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STAFFING CLASSROOMS: HOW DO NEW YORK SCHOOL DISTRICTS FIND THEIR TEACHERS?

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American Education Finance Association 2005 Annual Conference
Louisville Kentucky
March 17-19, 2005

Acknowledgements: This project would not have been possible without significant help from a number of individuals. Jim Wyckoff and EFRC generously agreed to fund the project. Tom Rogers at NYSCOSS graciously sponsored the survey. We want to especially thank Briggs McAndrews at NYSCOSS, who provided significant help with all aspects of the survey. Several superintendents and district administrators provided valuable advice on survey design including Marilyn Dominick, Superintendent at Jordan Elbridge School District; Martin Swenson, Superintendent at Fabius-Pompey School District; Yvonne Young, Associate Superintendent for Support Services at Syracuse City School District; Rudy Rubeis, Superintendent at West Genesee School District; Joe Proscia. Assistant Superintendent for Curriculum and Instruction at West Genesee School District; and Sally Romano, Director of Personnel at West Genesee School District. Deborah Cunningham, Charles Szuberla, Johanna Duncan-Poitier, Nancy Willie-Schiff, and Joe Porter of the New York State Education Department reviewed the survey and provided helpful comments. Dan Goldhaber and Michael DeArmond of the University of Washington had a number of valuable suggestions on both the content and design of the survey. Willow Jacobson at the University of North Carolina, Pat Ingraham at Syracuse University, and Mark Robbins and Bill Simonsen, at the University of Connecticut, critiqued the survey instrument, and proposed a number of revisions to reduce length and improve clarity. We also want to thank Jeff McLellan, Kim Kirsch, and Bob Bifulco for their comments on preliminary draft of the report. We appreciate the willingness of Robert Strauss of Carnegie Mellon University to allow us to borrow from his survey on teacher hiring practices in Pennsylvania. Errors and omissions are, of course, solely the responsibility of the authors.

Note: The full project report is available from the Education Finance Research Consortium on their website: http://www.albany.edu/edfin.

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Abstract

Decades of research on the determinants of student achievement make it clear that high quality teachers matter for student success. Despite the recent focus on teacher quality, relatively little research exists on district practices to recruit, screen and select teachers. This paper takes a first step in filling this gap by documenting the findings of a survey on teacher hiring practices in New York State school districts. We received a response rate of over 70%. In this paper will focus on the teacher recruitment part of the survey.

Most districts continue to use fairly traditional methods to recruit teachers by advertising in local newpapers, working with local colleges, recruiting student teachers and substitute teachers, and offering compensation for extracurricular activities and credit for teaching outside the district. A much smaller share of districts advertise outside the local area, work with colleges in other regions of the state or other states, or use non-traditional recruiting incentives, such as signing bonuses, subsidized tuition at local colleges, or assistance purchasing a home. Most districts use the internet to post job notices on the school district websites, but most districts do not post job notices on other job websites, or use the internet to actively search for teachers. Districts with more difficulty recruiting teachers are more apt to use all of the strategies to increase the local supply of teachers and to use several recruiting incentives.

We examined more formally the factors associated with district use of particular recruiting practices using a model of adoption of innovations. Estimation of this model shows that enrollment, difficulty recruiting, institutionalization of practices, and management capacity are significantly associated with adoption for many of the practices examined.

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Decades of research on the determinants of student achievement make it clear that high quality teachers matter to student success (Ferguson, 1998; Goldhaber, 2002; Goldhaber et al., 1999; Hanushek et al., 2002). With states under pressure to raise teacher quality to comply with NCLB and with a significant increase in demand for teachers projected for the next decade (Hussar, 1999), school districts face significant teacher recruitment challenges. Moreover, evidence suggests that high quality teachers are unequally distributed across districts and that disadvantaged students are much more likely to be served by less qualified teachers (Lankford et al., 2002; Oakes et al., 1992; Loeb 2000). The success of high need districts in meeting NCLB standards will depend in large part on their success in recruiting and retaining high quality teachers.

Despite the suggestion that differences in hiring processes may contribute to the teacher quality problem (Loeb, 2000), most policy proposals are aimed at the state level and focus on how to increase the supply of teachers and improve teacher retention. Research documenting the effectiveness of particular district hiring practices for teachers is very limited. This paper starts to fill this research gap by documenting the practices used in New York school districts for teacher recruitment based on a survey of school districts administered during the summer of 2004.

The paper is organized into five sections. In the first section of the paper we review briefly the literature on teacher labor markets, and empirical research on recruitment and selection policies in education. The second section describes survey design and implementation and analyzes our sample's representativeness of all districts in New York. In the third section, we present the descriptive results of the recruitment section of the survey. We then present a model of policy adoption, and test this model using some of the key recruitment practices identified in the survey. Finally, we summarize the results and discuss future research plans.

Research on Teacher Recruitment and Labor Supply

Recent concerns about teacher shortages first emerged in the 1990s as a result of demographic changes (a baby "boomlet") and class size reduction programs in many states increased the demand for teachers after several decades of stagnant or declining demand. From the standpoint of state policy to improve teacher quality, it is important to identify how teacher choices affect the overall quality and distribution of the teaching workforce. Are teacher shortages caused by a lack of strong candidates

entering teaching; significant attrition of individuals entering teaching early in their careers; teachers' choices to change school districts; or market imperfections that create localized teacher shortages?

According to Strauss, et al. (2000) teacher quality problems are not caused by a lack of teacher supply. In Pennsylvania, he estimates that 20,000 teaching certificates are issued per year, and only one-tenth this number of new teachers is hired on an annual basis. Instead, states should be more worried about improving the quality of students entering the teaching profession (Strauss et al., 2000; Murnane, 1996) and increasing the retention of high quality teachers.[1]

A large body of empirical research on teacher mobility confirms that compensation can significantly affect teacher decisions about leaving and moving (Baugh and Stone, 1982; Murnane and Olsen, 1990; Stinebrickner, 1998; Imazeki, 1999; Dolton et al., 1999). If compensation is a key factor affecting mobility, then in theory districts serving disadvantaged populations can attract and retain qualified teachers by raising salaries sufficiently. However, several factors suggest that solving the teacher shortage will be more difficult. Recent research indicates that teacher mobility across schools and districts may be driven in large part by the characteristics of the students that they are teaching and less by salary differences (Loeb, 2000; Hanushek, et al., 2001). Of equal concern, are the findings of Boyd, Lankford, Loeb, and Wyckoff (2004) that the teacher labor market is very localized. "Most public school teachers take their first public school teaching job very close to their hometowns or where they attended college" (p. 117) or in districts that share similar characteristics to their hometowns.[2] Strong preferences for a familiar teaching environment, implies that large central cities will have difficulty attracting and retaining teachers who grew up in non-city areas, even with significantly higher salaries.

Strauss et al. (2000) finds a similar result in Pennsylvania, but attributes it not to teacher preferences, but to the search process of the school district. Specifically, districts focus their hiring process on substitute or part-time teachers and graduates of local colleges, and do not "actively seek new teacher applications through vigorous advertising and recruiting." (p. 405) Concerns over the quality of the public teacher hiring process have been raised in several comparisons of teacher recruitment policies in public and private schools (Ballou, 1996; Ballou and Podgursky, 1998). Ballou (1996) argues that

[1]Nationally, 11% of teachers leave the profession after the first year, and 39% leave after five years (Ingersol, 2002). Recent estimates from the NCES (2004) indicate that 13 percent of teachers with 1 to 3 years of experience moved to another district, and 8.5 percent left teaching as an occupation from 1999-2000 to 2000-2001. Movers cited most frequently improvements in the assignments, working conditions, and salaries as very important to their decision to move. Leavers cited salary, working conditions, and interest in pursuing a family or another career.

[2] In fact, they found that 82 percent of New York teachers were employed in jobs teaching at schools that were within 40 miles of their hometowns.

"public school officials undervalue cognitive skills and subject matter knowledge when screening new applicants" (p. 130).[3]

Unfortunately, it is difficult to separate the effect of teacher preferences for the local area from district hiring decisions; districts may recruit locally because of the ineffectiveness of broader regional or national searches. Understanding this process is also hindered by a lack of information on teacher hiring processes. "We know little about how effective districts are in their hiring decisions" (Loeb, 2001, p. 109).

Recruitment, like all aspects of human resource management, requires careful planning to be successful (Pynes 1997). Ideally, a strategic human resource planning process would be used to determine the district's personnel needs. Based on the plan, the school district should develop a recruitment plan that delineates: 1) when will the district recruit (i.e. timing with respect to the school year); 2) how will the district recruit (e.g. newspaper ads, on-line job banks, etc.); and 3) where will the district recruit (e.g. locally, colleges and universities, nationally)?

Most of the literature on recruitment in education focuses on state policies and is case study based. These studies examine teacher recruitment, training, and compensation policies in particular states, and use these case studies to make broad recommendations (The Southeast Center for Teaching Quality, 2002; Pathways to Teaching Careers, 1997; Hirsch, 2001; Fox and Certo, 1999; Education Research Service, 2001; Clewell, et al., 2000). The focus of most of this research is on potential changes in state certification and compensation policy that can increase the supply of teachers.

The little evidence that does exist on actual recruitment practices in education suggests that districts engage in a fairly limited search for candidates. Using a detailed survey of superintendents, school board presidents, and teacher union presidents in Pennsylvania, Strauss et al (1998, 2000) find, for example, that 75% of districts only advertise in Pennsylvania and 17% only advertise locally. The media outlets used most frequently in order of importance include education trade publications (e.g., Pennsylvania School Board Association bulletin), education school placement offices, word of mouth, and newspapers. The internet was used at least sometimes by 29% of respondents. Only 30% of districts had partnerships with colleges for teacher training and placement, although 50% were contacted by colleges marketing their graduates.

While the Strauss study is valuable, it is for only one state and is seven years old. As might be expected for a 1997 survey, Strauss had only one question about the use of the internet. In addition, the survey didn't ask about district programs to expand the supply of teachers or the use of monetary recruitment incentives. These are topics included in our survey of New York districts.

[3] Ballou's (1996) analysis of data from the *Surveys of Recent College Graduates* (1976-1991) suggests that a stronger academic background does little for a candidate's job prospects in public schools.

Survey Design and Implementation

The literature on hiring practices in school districts has been primarily prescriptive and anecdotal in nature. The major objective of this survey is to document important teacher hiring practices used by school districts in New York State. The list of topics that could be included in a survey of teacher hiring practices is extensive and would require at least several surveys. To keep the survey to manageable length, choices had to be made about the focus of the survey; we wanted to limit the survey to important practices and to emerging practices as identified in the literature. The survey was organized into three broad topics: 1) teacher recruitment, 2) teacher screening, and selection, and 3) interest in training and support. (The full survey instrument is available in on the website: http://www-cpr.maxwell.syr.edu/faculty/duncombe/teaching-survey/teacher-hiring.htm

In constructing the survey, we borrowed extensively from the detailed survey developed by Strauss (1998), particularly in the section on screening and selection. The research of Liu (2002) indicated the importance of examining whether the hiring process was centralized, decentralized, or shared; therefore, we asked several questions about staff involvement in the recruitment, screening, interview, and selection processes. In addition, several studies of state recruiting programs were used to identify a range of recruiting incentives and strategies for increasing teacher supply (Clewell et al., 2000; Hirsch, 2001; The Southeast Center for Teacher Quality, 2002).

In implementing the survey, we followed closely the recommendations of Dillman (2000). A number of steps were taken to maximize the response rate to the survey. The director of the New York State Council of School Superintendents (NYSCOSS), Tom Rogers, graciously agreed to endorse the survey, put the NYSCOSS logo on the survey instrument, and send a joint cover letter with the survey. NYSCOSS also allowed us to put a link to the online survey on their website. To provide the greatest flexibility possible, the survey was available in both hardcopy and online.[4] We sent four waves of mailings to superintendents over a two month period, and included a copy of the survey, a sheet of instructions on how to use the online survey, a postage paid return envelope, and a cover letter explaining the objectives and importance of the survey in three of these mailings. The resulting response rate was excellent, 71.3%.

To examine how representative the sample is of all school districts in New York, we compared average characteristics for districts completing the survey with those of districts not completing it (Table 1). Included in our comparison are enrollment, fiscal, teacher, and region variables. Districts completing the survey have similar enrollment size and student socio-economic composition as non-respondents. The one exception is the share of limited English proficient (LEP) students, which was higher in districts not

[4] The online survey package, Survey Monkey, was used to design the online survey, and store survey results.

in the survey. Regarding district finances, districts in the survey have 6% lower spending overall and 3% lower operating spending. None of the other differences in fiscal variables are statistically significant from zero. The teacher work force in responding districts is very similar to non-respondents, except that non-respondents have slightly less experienced teachers and a slightly lower share of tenured and permanently certified teachers. Respondents and non-respondents tend to be distributed evenly between urban, suburban, and rural districts. Respondents are less likely to be located in downstate districts than non-respondents. A slightly higher share of districts completing the survey are average need districts and a lower share are low need districts.

<Table 1 about here>

Descriptive Survey Results on Teacher Recruitment

The high response rate and representative nature of the sample provides us the opportunity to examine the teacher recruitment practices of New York school districts. In this section we will present some descriptive analysis of the survey results. Specifically, we examine differences in results based on enrollment size, the difficulty of recruiting teachers,[5] and the resource capacity, and student needs of the district as classified by the New York State Education Department (SED).[6] Basic results for each survey questions as well as descriptive tables by income and poverty categories are presented on the website: http://www-cpr.maxwell.syr.edu/faculty/duncombe/teaching-survey/teacher-hiring.htm.

Traditional Recruiting Methods

The goal of teacher recruitment is to increase the number of high quality applicants to the district. Traditional methods of recruiting have focused on increasing the number of applicants from the local pool of teachers using fairly passive methods. Strategies would include advertising locally, attending local job fairs, and partnering with local colleges. In periods of teacher surplus, districts may be able to produce sufficient numbers of high quality applicants by only tapping the local pool. When there are teacher shortages, districts may have to consider more aggressive (and expensive) strategies. One possibility is to expand traditional approaches such as advertising, job fairs, and college partnerships to other areas of the state or outside the state. Another alternative is to search for "innovative" approaches to both expand the

[5] To calculate the difficulty of recruitment, we took the average share of teacher categories (subject areas, types of schools, and demographics of teachers) where districts had recruited in the last 3 years, which they identified as very difficult to recruit for. If a district had less than 8% of these categories identified as very difficult, they were categorized as low difficulty, 8% to 31% as medium difficulty, and above 31% as high difficulty.

[6] The SED classification uses the share of free lunch students in K-6 as the measure of needs, and CWR as the measure of fiscal capacity. We have combined the categories for the Big 4 cities and "other high need urban" districts to preserve confidentiality of the survey responses.

number of applicants from outside the local area and to try to expand the local supply of teachers available to a district. The term "innovative" is put in quotation marks because innovative does not necessarily imply effective; the research on the effectiveness of these strategies is anecdotal at best. We will focus initially on the more traditional approaches and then turn, in the next section, to "innovative" approaches. This is one of the few surveys that we are aware of that systematically documents the use of these strategies by school districts.

Advertising

A simple and fairly passive strategy for recruitment is to put an advertisement in a newspaper, trade publication, or on radio or television. The least expensive option would probably be local newspapers and possibly local radio stations. We asked districts to identify the media outlets they use and whether the newspapers are local (within 50 miles), in other areas of the state, or based out of state.[7] The typical district begins advertising in March or April and makes an offer in June (Table 2); an early advertising date is associated with making earlier offers to prospective teachers.[8] Large districts start advertising a month earlier than small districts and make their offers a half a month earlier. High need urban districts begin advertising around the same time as average need and low need districts, but make their offers one-half to one month later (even controlling for enrollment).[9]

Table 2 suggests that most advertising is in local papers, with a smaller subset of advertising in other New York newspapers. A third of districts indicated that some of their advertising was in education trade publications and almost no districts report using radio or TV advertisements. Small districts are more apt to use local newspapers and less apt to use other New York newspapers than districts with high enrollment. High need urban districts and average need districts are less apt to use newspaper advertising in general than high need rural districts but are not more likely to use other media (even controlling for enrollment). Unexpectedly, high need rural districts are more apt to use radio and TV advertising than other districts (use is still very limited).

<Table 2 about here>

[7] We did not clarify in this question whether a New York newspaper with national circulation, such as the *New York Times*, is considered an out-of-state paper. The distinctions across the three categories could be handled differently by districts if they advertise in the *New York Times*. Given the expense of such an advertisement, we are assuming that relatively few districts outside of the New York City area advertise in this paper.

[8] The correlation between the date of advertising (in months) and offering date is 0.44. For districts that gave us a range of months for advertising date and offer date, we used the middle date in the calculations (using fractions of months).

[9] To identify emergency hires, we asked superintendents to indicate the number of hires after the first day of school. Unfortunately, the results from this question suggest that superintendents interpreted the question differently, so the results are not reported.

Recruiting from Colleges

While advertising may be a successful strategy for experienced teachers, for new teachers a more effective approach may be to work with the colleges producing them. The contact can be fairly passive, such as asking colleges to post job notices on bulletin boards or in placement newsletters, or can involve a more direct contact by visiting the campus or talking to faculty about job candidates. School districts and colleges can establish even stronger partnerships through student teaching arrangements and the interaction of college faculty and district personnel on curricular and pedagogical issues.

The most common college recruitment strategies used by districts are supervision of student teachers, posting of job notices at the colleges, and contacting college faculty in local colleges (Table 3). The majority of districts post job notices in non-local New York colleges but otherwise have little direct contact with these colleges. With regard to non-New York colleges, the share of districts working with these colleges on recruitment drops to 10% for most strategies. Larger districts are more apt to use recruitment strategies in both local colleges and non-local colleges than smaller districts. High need urban districts are more likely to visit local colleges and supervise student teachers from non-local colleges but otherwise are not any more active in working with colleges than other types of districts.

Job Fairs

Another common approach to teacher recruitment is for a district to be present at education job fairs. The typical district in New York attends one job fair and 37% of districts attend no job fairs. Over 90% of districts attend three or fewer job fairs, but attendance at job fairs goes up significantly with district enrollment. Large districts, for example, attend between two and three job fairs and 20% attend four or more. High need districts or those with difficulty recruiting teachers are not more likely to attend job fairs once enrollment is controlled for.

Emerging Approaches for Teacher Recruitment

Districts continue to focus their recruitment efforts primarily on traditional methods, particularly in the local area. Relatively few districts advertise outside the local area or work with non-local colleges. The fact that the use of traditional methods, especially outside the local area, goes up with enrollment suggests that the costs of teacher recruitment are perceived to be relatively fixed, in the sense that costs per position recruited go down with the number of positions recruited.[10] The first emerging approach we examine may provide the opportunity to reduce some of the fixed costs of recruiting.

[10] Ideally, we would like to test this assumption, but we do not have recruitment costs disaggregated from other central office expenditures.

Use of the Internet

The internet should be the ideal medium for teacher recruitment. For the cost of posting job notices on a website, a district can potentially have access to a national market of teachers. Districts can post job notices on their own websites and can provide recruiting brochures online for candidates to download. Prospective teachers can communicate with the districts by email and can even submit their applications online. Districts can use the internet to do a national search for the right teachers as inexpensively as if they were doing a local search.

Approximately three-quarters of districts use the internet, primarily to post job notices on the school district website and other recruitment websites (Table 4). A much smaller share use the internet to search for job candidates. Large districts are more likely to use the internet, particularly to post jobs on district websites, allow candidates to submit online applications, and search for job candidates. High need urban districts use the internet in similar rates as average and low need districts. Districts with medium to high recruitment difficulties are more apt to use a range of internet services than districts with little difficulty recruiting teachers. These findings suggest that most districts are reaping only a portion of the potential benefits of the internet.

<Table 4 about here>

Small districts are less likely to use the internet, even though it may have greater benefits for small districts by potentially broadening their searches. Using the internet for recruitment requires staff time and some technical competence in the use of the internet. In addition, some small districts may not have a district website on which they can post job notices and accept applications. Regional education organizations, such as New York's Board of Cooperative Educational Services (BOCES), can help to bridge this technical divide by providing recruiting services to school districts. We asked about a range of BOCES services including assistance with online application systems, online placement of vacancy notices, advertising, and recruitment fairs.

Approximately half the districts responding to the survey use hiring services provided by BOCES, particularly for online applications, online vacancy notices, advertising and recruitment fairs. The BOCES providing the broadest range of services and serving the most districts (Putnam-Westchester BOCES) also operates an online application system (OLAS) used by 150 school districts. Small districts are not more apt to use BOCES services than large districts, especially for online application systems. However, small districts using BOCES recruitment services are much more likely to use the internet for recruitment than those that do not. Districts with medium to high difficulty recruiting teachers are more likely to use BOCES online recruitment services and assistance with recruitment fairs. These findings suggest that BOCES can help reduce the potential fixed costs and staffing challenges of using the internet for recruiting, and that BOCES recruitment services should be made more readily available to districts.

Teacher Recruitment Incentives

Complementing the use of the internet to broaden the search beyond the local area are monetary incentives to increase the attractiveness of working in the district. Given the potential costs to teachers for taking a job in a new area, both monetary and non-monetary, districts may be able to attract new teachers by providing them a higher salary or some other form of compensation. For example, the district could offer prospective teachers a signing bonus or could credit teachers for experience in other districts or even for work experience in non-teaching occupations. Opportunities to supervise extra-curricular activities for compensation could be made available for teaching candidates. Other incentives used in some states include compensation for National Board Certification, subsidized tuition at local colleges, additional compensation for teaching in hard to staff schools or fields, and assistance with the purchase of a home. In a heavily unionized state such as New York, it is likely that most of these incentives would need to be negotiated with the union as part of the collective bargaining process.

Almost three-quarters of superintendents responding to the survey said they used some type of recruitment incentive (Table 5). However, only two of the incentives—compensation for extracurricular activities and crediting teachers for experience outside the district—are used by almost half the districts. The fact that these are the most common incentives is not surprising given that they are not likely to be controversial provisions of teacher contracts. Approximately 16% of districts provide subsidized tuition at local colleges, offer additional compensation for National Board Certification, and give credit for work experience in non-teaching occupations. The only other incentive used by at least 25 school districts is additional compensation in hard-to-staff fields. The use of incentives tends to go up with district size, particularly additional compensation for National Board Certification.[11] High need urban districts are more likely to use incentives than other types of districts, particularly signing bonuses, additional compensation for National Board Certification, subsidized college tuition, additional compensation for hard-to-staff fields, and for extra-curricular or administrative functions. Use of recruiting incentives also goes up with recruiting difficulty, particularly additional compensation for extra-curricular activities and flexibility in crediting previous experience. However, districts with high recruiting difficulty are not more likely to use nontraditional incentives such as signing bonuses or help with the purchase of a home.

<Table 5 about here>

Strategies to Increase Supply

Besides broadening the search outside the local area and using incentives to increase applications, districts can try to expand the pool of potential teachers in the local area. Strategies to increase supply

[11] Controlling for need/resource capacity, district size is positively related (and statistically significant) to use of all incentives except extra compensation for extracurricular activity and hard to staff fields and schools.

could include recruiting substitute teachers, retired teachers, former teachers, and alternatively certified teachers, or providing incentives for paraprofessionals to become certified teachers. The first three strategies can be implemented relatively easily (assuming these teachers are certified). Recruitment of alternatively certified teachers could be a matter of dispute with the teachers' union and assisting paraprofessionals to become teachers is a longer term strategy.

Almost 90% of districts use some strategy to increase supply with recruiting of substitutes being the most commonly used strategy (Table 6). Over 40% of districts recruit teachers certified through alternative routes and 28% recruit retired teachers or provide assistance to paraprofessionals to become teachers. Only 7% recruit former teachers. Use of supply strategies is not strongly related to district size but larger districts are more likely to recruit substitutes and to assist paraprofessionals. High need districts are not more apt to use these strategies than average need districts. The results in Table 6 suggest that districts with high recruiting difficulties are more apt to use all of the strategies to increase supply except recruiting former teachers.

<Table 6 about here>

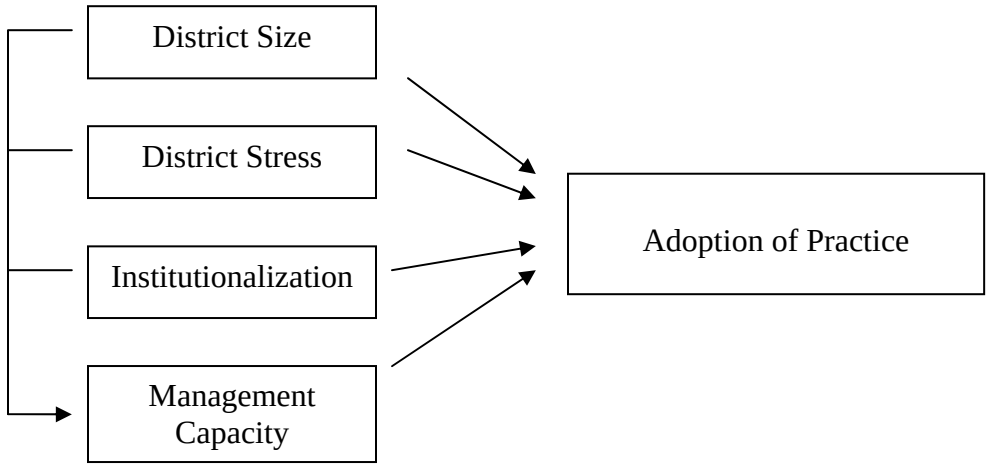
Analysis of Factors Affecting Adoption of Recruitment Practices

So far, we have focused on frequencies and bivariate relationships among recruitment practices and district characteristics. In this section of the paper, we examine multivariate relationships using an exploratory model of adoption as a framework. We first use district size as a single explanatory variable to confirm the importance of that characteristic suggested by the previous analysis. Next, we add the exogenous variables, district stress and institutionalism of practices, to the model. Finally, we use the complete model which includes the likely endogenous variables, difficulty recruiting and management capacity.

Adoption Model

To model the adoption of teacher recruitment practices we draw from research in economics and organization theory. We hypothesize that adoption of recruiting practices are affected by district size, district fiscal and political stress, institutionalization of the practice within the district's peer group, and management capacity of the district (Figure 1). We will briefly discuss each of these factors, before turning to measurement and model results.

Figure 1. Adoption Model



Adoption of practices could be affected by the size of the organization if there are economies of scale in their implementation (Duncombe and Yinger, 2001). Typically, economies of scale would arise in the short-run from significant fixed costs. In the case of teacher recruiting, recruitment costs associated with organizing the process, developing advertising material, organizing contacts with local colleges, and implementing a recruitment website could be relatively fixed, and thus we might expect a positive relationship between their adoption and district size. However, it is possible that these relationships are nonlinear, so we examine different forms for enrollment.

The other factors in the model are drawn primarily from the organizational theory literature. The institutionalization of a practice is the degree to which it has been accepted as a standard in a given field (Rainey, 1997). Clearly, this should affect an organization's decision of whether or not to use the practice. Researchers have found that organizations adopt practices because other similar organizations use them rather than on the basis of efficiency or effectiveness considerations (e.g. Meyer and Rowan, 1983; DiMaggio and Powell, 1983; Pfeffer, 1982). In this case, we care not just about what is standard practice in human resources as a whole, but specifically in what is considered standard practice in school districts. We expect that the more standardized a given recruitment practice is in a school district's peer group, the more likely the district is to adopt it.

We are particularly interested in looking at the adoption of "innovative" practices. Innovation is different from change that might be driven by institutionalization because it is, by

definition, a practice that is not the standard or state-of-the-art (Kimberly, 1981). This departure from the norm does not necessarily have to be drastic, however, and thus the adoption of individual practices within the larger process of recruitment may qualify as "innovative." Innovations are related to the organization's conditions and can be influenced by both internal and external or environmental factors (Hall, 2002). Organizational characteristics that may influence the adoption of innovation include professionalization of organization members, decentralization of power, and a low emphasis on efficiency and volume as opposed to quality (Hage and Aiken, 1970). In the context of our study, we consider the management capacity of the district. Many of the recruitment practices require devoting time to implement properly and at least some of them require specialized knowledge or skill. We assume that the greater the district's capacity to manage the recruitment process, the more likely the district is to adopt more and "innovative" practices.

With regard to environmental factors, district stress, both fiscal and political, is also expected to affect the adoption of recruitment practices, though the direction of that effect is unclear. It has been found that when facing adversity, less successful organizations are forced to innovate, whereas more successful organizations are shielded from the adversity (Manns and March, 1978). Thus, we might expect that school districts experiencing high levels of district stress would be more likely to adopt "innovative" practices as a district must find new ways to accomplish its goals in challenging circumstances. At the same time, however, it is possible that greater stress limits the capacity for innovation. If certain innovative practices carry with them high costs, for example, those districts facing fiscal stress may be unable to implement them.

Measurement

We have both discrete and continuous dependent variables. Most of our dependent variables are dummies coded "1" if the district uses the practice and "0" if it doesn't. We wanted to look at practices that have some variation in reported use and so chose practices which more than 20% and fewer than 80% of districts use. We did make a couple of exceptions to this decision rule for practices that are of great interest despite being limited in use. Both in an effort to increase variation and in the interest of focusing on innovation, we also collapsed some of the individual practices within a given category into broader variables. For example, in the category of advertising in various media outlets, we collapsed the more unusual advertising practices

(advertising in newspapers outside of the local area but within the state, in newspapers in other states, and on the radio or television) into a variable called innovative advertising. The models using these dependent variables were estimated using logistic regression. We include several quasi-continuous variables as well; most are counts of the number of a certain type of practice used and one is the month during which job offers are made. The models using these dependent variables were estimated using ordered logistic regression.

The independent variables also include both discrete and continuous variables. In the first stage of the model, we use three different measures of enrollment: enrollment; enrollment and enrollment squared; and enrollment categories ranging from small to very large. In the second and third stages of the model, we use enrollment and enrollment squared. District stress is measured with four variables. The first, a standard measure of poverty, is the percentage of students eligible for free or reduced price lunch. The second is the combined wealth ratio (CWR) of the district, which is a measure of fiscal capacity developed by the New York State Education Department that averages a property value index and income index. The third is the number of budget defeats the district has faced in the last five years. The fourth and final stress variable is the percentage of positions recruited that the district indicated were "very difficult" to recruit.

Institutionalization is measured as the percentage of districts who share the same BOCES that have adopted the practice. We hypothesize that districts view other districts as peers, and are more likely to adopt a practice if a sizeable share of their peers adopt. Management capacity is measured in three ways. The first variable is the presence of a human resource director on district staff. The presence of a human resource director may indicate the level of professionalization of human resource management in the district. The second is whether the recruitment process is decentralized, defined as being managed at the school level or shared between the district and school levels. Decentralization may not only affect the selection process but may have an influence on what decisions are made about media outlets, college contacts, and other strategies to expand supply. The third management variable is the number of positions involved in the recruitment process. A broader set of actors involved in the recruiting process could influence district choices; however, it is difficult to predict the direction of these effects.

Results

The bivariate analysis suggested that district size is related to the use of various recruitment practices. We therefore estimated the effects of enrollment on the use of those practices, using enrollment as the only explanatory variable. In order to observe some of the nuance of the relationship, we used three different specifications of enrollment: enrollment; enrollment and enrollment squared; and dummy variables for size categories. While each of these specifications yields significant results for a portion of the practices, none yields significant results for all of the practices (Table 7). For example, district size is very significant, under all three specifications in predicting attendance at job fairs while it is unrelated, for the most part, to the use of BOCES services. Enrollment is also important in the use of the internet, college recruitment strategies, and of certain recruitment incentives, particularly additional compensation for National Board Certification. These positive relationships are consistent with the existence of economies of scale in spending on these practices. It is interesting to note that for a subset of practices, the second specification shows a non-linear relationship between enrollment and adoption. This subset includes use of the internet, college recruitment, attendance at job fairs, and use of certain recruitment incentives.

<Table 7 about here>

Our next step is to look at a more complete adoption model by adding those variables affecting adoption that are clearly outside district control. The first category is district stress, and includes measures of fiscal capacity (CWR), the percent of students eligible for free or reduced price lunch, and the number of budget defeats in the last five years. The second type is institutionalization, measured as the percentage of districts in the district's BOCES that use the practice.

The first panel of Table 8 shows the results of this model for advertising, college recruitment, and job fair attendance. Enrollment is negatively related to advertising in local newspapers but that is the only form of advertising it is associated with in this model. Interestingly, districts that have high poverty rates are more likely to advertise on radio and television, a result echoed in the bivariate analysis. This, however, is the only significant coefficient among district stress variables. The degree of institutionalization seems to have the most effect on advertising practices, with a highly significant impact on "innovative" advertising,

which includes advertising in non-local and out-of-state newspapers as well as on the radio and television.

<Table 8 about here>

With the exception of posting job notices on campus, all college recruitment practices are positively related to enrollment size. Visiting campuses, advertising in newsletters, and the use of "active" strategies (visiting campuses, contacting faculty, supervising student teachers) have non-linear relationships with enrollment, while the other practices have positive linear relationships. Here we see slightly more effect of district stress; fiscal capacity (CWR) negatively affects posting job notices and advertising in news letters. We might assume this is because districts with stronger tax bases are inherently more attractive to teachers and thus face less need to recruit. The only practice affected by institutionalization is the use of any of these strategies outside the state of New York. This is particularly interesting as recruiting outside the state would be considered more "innovative," suggesting that institutionalizing innovative practices would encourage more districts to use them. With job fair attendance we see a similar pattern. Enrollment is positively related to attendance at job fairs and non-linearly related to the number of job fairs attended. Institutionalization increases attendance and districts with higher fiscal capacity are less likely to attend job fairs.

Turning to the use of BOCES recruitment services, we see that only the degree of institutionalization is significant for adoption (Table 9). It is possible that this result merely reflects the fact that the availability of services differs from BOCES to BOCES. It is entirely logical that those districts that share a BOCES are apt to take advantage of what is available and thus use the same set of BOCES services. In the future we will examine other ways of measure institutionalization that avoid this potential endogeneity. Institutionalization remains highly significant for internet use, including "non-district" applications—posting job openings on general recruitment websites, posting job openings on recruitment websites targeted to teachers, and searching for candidates on recruitment websites. Enrollment is also significantly related to the use of the internet and is non-linear.

<Table 9 about here>

The pattern of the importance of enrollment and institutionalization holds up fairly well for the use of supply increasing practices and recruiting incentives (Table 10). Interestingly, we see that institutionalization again supports the use of "innovative" strategies when it comes to

increasing teacher supply (recruiting teachers certified through alternative routes, recruiting former teachers, and recruiting retired teachers) but not when it comes to the use of "innovative" recruiting incentives (signing bonuses, crediting job experience in non-teaching occupations, compensation for hard-to-staff-schools and –fields, and help with the purchase of a home). It is likely that the use of innovative incentives is significantly hindered by the strength of the unions in New York State school districts and that those effects swamp any others.

< Table 10 about here >

In the third and final stage of our analysis, we use the complete adoption model and add potentially endogenous variables. These include a measure of teacher recruiting difficulty in the district (put in the district stress category) and three management capacity variables--the presence of an HR director, decentralization of the recruiting process, and the number of positions involved in recruitment. Ideally, we would find appropriate instruments and estimate these models using an IV method.[12] Time limits have prevented us from taking this step for this paper. Accordingly, the results should be viewed as exploratory only given the potential simultaneity bias.

The results of this model are displayed in the second panels of Tables 8, 9 and 10. In general, enrollment continues to be significantly related to adoption of these practices. While other district stress variables are still limited in their importance, the measure of teacher recruitment difficulty is quite significant for several groups of practices. Management capacity variables are also important for several sets of practices.

Those districts that report difficulty in recruiting teachers and have higher rates of poverty are more likely to advertise on the radio and television (Table 8). This follows from the result of the bivariate analysis that showed that high need rural districts are more likely than any other type to use these media outlets. The presence of an HR director is negatively related to advertising in local newspapers, suggesting that HR directors are more likely to use "innovative" practices and focus efforts outside of the local area. The number of positions involved in recruitment is positively related with local and non-local newspaper advertising but negatively related with radio/TV advertising. This negative relationship may again be picking up the high need rural districts that cannot devote much in the way of staff resources to recruiting.

[12] Whether the recruitment difficulty is endogenous depends on whether district response to this question was influenced by the types of hiring practices used by the district. We will test its endogeneity in future rounds of this research.

Adoption of college recruitment practices does not appear strongly related to most of the management variables. Difficulty recruiting does have significant positive effects on advertising in newsletters, contacting faculty, and the use of college recruiting outside of New York. This last relationship suggests that, as the innovation literature indicates, "innovative" strategies may be a response to adversity. Both difficulty recruiting and management capacity affect job fair attendance. Districts that face more difficulty in recruiting are more likely to attend job fairs and as their difficulty increases so does the number of job fairs they attend. It is logical that the number of positions involved in recruiting increases job fair attendance as there are more staff people to attend. At the same time, it makes sense that a district that employs a more decentralized process would be less likely to attend job fairs as that may be a practice best promoted and organized by central administration.

The use of BOCES recruitment services is affected by management capacity (Table 9). Districts that have HR directors are more likely to use a greater number of BOCES services than those that don't and districts with a decentralized recruiting process are less likely to use any BOCES services, particularly the "active" services. This finding might be due to the fact that an HR director (or a "point person" in centralized processes) would have an easier time functioning as a liaison with the BOCES, building a relationship, keeping apprised of available services, and coordinating the acquisition of those services. The only management capacity variable related to internet use is the number of number of positions involved in recruiting. Internet use, including use of "non-district" internet applications, is very significantly affected by the difficulty the district has in recruiting teachers. This result suggests again that districts are innovating in response to adversity.

Not surprisingly, difficulty recruiting has a highly significant and positive effect on the use of strategies to increase the supply of teachers (Table 10). The greater difficulty a district faces, the greater the number of these strategies it uses, particularly "innovative" strategies. The most significant result is for recruiting retired teachers, a practice that only 28% of districts report using. Management capacity also has an effect here. Those districts with HR directors are less likely to provide assistance to paraprofessionals to become certified teachers, perhaps because HR directors—professionalized specialists—are more likely to want to recruit professionals. The more decentralized the process, the less likely districts are to recruit teachers certified through alternative routes, perhaps because that effort requires specialized knowledge of

alternative programs which may be more likely to reside with a central administrator. The number of positions involved in recruitment increases the number of strategies a district uses and its likelihood of using innovative strategies. This, too, seems logical as the more people are involved, the more ground they can cover.

Management capacity does not have much effect on the use of recruiting incentives, however. The one exception is that the more positions involved, the more likely the district to credit experience in non-teaching occupations. The explanation for this relationship is not readily apparent but, perhaps, involving more people increases the likelihood that the recruitment team will include people who recognize the potential value in such experience. As expected, difficulty in recruiting does have a positive effect on the use and number of recruiting incentives. Of particular note is the increase in the use of "innovative" incentives as recruiting difficulties increase.

Conclusions

The survey results have provided a rich picture of the hiring process in New York school districts. We have documented the use of a wide range of practices and how they vary with school district characteristics. We have also developed a model to explain the adoption of district recruitment practices. While some factors, such as enrollment, appear to be consistently related to hiring practices, hiring practices are complex and not easily explained by socio-economic variables. In this section, we will pull together some of the conclusions that we have drawn from reviewing the results. These should be viewed as preliminary conclusions, which will undoubtedly be modified as we analyze the data further.

Local newspapers remain the major form of advertising, especially in small districts. The degree of institutionalization of advertising practices has a significant impact on their use, especially when it comes to advertising beyond local newspapers.

The most common college recruitment strategies used by districts are supervision of student teachers, posting of job notices at the colleges, and contacting college faculty in local colleges. The employment of these strategies increases with district enrollment and, unlike most practices we examined, is influenced by some district stress effects.

The typical district attends one job fair, and 37% of districts attend no job fairs. Attendance at job fairs goes up significantly with enrollment, institutionalization, difficulty recruiting, and the number of positions involved in recruitment.

Approximately half the districts responding to the survey use recruitment services provided by BOCES, particularly for online applications, online vacancy notices, advertising, and recruitment fairs. The use of BOCES services is not affected by enrollment or district stress but is significantly and positively related to institutionalization. It is also significantly and negatively related to a decentralized recruitment process.

The internet should be an ideal medium for teacher recruitment because for relatively little cost, a district can have access to a national market of teachers. Approximately three-quarters of districts use the internet, primarily to post job notices on the school district website and other recruitment websites. A much smaller share uses the internet to search for job candidates. Enrollment and degree of institutionalization are positively and significantly related to internet use.

Almost 90% of districts use some strategy to increase the local supply of teachers. The main strategies are recruiting substitute teachers, alternatively certified teachers, and retired teachers and providing assistance for paraprofessionals to become teachers. The likelihood of using these strategies increases with enrollment, difficulty recruiting, and institutionalization.

Most districts use compensation for extracurricular activities and crediting teachers for teaching experience outside the district as teacher recruitment incentives. A much smaller set of districts provide additional compensation for National Board Certification (NBC), subsidized tuition at local colleges, and credit for work experience outside of teaching. The use of incentives is positively related to institutionalization and, for some incentives, enrollment. The use of innovative incentives is positively related to difficulty recruiting. Teacher contract negotiations are probably a major constraint on the wider use of recruitment incentives.

As expected, enrollment holds as a significant factor for many practices under consideration here. It appears that institutionalization and management capacity have greater impact on the adoption of recruitment practices than district stress variables (with the exception of teacher recruiting difficulty). This relationship bears further study. The next step in our research will be to link our findings on recruitment practices to teacher quality data. We hope to determine whether there are patterns in the relationships between districts' use of these practices and their ability to hire high quality teachers and be able to draw some conclusions about the effectiveness of various human resource practices for school districts.

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Table 1. Evaluation of Whether Sample Responding to Teacher Hiring Survey Is Representative of All Districts In New York[1]

	All Districts	Districts In Survey	Districts Not in Survey
Enrollment Variables:			
Enrollment (dcaadm)	2,676	2,681	2,545
Percent nonwhite enrollment	11.5	10.9	13.0
Percent Hispanic enrollment	4.5	4.1	5.3
Percent LEP students	1.4	***1.2***	***1.8***
Percent of free lunch students	29.4	29.0	30.3
Child poverty rate (2000)	11.6	11.5	12.1
Percent single mother families	6.3	6.2	6.5
Financial Variables:			
Per pupil total spending	$16,565	***$16,284***	***$17,269***
Per pupil operating spending	$14,389	***$14,256***	***$14,725***
Per pupil spending on teaching	$8,539	***$8,420***	***$8,839***
Per pupil state aid	$5,680	$5,694	$5,645
Per pupil local taxes	$7,940	$7,871	$8,115
Local property tax rate (per $1000 of MV)	17.1	15.8	20.3
Combined wealth ratio (CWR)	1.20	1.20	1.17
Per pupil income (AGI)	$142,584	$137,845	$154,467
Per pupil market property values	$657,545	$688,163	$580,604
Teacher Variables (all teachers):			
Salary	$46,465	$46,694	$45,890
Adjusted salary index[2]	1.00	1.00	1.00
Total experience	16.5	***16.6***	***16.2***
Percent with graduate degree	73.6	73.2	74.5
Percent probationary	25.4	***25.0***	***26.2***
Percent tenured	71.5	***71.8***	***70.5***
Percent female	73.6	73.5	73.8
District Classifications (percent of all districts):			
SED regions			
Large and small city districts	8.8	8.8	8.8
Upstate and downstate suburban districts	60.5	60.0	61.7
Upstate rural districts	30.2	30.5	29.5
Downstate districts	26.0	***23.8***	***31.6***
Upstate districts	74.0	***76.2***	***68.4***
Need/resource capacity categories			
High need urban districts[3]	6.0	5.5	7.3
High need rural districts	23.5	21.7	28.0
Average need districts	50.2	***54.9***	***38.3***
Low need districts	19.7	***17.2***	***25.9***

2000 Census of Population .

[1]Bold and italics indicates a statistically signficant difference between districts completing the survey and those not completing

[2]Teacher salaries adjusted for years of experience and education level.

[3]Includes the categories for large cities and other high need urban districts.

Table 2. Advertising for Teachers in Media Outlets by District Characteristics

(percent of responses with "most" or "all" advertisements)[1]

Enrollment[2]	Low	Medium	High	All Districts
Date of first advertisements (months)	***4.1***	***3.7***	***3.0***	3.6
Date of typical offer (months)	***6.1***	***5.8***	***5.7***	5.9
Local newspapers/periodicals (within 50 miles)	***86.6***	***81.0***	***71.1***	79.7
Other newspapers/periodicals in New York	***24.5***	***19.0***	***31.8***	24.8
Newspapers/periodicals in other states	1.4	1.8	0.7	1.3
Education trade publications/periodicals	2.1	3.0	5.5	3.5
Radio/television	2.2	0.6	0.7	1.1

SED Need/Resource Capacity Categories	High Need Urban	High Need Rural	Average Need	Low Need
Date of first advertisements (months)	***3.5***	***4.1***	***3.6***	***3.1***
Date of typical offer (months)	***6.4***	***6.1***	***5.9***	***5.4***
Local newspapers/periodicals (within 50 miles)	***70.4***	***86.8***	***81.7***	***66.3***
Other newspapers/periodicals in New York	***19.2***	***26.7***	***19.2***	***42.0***
Newspapers/periodicals in other states	0.0	3.2	1.1	0.0
Education trade publications/periodicals	***7.7***	***6.1***	***1.5***	***5.0***
Radio/television	0.0	3.1	0.8	0.0

[1]Bold and italics indicates that there is a statistically significant difference between the categories (10% level).

[2]"Low" is below 30th percentile, "medium" is 30th to 70th percentile, and "high" is above the 70th percentile.

Table 3. Location of Colleges Where Districts Using Recruitment Strategies By District Characteristics

(percent of responses using recruitment strategy)[1]

	Local Colleges[3]				Non-Local Colleges			
Enrollment[2]	Low	Medium	High	All Districts	Low	Medium	High	All Districts
Post job notices at the college	77.7	83.6	86.8	82.7	54.5	50.7	54.4	53.0
Visit campus to actively recruit job candidates	***42.6***	***63.0***	***82.5***	67.8	***23.4***	***17.8***	***42.7***	30.0
Advertise in placement newsletter distributed by college	54.7	59.7	69.4	61.7	42.2	36.1	47.2	41.6
Contact specific college faculty to identify potential job candidates	76.3	80.7	84.5	80.5	31.2	26.9	37.3	31.3
Supervise student teachers from the college	84.4	86.1	90.0	86.8	***18.0***	***21.2***	***37.1***	25.3
SED Need/Resource Capacity Categories	High Need Urban	High Need Rural	Average Need	Low Need	High Need Urban	High Need Rural	Average Need	Low Need
Post job notices at the college	73.9	76.7	86.6	79.2	34.8	59.3	54.0	45.8
Visit campus to actively recruit job candidates	***92.3***	***46.7***	***71.9***	***70.5***	30.8	26.7	32.8	25.0
Advertise in placement newsletter distributed by college	58.3	57.1	66.9	48.3	33.3	46.9	43.5	27.6
Contact specific college faculty to identify potential job candidates	78.9	81.7	79.9	82.0	31.6	31.0	32.3	28.0
Supervise student teachers from the college	80.0	86.2	86.5	91.2	44.0	21.3	25.4	23.5

[1]Bold and italics indicates that there is a statistically significant difference between the categories (10% level).

[2]"Low" is below 30th percentile, "medium" is 30th to 70th percentile, and "high" is above the 70th percentile.

[3]Local colleges are those within 50 miles of the district.

Table 4. Use of the Internet and BOCES Hiring Services By Difficulty of Recruiting Teachers[1]

	Difficulty Recruiting Teachers		
	Low	Medium	High
District Uses the Internet to Recruit Teachers	***63.6***	***78.0***	***83.3***
Posts job openings on school district website	***46.6***	***61.6***	***61.1***
Post job openings on online recruitment websites targeted to teachers	***30.5***	***49.6***	***43.7***
Posts job openings on general online recruitment websites	***3.4***	***12.8***	***10.3***
Searches for candidates on a recruitment website	***11.9***	***18.0***	***23.8***
Allows candidates to submit applications online	***23.7***	***40.8***	***42.1***
Uses BOCES	***43.1***	***54.4***	***56.0***
Services (percent of districts using BOCES):			
Online application system	***16.4***	***25.3***	***30.4***
Online placement of vacancy notices	***16.4***	***29.7***	***31.2***
Advertising	26.7	34.1	38.4
Recruitment fairs	***23.3***	***32.9***	***36.0***
Assistance with interviewing	0.0	3.2	1.6
Applicant screening	***2.6***	***4.4***	***8.8***
Fingerprinting	17.2	17.7	17.6

[1]Bold indicates statistically significant differences by recruiting difficulty at 10% level. Difficulty of recruiting teachers is based on the percent of

Table 5. Use of Teacher Recruitment Incentives by District Characteristics

(percent of responses)[1]

Enrollment[2]	Low	Medium	High	All Districts
District offers recruiting incentives	***66.0***	***75.6***	***76.3***	72.8
One-time compensation for new teachers (signing bonus)	1.3	2.8	2.6	2.3
Additional compensation for extra-curricular or administrative functions	45.1	48.9	55.9	49.9
Flexibility in crediting teaching experience in other districts or states	41.8	49.4	50.7	47.4
Flexibility in crediting job experience in non-teaching occupations	19.0	15.0	18.4	17.3
Additional compensation for National Board Certification	***8.5***	***13.3***	***25.7***	15.7
Subsidized tuition in local college	15.7	16.1	17.8	16.5
Additional compensation for teaching in hard-to-staff fields	9.2	6.1	7.2	7.4
Additional compensation for teaching in hard-to-staff schools	0.7	0.6	0.0	0.4
Help with purchase of a home	0.7	1.1	0.7	0.8
SED Need/Resource Capacity Categories	High Need	High Need	Average	Low Need
District offers recruiting incentives	89.3	75.7	71.3	67.9
One-time compensation for new teachers (signing bonus)	***10.7***	***4.7***	***1.5***	***0.0***
Additional compensation for extra-curricular or administrative functions	64.3	52.3	49.1	41.7
Flexibility in crediting teaching experience in other districts or states	39.3	45.8	48.0	47.6
Flexibility in crediting job experience in non-teaching occupations	10.7	15.0	17.8	19.0
Additional compensation for National Board Certification	***28.6***	***9.3***	***16.4***	***16.7***
Subsidized tuition in local college	***21.4***	***14.0***	***19.3***	***8.3***
Additional compensation for teaching in hard-to-staff fields	***17.9***	***11.2***	***5.1***	***6.0***
Additional compensation for teaching in hard-to-staff schools	0.0	0.0	0.7	0.0
Help with purchase of a home	3.6	1.9	0.4	0.0
Difficulty Recruiting Teachers	Low	Medium	High	
District offers recruiting incentives	***63.8***	***75.7***	***75.4***	
One-time compensation for new teachers (signing bonus)	1.7	2.5	2.4	
Additional compensation for extra-curricular or administrative functions	***41.4***	***50.6***	***56.3***	
Flexibility in crediting teaching experience in other districts or states	***35.3***	***52.3***	***49.2***	
Flexibility in crediting job experience in non-teaching occupations	***7.8***	***19.8***	***21.4***	
Additional compensation for National Board Certification	10.3	18.1	15.9	
Subsidized tuition in local college	11.2	17.3	19.8	
Additional compensation for teaching in hard-to-staff fields	6.0	7.4	8.7	
Additional compensation for teaching in hard-to-staff schools	0.0	0.4	0.8	
Help with purchase of a home	0.9	0.8	0.8	

[1]Bold and italics indicates that there is a statistically significant difference between the categories (10% level).

[2]"Low" is below 30th percentile, "medium" is 30th to 70th percentile, and "high" is above the 70th percentile.

Table 6. Use of Strategies to Increase Supply of Teachers by District Characteristics
(percent of responses)[1]

Enrollment[2]	Low	Medium	High	All Districts
Use Strategy to Increase Supply	83.0	87.8	89.5	86.8
Recruit teachers certified through alternative routes	40.5	40.0	50.0	43.3
Recruit substitute teachers	***73.2***	***81.1***	***83.6***	79.4
Recruit retired teachers	27.5	27.2	30.3	28.2
Recruit former teachers who have left teaching	9.2	5.0	8.6	7.4
Provide assistance to paraprofessionals to become certified teachers	***24.2***	***24.4***	***35.5***	27.8

SED Need/Resource Capacity Categories	High Need Urban	High Need Rural	Average Need	Low Need
Use Strategy to Increase Supply	85.7	86.0	89.5	79.8
Recruit teachers certified through alternative routes	46.4	41.1	46.5	36.9
Recruit substitute teachers	***82.1***	***71.0***	***83.6***	***73.8***
Recruit retired teachers	28.6	27.1	28.7	26.2
Recruit former teachers who have left teaching	7.1	8.4	7.6	6.0
Provide assistance to paraprofessionals to become certified teachers	39.3	26.2	25.8	28.6

Difficulty Recruiting Teachers	Low	Medium	High
Use Strategy to Increase Supply	***77.6***	***88.5***	***92.1***
Recruit teachers certified through alternative routes	***23.3***	***51.4***	***46.0***
Recruit substitute teachers	***71.6***	***81.5***	***82.5***
Recruit retired teachers	***19.0***	***26.7***	***39.7***
Recruit former teachers who have left teaching	7.8	7.0	7.9
Provide assistance to paraprofessionals to become certified teachers	***20.7***	***28.4***	***33.3***

[1]Bold and italics indicates that there is a statistically significant difference between the categories (10% level).

[2]"Low" is below 30th percentile, "medium" is 30th to 70th percentile, and "high" is above the 70th percentile.

Table 7. Impact of Enrollment on Recruitment Practices

Practice	Enrollment	Enrollment	Enrollment^2	Enrollment Categories: Small	Medium	Large	Very Large
Advertising							
Local newspapers	-0.0001119 ***	-0.0001435 **	1.73E-09	0.2529965	-0.2543749	-0.7101255	-0.9826134 **
Other NY newspapers	0.0000294	0.0001512 *	-7.75E-09	0.0870114	-0.2666287	0.3527145	0.5531011
Radio/TV	-0.0000919	-0.0001613	3.94E-09	-1.419817	-2.032922 *		-0.71562
"Innovative" advertising[1]	0.0000312	0.0001521 *	-7.77E-09	0.0921153	-0.2174129	0.3566749	0.567984
Use of Internet							
Any use	0.0001692 ***	0.0002429 ****	-5.48E-09 **	0.9093703 ***	1.220902 ****	1.585627 ****	2.24071 ****
Accepting online applications	0.0000383	0.0004461 ****	-3.60E-08 ***	0.6546052	1.064984 ***	1.764646 ****	1.011907 **
"Non-district" internet applications[2]	0.000041	0.000058	-8.63E-10	0.6161861 *	0.4801184	0.9178399 ***	0.9461437 **
Use of BOCES							
Any services	-0.0000206	0.0001203	-1.13E-08	0.194156	0.2666287	0.5596158	-0.0425596
Number of services	-0.0000158	0.0001286	-1.20E-08	0.2274969	0.3259859	0.6725436 **	-0.0424303
"Passive" services[3]	-0.0000196	0.0000704	-7.12E-09	0.1304402	0.2995165	0.4756461	-0.086146
"Active" services[4]	-7.48E-06	0.000113	-9.32E-09	0.3413622	0.4764621	0.8021774 **	0.086146
Use of College Recruitment							
Post job notices at the college	0.0000296	0.0000406	-5.89E-10	0.6481 *	0.8486259 ***	0.4899644	1.005522 **
Visit campus to actively recruit job candidates	0.000286 ****	0.0006029 ****	-2.38E-08 ****	0.2424678	0.7492366 *	1.94591 ****	2.908721 ****
Advertise in placement newsletter distributed by college	0.000031	0.0002738 ***	-1.94E-08 **	0.2841043	0.1152353	0.4353181	0.8668107 **
Contact specific college faculty to identify potential job candidates	0.0000978 **	0.0001223 **	-1.81E-09	-0.0153142	0.2282187	0.3780661	0.8443782 **
"Active" strategies[5]	0.0002012 **	0.0002953 ***	-6.92E-09 **	0.2583075	1.193922 ***	1.382717 ***	1.589235 **
Any strategies at colleges outside NY	0.0001721 ****	0.0002091 ****	-2.55E-09	0.9663572	0.9214058	1.798585 ***	2.157219 ****
"Active" strategies at colleges outside NY	0.0001983 ****	0.0002434 ****	-3.97E-09	0.3302417	0.3803592	1.098612 ***	1.734601 ****
Job Fairs							
Attend any job fairs	0.0004477 ****	0.0005194 ****	-1.03E-08 ***	0.5718712	1.027492 ***	1.876994 ***	3.036975 ****
Number of job fairs attended	0.0003166 ****	0.0005004 ****	-1.08E-08 ****	0.4853903	1.075634 ****	2.188225 ****	3.247251 ****
Use of Strategies to Increase Supply							
Recruit teachers certified through alternative routes	0.0000696 **	0.0000631	4.44E-10	0.5034455	0.3166696	0.6821294 *	0.7990958 **
Recruit substitute teachers	0.0001289 **	0.0001268	2.27E-10	0.1565239	0.5543784	0.4834266	1.337842 **
Recruit retired teachers	0.0000308	5.28E-06	1.17E-09	0.189242	0.1152353	0.2513144	0.2876821
Provide assistance to paraprofessionals to become certified teachers	0.0001271 ****	8.50E-06	1.11E-08	-0.3755377	-0.2255975	0.0074837	0.8259067 **
Any strategy to increase supply	0.0001473 **	0.000063	1.08E-08	-0.1762792	0.2668045	0.1105419	1.514128 *
Number of strategies used to increase supply	0.0001054 ****	0.00008 *	1.36E-09	0.0821014	0.1414534	0.3844467	0.8823666 **
"Innovative" strategies to increase supply[6]	0.0000447	0.0000453	-3.77E-11	0.2186892	0.2231436	0.4895482	0.3894648
Recruiting Incentives							
Additional compensation for extra-curricular or administrative functions	0.0000308	0.0000217	4.91E-10	0.4105802	0.4255519	0.7111657 **	0.7018052 *
Flexibility in crediting teaching experience in other districts or states	0.0000719 **	0.0000592	9.63E-10	-0.0297129	0.2879318	0.2301122	0.5419565
Flexibility in crediting job experience in non-teaching occupations	0.0000504	-0.0000732	7.56E-09	0.3672439	-0.029853	0.04652	0.5007753

Additional compensation for National Board Certification	0.0001887 ****	0.0002329 ****	-3.04E-09	0.1603427	0.6131045	1.098612 *	1.932838 ****
Subsidized tuition in local college	0.0000597 *	-0.0000619	7.71E-09	1.08619 *	0.8349226	0.8992794	1.049822 *
Any incentives	0.000076 *	0.0000977	-1.51E-09	0.2529965	0.4307829	0.5759649	0.9650809 *
Number of incentives	0.0001175 ****	0.0000267	5.60E-09 *	0.4751903	0.4695004 *	0.636883 **	1.04971 ***
"Innovative" incentives[7]	0.0000543 *	-0.0000475	7.03E-09	0.6546052	0.2787773	0.1776812	0.8418408 *

[1]Includes other NY newspapers, newspapers in other states, and radio/TV.

[2]Includes posting job openings on general recruitment websites, posting job openings on recruitment websites targeted to teachers, and searching for candidates on recruitment websites.

[3]Includes online application system, online placement of vacancy notices, and fingerprinting.

[4]Includes advertising, recruitment fairs, assistance with interviewing, and applicant screening.

[5]Includes visit campus, contact faculty, and supervise student teachers.

[6]Includes recruiting teachers certified through alternative routes, recruiting former teachers, and recruiting retired teachers.

[7]Includes sigining bonuses, crediting job experience in non-teaching occupations, compensation for hard-to-staff schools, compensation for hard-to-staff fields, and help with the purchase of a home.

*Significant at the .1 level

**Significant at the .05 level

***Significant at the .01 level

****Significant at the .001 level

Table 8. Results of Modeling Adoption of Advertising and Use of College Recruitment Strategies

(1st panel: exogenous variables; 2nd panel: exogenous and endogenous variables)

	Advertising				Use of College Recruitment							Job Fairs	
	Local newspapers	Other NY newspapers	Radio/TV	"Innovative" advertising[1]	Post job notices	Visit campus	Advertise in newsletter	Contact college faculty	"Active" strategies[2]	Any strategies outside NY	"Active" strategies outside NY	Attend any job fairs	Number of job fairs attended
District Size													
Enrollment	-0.0001 ***	3.46E-05	-2.33E-05	3.54E-05	2.14E-05	0.000563 ****	0.000295 ***	0.000101 ***	0.000276 ***	0.000161 ****	0.000199 ****	0.000385 ****	0.000452 ****
Enrollment squared						-2.18E-08 ****	-1.97E-08 **		-6.50E-09 **				-9.91E-09 ****
District Stress													
Combined wealth ratio	-0.0766	0.060755	-1.03444	0.04708	-0.26112 ***	-0.14748	-0.37131 **	-0.02392	-0.0777	-0.04087	-0.09555	-0.15733 *	-0.14754 *
Reduced price lunch	0.510717	-0.94138	0.976336 *	-0.16564	0.032898	-0.01702	-1.54624	-1.01695	0.209524	0.208374	-0.82733	0.43507	0.191003
Budget defeats	0.064614	0.039607	-0.26376	0.068984	0.315232 **	-0.05063	-0.0653	0.024231	0.018259	0.168486	0.087741	-0.06287	-0.06216
Institutionalization													
Proportion of BOCES districts using the practice	1.864572 *	3.190791 ****	8.950478	3.104046 ****	0.83371	0.986229	0.363439	-0.85561	0.833333	2.710596 ***	1.025566	2.887706 ****	0.820397 ****
District Size													
Enrollment	-8.6E-05 **	-1.5E-05	8.62E-05	-1.5E-05	4.19E-05	0.000451 ****	0.000344 **	0.000143 ***	0.000318 **	0.000162 ***	0.000195 ****	0.000256 ***	0.000351 ****
Enrollment squared						-1.70E-08 **	-2.26E-08 **		-7.35E-09 **				-7.56E-09 ****
District Stress													
Combined wealth ratio	-0.05555	0.088736	-1.16961	0.063057	-0.25635 ***	-0.16635	-0.32835 **	-0.01821	-0.08732	-0.03983	-0.11419	-0.17006 *	-0.15744 *
Reduced price lunch	0.384759	-0.84112	1.665324 **	-0.07327	0.032816	-0.01582	-1.59039	-1.08491	0.225188	0.246631	-0.82021	0.563284	0.277539
Budget defeats	0.11394	-0.03455	0.182574	0.008086	0.313863 **	-0.04907	-0.05063	0.072325	0.155331	0.187364	0.116666	-0.04893	-0.05557
Difficulty recruiting	-0.79955	0.559681	7.839454 **	0.626157	0.196742	0.467101	1.491346 **	1.076432 *	1.420597	1.386412 *	0.97993	1.127622 *	1.205106 **
Institutionalization													
Proportion of BOCES districts using the practice	2.093531 **	3.047386 ****	6.642695	2.943929 ****	0.788651	0.774746	0.373512	-0.97062	1.043731	2.604275 ***	0.998221	2.633917 ****	0.63112 ***
Management Capacity													
HR director	-0.65428 **	0.096437	0.642041	0.277246	-0.1188	0.3285	-0.20452	-0.31094	-0.09217	-0.03861	0.272095	0.25238	0.385217
Decentralized process	-0.35757	-0.46832 *	0.279198	-0.39634	-0.00579	-0.25151	-0.02735	0.259537	0.270231	-0.00292	0.093767	-0.50811 **	-0.42799 **
Number of positions involved in recruiting	0.150285 *	0.195697 **	-0.74758 **	0.125987	-0.03105	0.060207	0.014725	0.018572	-0.04111	0.004057	-0.09843	0.163778 **	0.111649 *

[1]Includes other NY newspapers, newspapers in other states, and radio/TV.

[2]Includes visit campus, contact faculty, and supervise student teachers.

*Significant at the .1 level

**Significant at the .05 level

***Significant at the .01 level

****Significant at the .001 level

Table 9. Results of Modeling Adoption of Use of BOCES Services and the Internet

(1st panel: exogenous variables; 2nd panel: exogenous and endogenous variables)

	BOCES Services				Internet		
	Any BOCES services	Number of BOCES services	"Passive" BOCES services[1]	"Active" BOCES services[2]	Any use	Accepting online applications	"Non-district" internet applications[3]
District Size							
Enrollment	5.59E-06	1.47E-05	8.83E-06	2.78E-05	0.000131 **	0.00039 ****	5.92E-05 *
Enrollment squared						-3.04E-08 ***	
District Stress							
Combined wealth ratio	-0.1162	-0.08548	-0.0555	-0.09321	-0.09639 *	-0.01711	-0.0589
Reduced price lunch	0.756082	0.300896	-0.03822	0.45416	-0.5408	-0.44787	-0.36571
Budget defeats	-0.0548	-0.12988	-0.22582	-0.05337	4.12E-05	0.028659	0.044971
Institutionalization							
Proportion of BOCES districts using the practice	4.329983 ****	1.24288 ****	4.676609 ****	4.452426 ****	2.701168 ****	1.718017 ***	2.822517 ****
District Size							
Enrollment	-4.9E-05	-2.8E-05	-4.65E-06	-2E-05	5.28E-05	0.000324 **	4.97E-05
Enrollment squared						-2.62E-08 **	
District Stress							
Combined wealth ratio	-0.14067	-0.11367	-0.06482	-0.11947	-0.09952	-0.01604	-0.06782
Reduced price lunch	0.881451	0.324709	-0.03213	0.462396	-0.42008	-0.4499	-0.33447
Budget defeats	-0.07425	-0.14948	-0.24889	-0.09036	0.018437	0.048369	0.024965
Difficulty recruiting	0.52863	0.694624	0.474959	0.267256	2.318338 ****	0.864026	1.113899 *
Institutionalization							
Proportion of BOCES districts using the practice	4.228408 ****	1.223367 ****	4.619085 ****	4.412353 ****	2.318281 ***	1.636997 ***	2.798025 ****
Management Capacity							
HR director	0.325583	0.392629 *	0.109654	0.295344	0.195681	0.080342	0.071611
Decentralized process	-0.63523 ***	-0.41022 **	-0.288	-0.83249 ****	-0.0334	0.032314	-0.24573
Number of positions involved in recruiting	0.027842	-0.01943	-0.00871	0.019229	0.181379 **	0.058291	-0.00692

[1]Includes online application system, online placement of vacancy notices, and fingerprinting.

[2]Includes advertising, recruitment fairs, assistance with interviewing, and applicant screening.

[3]Includes posting job openings on general recruitment websites, posting job openings on recruitment websites targeted to teachers, and searching for candidates on recruitment websites.

*Significant at the .1 level

**Significant at the .05 level

***Significant at the .01 level

****Significant at the .001 level

Table 10. Results of Modeling Adoption of Strategies to Increase Supply of Teachers and Use of Recruitment Incentives

(1st panel: exogenous variables; 2nd panel: exogenous and endogenous variables)

	Increasing Supply							Recruitment Incentives							
	Recruit alternative routes	Recruit substitutes	Recruit retired teachers	Help paras become certified	Any strategy	Number of strategies	"Innovative" strategies[1]	Extra-curricular, administrative functions	Crediting experience in other districts	Crediting non-teaching experience	National Board Certification	Subsidized tuition	Any incentives	Number of incentives	"Innovative" incentives[2]
District Size															
Enrollment	8.03E-05 **	0.000142 **	2.83E-05	0.000129 ****	0.000149 **	0.000105 ****	0.000049	3.52E-05	5.88E-05 *	4.91E-05	0.000167 ****	6.05E-05 *	6.95E-05 *	9.94E-05 ****	5.18E-05
Enrollment squared															
District Stress															
Combined wealth ratio	-0.13512	0.014692	-0.04371	0.098246 *	0.000404	0.013053	-0.01794	-0.05146	-0.00709	0.067554	-0.01828	-0.25444	-0.08576	-0.050449	0.357731
Reduced price lunch	-0.21596	1.657243	-0.18042	0.354233	3.582045	0.161016	-0.30073	-1.43975	0.941755	-0.69401	-0.1688	-0.76077	0.180075	-0.170014	0.072888
Budget defeats	-0.02985	0.0068	-0.01685	-0.11043	-0.10444	-0.01122	0.071172	0.165825	0.310641 **	0.13476	0.095398	-0.1824	0.310023 **	0.162057	0.154624
Institutionalization															
Proportion of BOCES districts using the practice	2.814665 ****	-2.04745 *	-1.58823 *	0.952293	-1.8497	0.119028	1.578185 **	1.18915 **	1.311586 **	1.06004	3.650802 ****	3.589334 ****	1.067555	0.580697 ****	0.357731
District Size															
Enrollment	3.09E-05	0.000159 **	2.38E-05	0.000172 ****	0.000163 *	0.000103 ****	6.41E-06	2.62E-05	6.69E-05	6.32E-05	0.00011 **	7.42E-05 *	4.75E-05	0.000104 ***	5.71E-05
Enrollment squared															
District Stress															
Combined wealth ratio	-0.14798	0.027067	-0.0492	0.121994 **	0.027454	0.03453	-0.01808	-0.05719	0.002511	0.087996 *	-0.02342	-0.21897	-0.0818	-0.047197	0.04813
Reduced price lunch	-0.14197	1.792155	-0.09977	0.385207	3.880814	0.29489	-0.16376	-1.42021	0.946248	-0.679	-0.06975	-0.75582	0.229679	-0.084462	0.154471
Budget defeats	-0.06457	-0.00077	0.019808	-0.08783	-0.09526	-0.01036	0.091504	0.156373	0.300471	0.170733	0.096168	-0.17218	0.311411 **	0.161791	0.189789
Difficulty recruiting	1.382721 **	1.384629 *	2.538125 ****	1.281841 **	2.987026 ***	2.400059 ****	2.929215 ****	1.163983 **	0.628322	1.361204 *	0.492164	0.969368	0.910357	1.235079 **	1.308084 **
Institutionalization															
Proportion of BOCES districts using the practice	2.670701 ****	-2.16884 *	-1.81727 *	1.064487	-2.73013	-0.06041	1.201372 *	1.156241 *	1.165306 *	0.565503	3.501464 ****	3.702899 ****	0.955263	0.511466 ***	-0.032555
Management Capacity															
HR director	0.158224	-0.30634	-0.02288	-0.69149 **	-0.45635	-0.24544	0.161086	0.044737	-0.20963	-0.49707	0.34384	-0.09184	0.048623	-0.142592	-0.176647
Decentralized process	-0.42635 **	-0.19203	0.098033	-0.0862	-0.44317	-0.24211	-0.2246	-0.17537	0.089613	0.248695	0.073954	0.059984	0.152494	0.078859	0.240607
Number of positions involved in recruiting	0.125588 *	0.081761	0.048116	0.141836 *	0.136047	0.119928 **	0.118938 *	0.0076	0.074162	0.177755 **	0.123761	-0.05367	0.068075	0.049251	0.081617

[1]Includes recruiting teachers certified through alternative routes, recruiting former teachers, and recruiting retired teachers.

[2]Includes sigining bonuses, crediting job experience in non-teaching occupations, compensation for hard-to-staff schools, compensation for hard-to-staff fields, and help with the purchase of a home.

*Significant at the .1 level

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