Title:
Financial Incentives to Promote Teacher Recruitment and Retention: An Analysis of the Florida Critical Teacher Shortage Program*

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*This study is supported by an Efficacy and Replication grant (R305A110697) from the Institute of Education Sciences in the U.S. Department of Education. We are grateful to the Florida Department of Education for providing the data for this analysis. We alone are responsible for any errors in analysis or interpretation. The results reported herein do not necessarily reflect the views of the Florida Department of Education or our funder.
Background

Staffing problems are pervasive in certain subject areas, such as secondary math and science and special education, where the combination of training requirements and relatively high alternative wages makes it difficult to attract and retain high-quality teachers. Ingersoll and Perda (2009) find that roughly 3 to 4 times as many secondary schools report significant difficulty in filling positions in mathematics, special education and science relative to English or social studies. The problems with staffing such “high need” areas are exacerbated in urban schools and schools serving high proportions of low-income students, since teachers tend to migrate toward schools with high achieving students from affluent backgrounds and avoid schools serving primarily minority students, low-achieving students, and students with disciplinary problems (Hanushek, Kain and Rivkin (2004), Boyd, et al. (2005), Scafidi, Sjoquist and Stonebricker (2007), Feng (2009)).

In an attempt to promote recruitment and retention of teachers in high-need areas, at least 40 states offer some kind of loan forgiveness or scholarship program for teachers (American Federation of Teachers (2009)). However, there is scant research on their efficacy. There is limited evidence of the success of differential-salary initiatives in California and North Carolina (Steele et al. (2009), Clotfelter, Glennie, Ladd, and Vigdor (2008)). A single descriptive study of recruitment bonuses exists (Fowler (2003)) and there has been no systematic evaluation of tuition reimbursement/loan forgiveness programs. In order to broaden the understanding of targeted incentives in the teacher labor market we analyze one of the earliest and longest-running incentive programs, the Florida Critical Teacher Shortage Program (FCTSP).

The FCTSP was established in 1984 by the Florida legislature to increase the supply of teachers in particular certification areas. The FCTSP had two components. The tuition reimbursement program compensated teachers for tuition expenditures on undergraduate and graduate education courses taken to satisfy certification requirements in a designated critical teacher shortage area. Eligible teachers could receive payments of up to $78 per credit hour, for a maximum 9 hours per award year or $702 per year. The maximum total amount eligible applicants could receive was $2,808 for up to 36 credit hours. Awards were prorated based on the number of eligible applicants and the annual appropriation provided by the Legislature. The loan forgiveness program enhanced the compensation of eligible Florida teachers by repaying student loans if they continued teaching in a designated critical shortage area. Relative to the tuition reimbursement program, the potential compensation was much more generous. For undergraduate loans the maximum allowable award was $2,500 dollars per year for up to four years; for graduate loans the maximum was $5,000 per year for up to two years. As with the tuition reimbursement program, actual compensation varied annually with the number of applicants and the legislative appropriation. Funding for the programs was relatively stable until 2002, with loan forgiveness payouts averaging $2,000-3,000 per teacher and tuition reimbursement hovering just under $500 per teacher. The 2002 legislature slashed funding for the programs, resulting in a nearly 48% reduction in funding and a drastic decrease in payments per teacher. Funding was eliminated by the 2010 legislature. Annual numbers of participants and average payments for both the loan forgiveness and tuition reimbursement programs are provided in Tables 1 and 2.

The FCTSP legislation required the Florida State Board of Education to identify critical teacher shortage areas each year. The Florida Commissioner of Education provided a list of recommended areas to the board, based on: (i) current vacancies in the discipline, (ii) positions filled by teachers lacking proper certification in the relevant field, (iii) the projected supply of
future graduates in the relevant area from state approved teacher preparation programs. Thus the designated shortage areas changed over time. A matrix of covered subjects by year is provided in Table 3.

In addition to the loan forgiveness and tuition reimbursement programs, bonuses for recruitment and retention of teachers in critical-need areas were also used in Florida for a brief period. In 2000 the Florida legislature allocated $60 million for a Teacher Recruitment and Retention Fund (TRRF). The fund provided for a bonus of up to $1200 to both new and experienced middle and high school teachers in critical shortage areas. In 2001 the legislature increased the Teacher Recruitment and Retention Fund to $152 million, providing an $850 retention bonus to all full-time instructional personnel (regardless of subject area). After allotting the retention bonus, districts could also offer $850 recruitment bonuses with any remaining funds. The TRRF was eliminated by the 2002 Florida legislature. However, a few districts continued to provide recruitment/retention bonuses in subsequent years.

The inter-temporal changes in subject area coverage and loan forgiveness/tuition reimbursement funding provide an opportunity for uncovering the causal impacts of these programs. The large and abrupt changes in funding for loan forgiveness and bonuses can be viewed as plausibly exogenous events that can be used to identify the effects of varying compensation on the recruitment and retention of teachers in high-needs areas. While the subject area designations were influenced by anticipated supply and demand conditions, the discrete changes in subject area coverage from one year to the next can also be used to identify the impacts of the programs.

**Purpose and Research Questions**

This project will evaluate the impacts of the FCTSP and TRRF on the supply of new teachers and the retention of teachers in high-need areas such as special education, math and science. More specifically, our research will address the following specific research questions. Unless otherwise specified, questions pertain to all three programs (loan forgiveness, tuition reimbursement and recruitment/retention bonuses).

**Program Participation**

a. For each subject area, how many teachers participated in the program? What is the length of program participation?
b. For each subject area, are the observable characteristics of teachers who enter targeted areas when assistance is available different in their demographic characteristics, their qualifications, the kind of schools they work in, and their effectiveness (value-added) than the characteristics of those who enter when financial incentives do not exist?

**Impacts on Recruitment, Retention and Teacher Quality**

c. How does the existence and size of recruitment bonuses affect the number of certified teachers entering a subject area?
d. How does the program affect retention rates for participating teachers and how does the impact vary with the level of assistance provided? Are these teachers more likely to stay in their initial placement schools? Are they more likely to stay in teaching?
e. Does the program lead to increased retention of high quality teachers (as measured by value-added)?
f. Are there different effects of the loan forgiveness and tuition re-imbursement programs across subject areas? For example, are reading teachers’ mobility decisions more responsive than math and science teachers?

g. For the loan forgiveness program, was the high intensity period in the 1990s, characterized by a low participation rate and a high average payout per teacher, more effective in increasing the supply of teachers than the low intensity period since 2002 (low average payout and high participation)?

Setting

This study uses individual-level statewide longitudinal data from Florida public schools for 1995/96 through 2012/13.

Population

The analysis will include all Florida public school teachers and their students from 1995/96 through 2012/13.

Intervention

The research team will investigate the causal effects of the programs and also address questions related to the general characteristics of the program and participating teachers. Components of the programs were in place from 1984 to 2010 and provided a variety of incentives to become fully certified to teach in hard-to-staff disciplines like math, science and special education. The FCTSP provided loan forgiveness to teachers who teach in designated shortage disciplines (e.g., middle and high school mathematics, special education, and English for speakers of other languages (ESOL). The program also compensated teachers for the tuition cost of courses to become certified in a designated shortage area. In addition, for one year the TRRF provided recruitment and retention bonuses to Florida teachers in designated critical-need subjects and then to all teachers in a second year. After the statewide program ended in 2002, a handful of school districts have continued to offer bonuses to teachers in critical-need subject areas. The areas of staff specialization that were eligible for the financial incentives changed periodically throughout the course of this study.

Research Design and Methods

A statistical analysis of secondary data will be carried out. The data will be drawn from the Florida Education Data Warehouse augmented with data from the Office of Student Financial Assistance. These data files contain teacher-level records on FCTSP participants, award amounts, and information from the annual Critical Teacher Shortage Areas List published by the Florida Department of Education. The analysis will first measure teacher quality using various value-added methodologies. These measures will be used to investigate the effects of the FCTSP tuition assistance/loan forgiveness program and the Teacher Recruitment and Retention Fund on teacher quality. The project will investigate how teacher quality changes in different subject areas as disciplines change from untargeted to targeted status and back. Specifically, it will determine if highly effective teachers are recruited and retained as a result of the incentives embedded in the FCTSP and TRRF programs. In addition, the project will use a difference in difference estimator to evaluate the impact of these programs on teacher mobility and retention.
**Control Condition**

The teaching fields identified to receive incentives varied over time and the availability of recruitment and retention bonuses varied over time and across school districts. These variations will be used to compare differences between bonus recipients and non-recipients.

**Key Measures**

Key measures include employment in Florida public schools, subject area of certification, courses taught and impact on student test scores (“value-added”). Student achievement is measured by Florida's state reading and math tests in each of grades 3 through 10, called the "Sunshine State Standards" Florida Comprehensive Achievement Test (FCATSSS). In addition to test scores, the data includes an extensive set of student characteristics. For teachers, data collected identifies the base salary for each teacher, and also the amount of every type of supplemental compensation received, including the TRRF bonuses.

**Data Analytic Strategy**

Simple pre-post tallies will show whether the incentives, individually and collectively, resulted in a larger number of applicants and full-time-equivalent teachers for the targeted hard-to-staff areas. To investigate whether the programs impacted student achievement in the targeted areas, the researchers will employ a variety of quasi-experimental methods in a three-part strategy. First, researchers will estimate models of student achievement that include teacher fixed effects in order to derive "value-added" estimates of teacher quality. In the second stage of the analysis, the teacher value-added scores will be inserted into multinomial logit hazard models to investigate whether the FCTSP incentives and related bonuses encourage entry of high quality teachers into covered disciplines. The final part of the analysis will use instrumental variable and difference-in-difference (DID) techniques to determine the causal impacts of FCTSP incentives on teacher recruitment and retention in designated "critical need" subject areas.

**Preliminary Findings**

Our initial descriptive analysis indicates that FCTSP teachers tend to be of lower quality (as measured by value-added) than non-participants. They also tend to be less experienced and teach more challenging (lower achieving, less well-behaved) students. Analysis of mobility patterns revealed that participants are more likely to switch schools than non-participants. However, participants are also less likely to exit public school teaching.

**Conclusions**

While our preliminary analysis revealed some interesting patterns, much work remains to be done. Newly received data will allow us to greatly expand our sample so that it will cover the period from 1995/96 through two years after the termination of the FCTSP, 2012/13. With this expanded sample we will identify causal average program treatment effects, using an instrumental variables technique. Exogenous changes in program coverage and funding will allow us to also estimate difference-in-differences models to evaluate the effects of FCTSP on teacher retention and to determine the effects of changes in the magnitude of incentives on the supply of teachers in critical shortage areas. Future work will also include an analysis of the effects on recruitment and retention bonuses, which were only in effect for two years, 2000/01 and 2001/02.
Appendices

Not included in page count.

Appendix A. References


U.S. Department of Education.(n.d.).Office of Special Education Programs, Data Analysis System. Table AC2: Number of special education teachers serving students ages 6–21, by state. Available at http://www.ideadata.org/tables26th/ar_ac2.htm

Appendix B. Tables and Figures

Table 1: Number of Teachers Receiving Tuition Reimbursement and Loan Forgiveness Payments by Year, 1986/87-2009/10

Source: Florida Department of Education, Critical Teacher Shortage Reports
Table 2: Average Payment per Recipient in Tuition Reimbursement and Loan Forgiveness Programs by Year, 1986/87-2009/10

Source: Florida Department of Education, Critical Teacher Shortage Reports
### Table 3: Designated Critical Teacher Shortage Areas, 1984/85 – 2009/10

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Source: Florida Department of Education, Critical Teacher Shortage Reports - Various Years. In School Year 1992-1993, Middle and High Level Science was specifically labeled Middle and High Level Physical Sciences. In all years where Industrial Arts appears, except 1984-1985, it appears as Technology Education/Industrial Arts. Thus, they are listed as a combined area.