0.359	0.699	–9.80
$\ln(\text{distance})^3$	–0.009	0.991	–15.30	0.027	1.028	6.55
ln(distance) *female	–0.011	0.989	–0.80	–0.009	0.991	–0.54
*SAT	0.000	1.000	8.31	0.000	1.000	8.28
*urban	–0.074	0.929	–2.60	–0.081	0.922	–3.65
*rural	0.047	1.048	1.37	0.025	1.025	1.02
*age < 30	–0.117	0.890	–7.69	–0.137	0.872	–7.59
Region is home	1.143	3.135	21.78	1.050	2.857	19.56
Region is home *urban	–1.150	0.317	–8.10			
Region is home *rural	–0.298	0.742	–2.90			
Region and home same type	0.341	1.407	3.31	0.082	1.085	2.32
Region and home same type *urban	0.672	1.958	5.65			
Region and home same type *rural	–0.023	0.977	–0.17			
Region is other portion of home metro	–0.084	0.920	–1.70			
Distance from college						
ln(distance)	0.022	1.022	0.44	–0.506	0.603	–4.03
$\ln(\text{distance})^2$	–0.049	0.952	–17.91	0.198	1.219	3.74
$\ln(\text{distance})^3$	–0.006	0.994	–12.35	–0.036	0.965	–5.19
ln(distance) *female	–0.053	0.948	–3.56	–0.075	0.927	–4.09
*SAT	0.000	1.000	–0.55	0.000	1.000	1.59
*urban	–0.091	0.913	–4.81	–0.054	0.947	–2.00
*rural	–0.024	0.977	–1.37	–0.005	0.995	–0.26
*age < 30	0.060	1.062	4.05	0.061	1.063	3.14
Graduated from college in region	0.279	1.322	7.63	0.601	1.824	9.12
Log likelihood	–31,371			–17,198		
Sample size	33,465			33,465		

Table B–2. Examination of estimation robustness: Estimation without home variables for observations with and without home variables.

	(1) Home Variables Missing			(2) Home Variables Not Missing		
	Coefficient	Odds Ratio	Z Statistics	Coefficient	Odds Ratio	Z Statistics
Distance from college						
ln(distance)	–0.198	0.820	–12.55	–0.119	0.888	–9.86
$\ln(\text{distance})^2$	–0.096	0.908	–33.51	–0.084	0.919	–35.09
$\ln(\text{distance})^3$	–0.008	0.992	–14.64	–0.009	0.991	–22.78
Graduated from college in region	0.339	1.404	8.73	0.032	1.032	1.14
Log likelihood	–28,129			50,215		
Sample size	23,791			33,465		