

# The Impact of Incentives to Recruit and Retain Teachers in “Hard-to-Staff” Subjects: An Analysis of the Florida Critical Teacher Shortage Program

**Li Feng**

**Dept. of Finance and Economics  
McCoy College Of Business  
Administration  
Texas State University**

**Tim Sass**

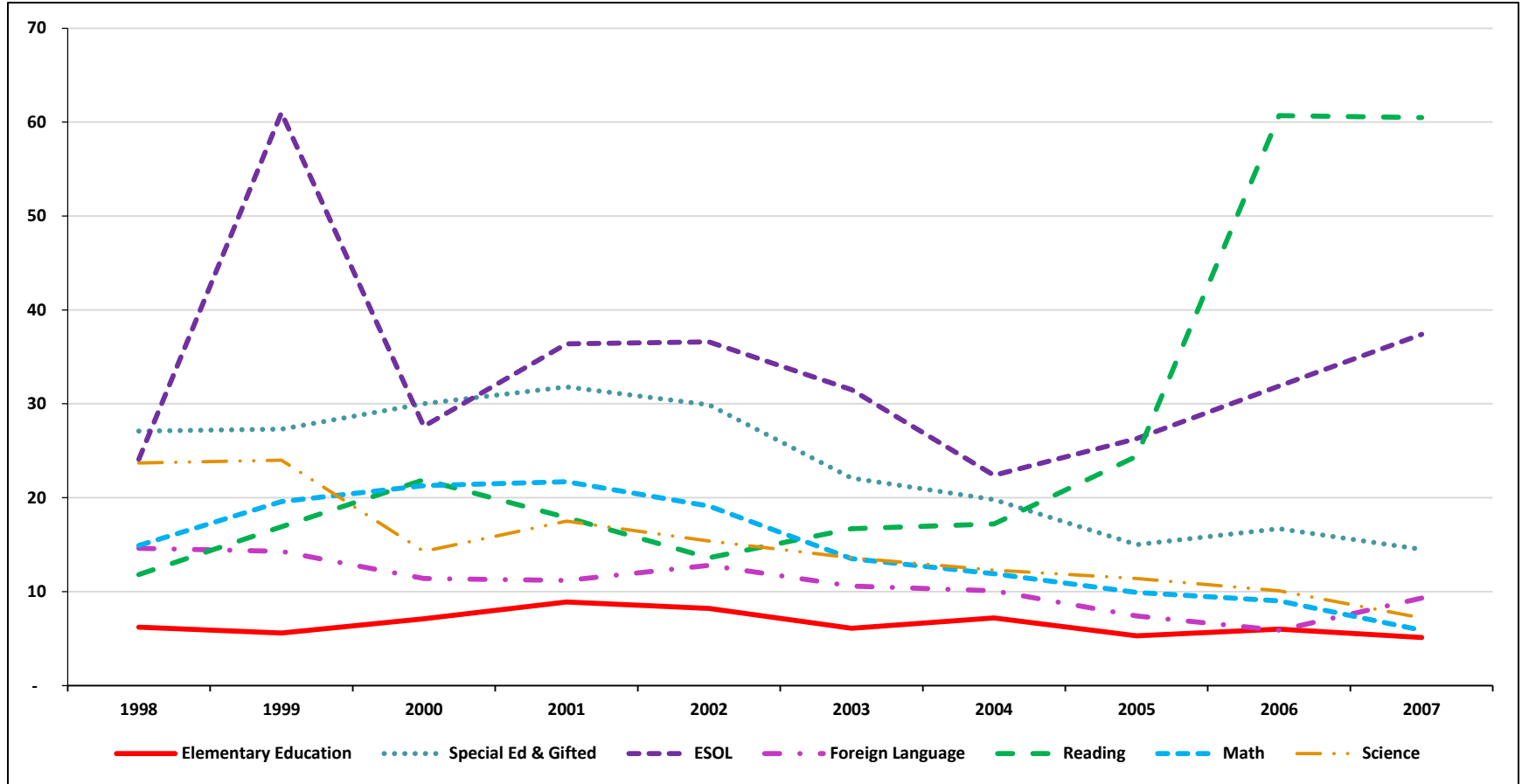
**Dept. of Economics  
Andrew Young School of Policy  
Studies  
Georgia State University**

2015 CALDER Research Conference  
Washington, DC

# Staffing Problems

- Due to Fixed Salary Schedules, Chronic Shortages of Teachers in Fields with High Alternative Wages and/or High Training Requirements
  - Math
  - Science
  - Special Education
- Problem is Exacerbated in “Less Desirable” Schools
  - Teachers tend to flee schools serving high proportions of low-income, low-achieving and poorly behaving students

# Percentage of New Hires Who are Not Certified in a Given Subject by Year, 1998/99 – 2007/08



Source: Florida Dept. of Education, “New Hires in Florida Public Schools – Fall 1998 – Fall 2007”

# Possible Policy Solutions

- One-Time Hiring Bonuses
  - Used by CA, MS, VA
- Differential Pay
  - GA allows new math and science teachers to start at a pay rate equivalent to teachers with five years of experience
  - Many district-level salary differential programs
  - NC bonus program for math, science and special ed. teachers in high-poverty schools
- Subsidize Education of Teachers
  - State Programs
    - At least 40 states offer loan forgiveness or scholarships for teachers in high-need areas
  - Federal Programs
    - Stafford Loan Forgiveness Program for teachers who work full-time in 5 consecutive years in low-income schools
    - Perkins Loan Cancellation Program for teachers who teach for a full year in a low-income school or in a high-need area

# Prior Research

- Loan Forgiveness
  - No Research on Loan Forgiveness in Education
  - Some evidence of effectiveness in attracting doctors to practicing in rural areas (Pathman et.al., 2004) and inducing lawyers to practice public interest law (Field, 2009)
- Pay Differentials
  - Clotfelter, et al (2008) find \$1800 bonus to math, science and special ed. teachers in high poverty schools reduced turnover rates by 18%

# Florida's Critical Teacher Shortage Program

- Loan Forgiveness
  - Must teach and be certified in a designated shortage area to qualify
  - Maximum of \$2500 per year for undergraduate loans and \$5000 per year for graduate loans
  - Could receive payments for two years if graduate loan and four years if undergraduate loan with a \$10,000 maximum total disbursement
  - Annual renewal contingent on continuing to teach and be certified in a critical-shortage area
  - Primary short-term impact on retention
    - May increase supply in long run

# Florida's Critical Teacher Shortage Program

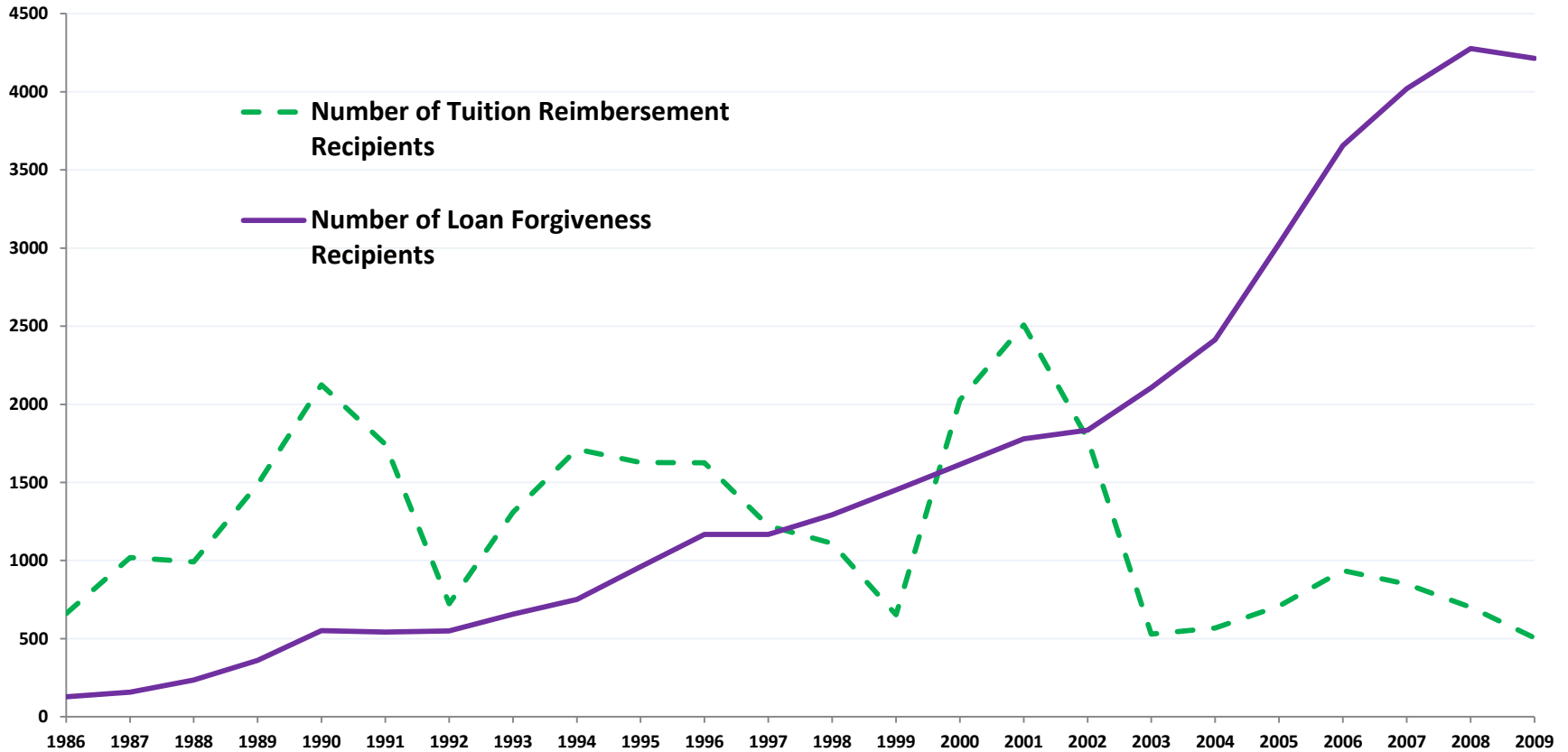
- Tuition Reimbursement
  - Open to all teachers in Florida public schools
  - Had to take courses leading to certification or an advanced degree in a designated shortage area and earn at least a 3.0 grade in the course
  - Could receive payments of up to \$78 per credit hour for a maximum of 9 credit hours per year
  - Maximum allowable reimbursement of 36 credit hours (\$2,808)
  - Primarily affects education and certification choices of existing teachers

# Florida's Critical Teacher Shortage Program

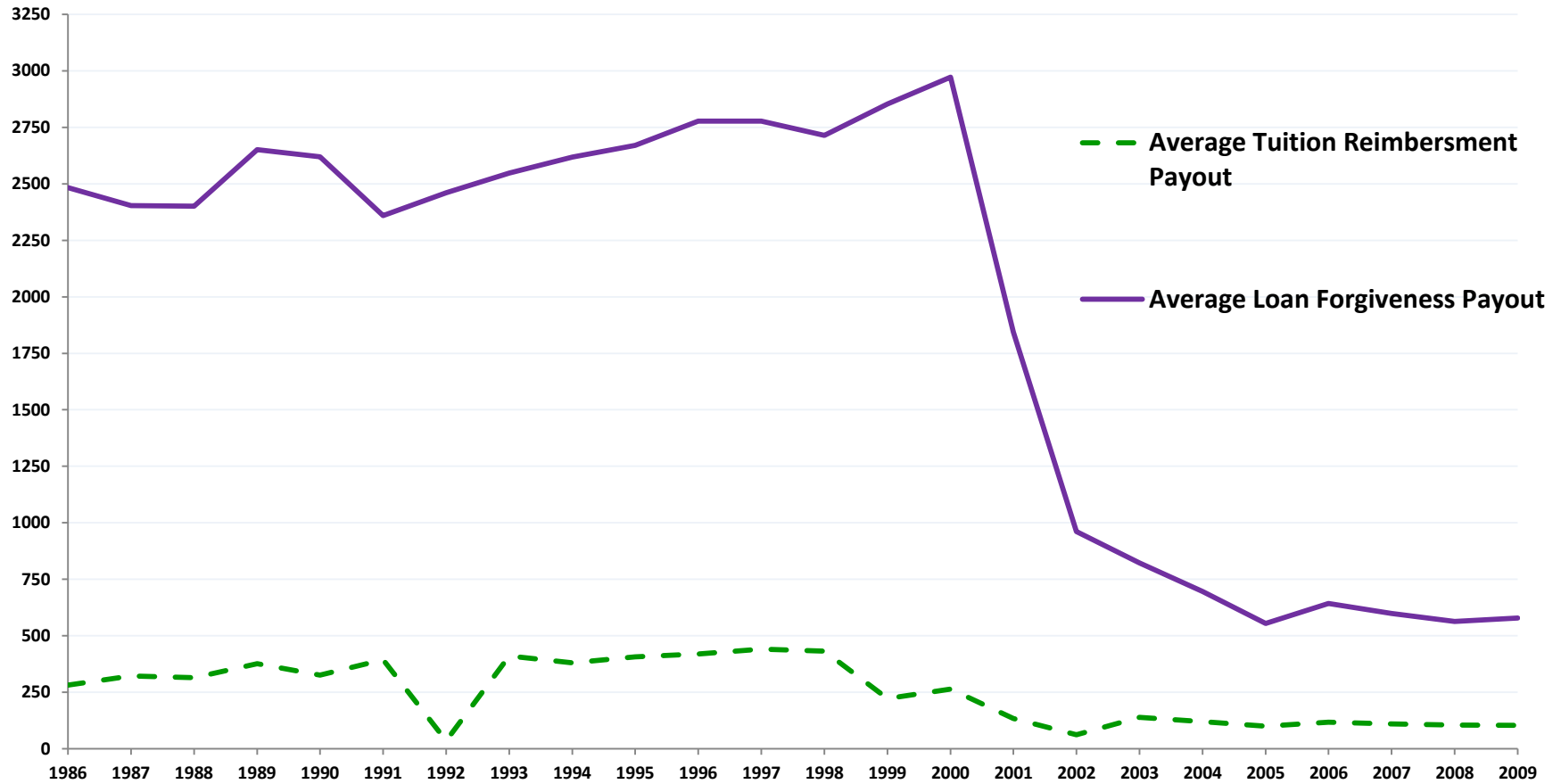
- Program Details
  - Established in 1984; payments began in 1986/87
  - Terminated in Spring 2011
    - Last disbursements in 2009/10
  - Designated shortage areas changed over time
  - Annual disbursements varied with legislative appropriation and number of applicants



# Number of Teachers Receiving Tuition Reimbursement and Loan Forgiveness Payments by Year



# Average Payment per Recipient in Tuition Reimbursement and Loan Forgiveness Programs by Year



# Data

- Education Data Warehouse
  - Universe of teachers and students in Florida for 1995/96 – 2012/13
    - Teachers and students linked to specific classrooms
    - Can compute “value-added” for math and ELA teachers in grades 4-10
- Office of Student Financial Assistance
  - Individual loan forgiveness payments for 1996/98 – 2009/10
  - Individual tuition reimbursement payments for 2001/02 – 2009/10

# Designated Critical Teacher Shortage Areas, 1984/85-2009/10

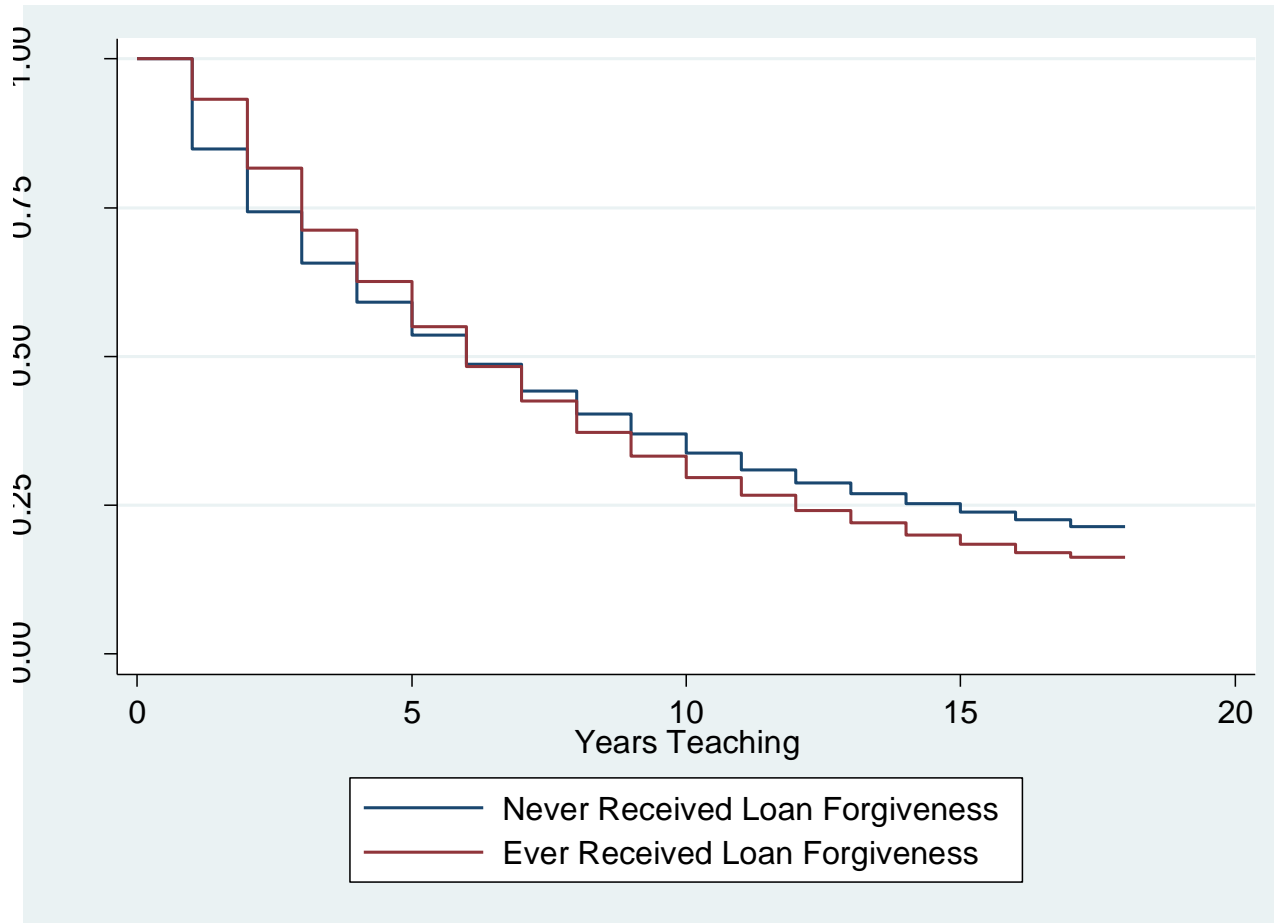
	Math	Science	Middle & High Science	Middle & High Math	Speech Therapy	Emotionally Handicapped	ESE ("Handicapped")	ESE (Special Ed. & Gifted)	Foreign Languages	English	Middle & High English	Reading	ESOL	Tech. Ed./ Ind. Arts	School Psychologists
1984-1985	x	x			x	x			x					x	
1985-1986	x	x				x			x	x					
1986-1987	x	x				x			x	x					
1987-1988	x	x				x			x						
1988-1989	x	x				x			x	x					
1989-1990			x	x			x		x		x				
1990-1991			x	x			x		x		x				
1991-1992			x	x			x		x		x				
1992-1993			x	x				x					x		
1993-1994								x					x		
1994-1995								x					x		
1995-1996								x					x		
1996-1997								x					x	x	
1997-1998								x					x	x	
1998-1999								x					x	x	
1999-2000								x					x	x	
2000-2001			x	x				x					x	x	
2001-2002			x	x				x	x				x	x	
2002-2003			x	x				x	x			x	x	x	x
2003-2004			x	x				x	x			x	x	x	x
2004-2005			x	x				x	x			x	x	x	x
2005-2006			x	x				x	x			x	x	x	x
2006-2007			x	x				x	x			x	x	x	x
2007-2008			x	x				x	x			x	x	x	x
2008-2009			x	x				x	x		x	x	x	x	
2009-2010			x	x				x	x		x	x	x	x	

# Methods

- Loan Forgiveness
  - Difference-in-difference hazard model of leaving public school teaching
    - Compare difference in covered and non-covered periods between eligible and in-eligible teachers
- Tuition Reimbursement
  - Panel probit model of becoming certified in a designated critical shortage area
- Teacher Quality
  - Compare distribution of value-added in math recipients/non-recipients and movers/stayers

# Results – Loan Forgiveness

## Kaplan-Meier Survival Estimates of Teaching in Florida Public Schools (Teachers Observed in Their First Year of Teaching)



# Results – Loan Forgiveness

## Exit Hazard Ratios of Ever-Eligible x Program Period

Subject	Model 1	Model 2	Model 3	Model 4
MS/HS Science	0.927**	0.931**	0.933*	0.935*
MS/HS Math	0.901**	0.905**	0.899**	0.867**
Special Ed/Gifted	0.963	0.975	0.968	0.954
Foreign Languages	0.895**	0.905*	0.924	0.940
MS/HS English	1.031	1.023	1.014	0.975
Reading	1.114	1.126	1.111	1.073
ESOL	0.752**	0.749**	0.740**	0.800**
<i>Teacher Demographics</i>		X	X	X
<i>Teacher Exp. &amp; Degree</i>			X	X
<i>Classroom Characteristics</i>				X

\*Significant at 5%, \*\*Significant at 1%

# Results – Loan Forgiveness

## Exit Hazard Ratios of Ever-Eligible x Program Period

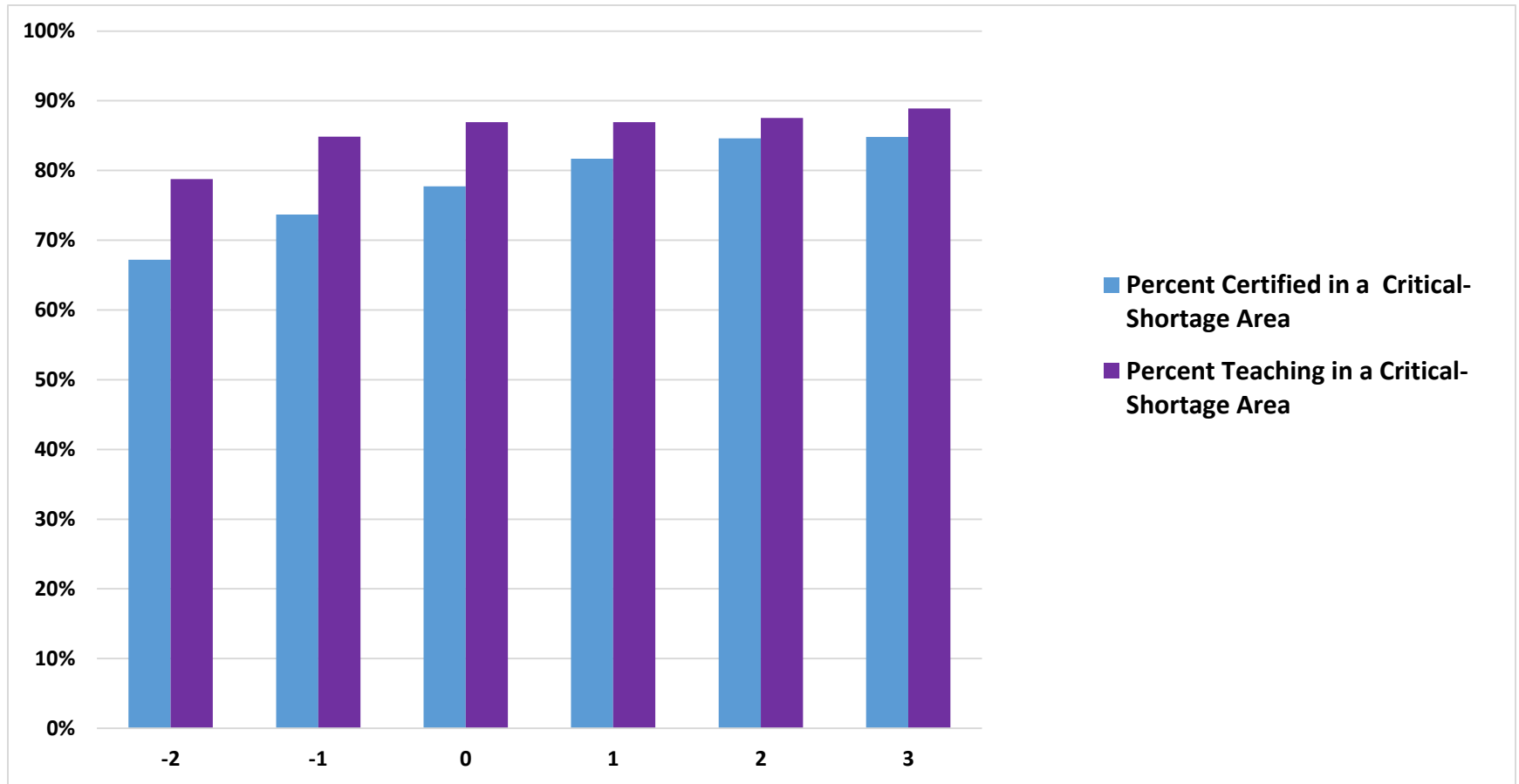
Subject/Payment Regime	Model 1	Model 2	Model 3	Model 4
MS/HS Science	0.937*	0.940*	0.944*	0.943
MS/HS Math	0.907**	0.910**	0.905**	0.871**
Special Ed/Gifted – High	0.873**	0.892**	0.882**	0.815**
Special Ed/Gifted – Low	0.995	1.006	1.000	0.974
Foreign Languages	0.903*	0.913*	0.932	0.952
MS/HS English	1.034	1.026	1.017	0.978
Reading	1.111	1.123	1.108	1.071
ESOL – High	0.672**	0.678**	0.650**	0.792
ESOL – Low	0.769**	0.765**	0.761**	0.801**
<i>Teacher Demographics</i>		X	X	X
<i>Teacher Exp. &amp; Degree</i>			X	X
<i>Classroom Characteristics</i>				X

\*Significant at 5%, \*\*Significant at 1%



# Results – Tuition Reimbursement

## Certification and Teaching Status by Years Before and After Receipt of Initial Tuition Reimbursement



# Results – Tuition Reimbursement

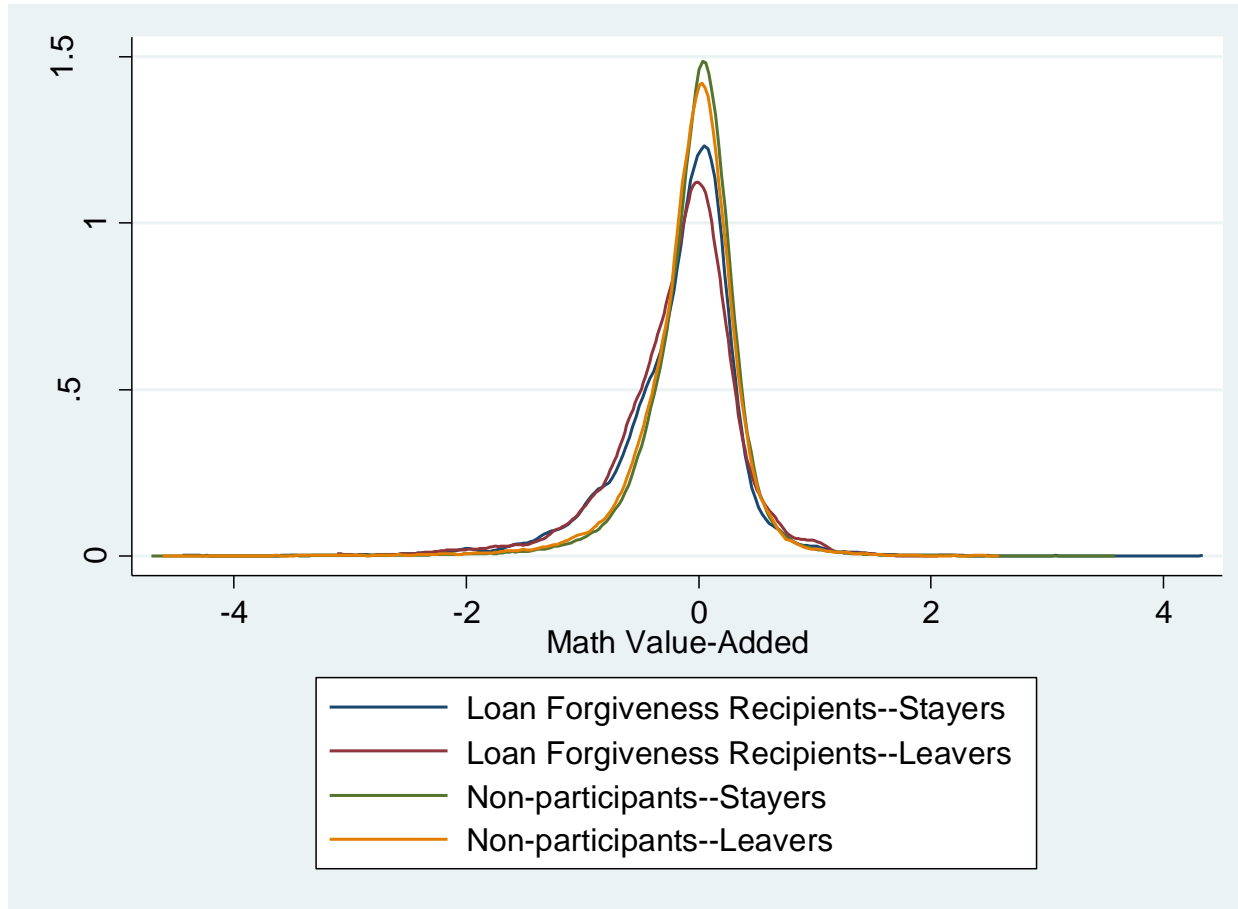
## Marginal Effects from Panel Probit Model of Becoming Certified

Variable	Model 1	Model 2
Received Tuition Reimbursement in Current Year	0.00925**	0.00933**
Received Tuition Reimbursement in Prior Year	0.00975**	0.00982**
Taught Shortage-Area Subject in Current Year	0.00349**	
Taught Shortage-Area Subject in Prior Year	-0.00129**	0.00098**
Taught Shortage-Area Subject Two Years Prior	-0.00372**	-0.00322**
Experience	-0.00094**	-0.00095**
Experience <sup>2</sup>	0.00001**	0.00001**

\*Significant at 5%, \*\*Significant at 1%

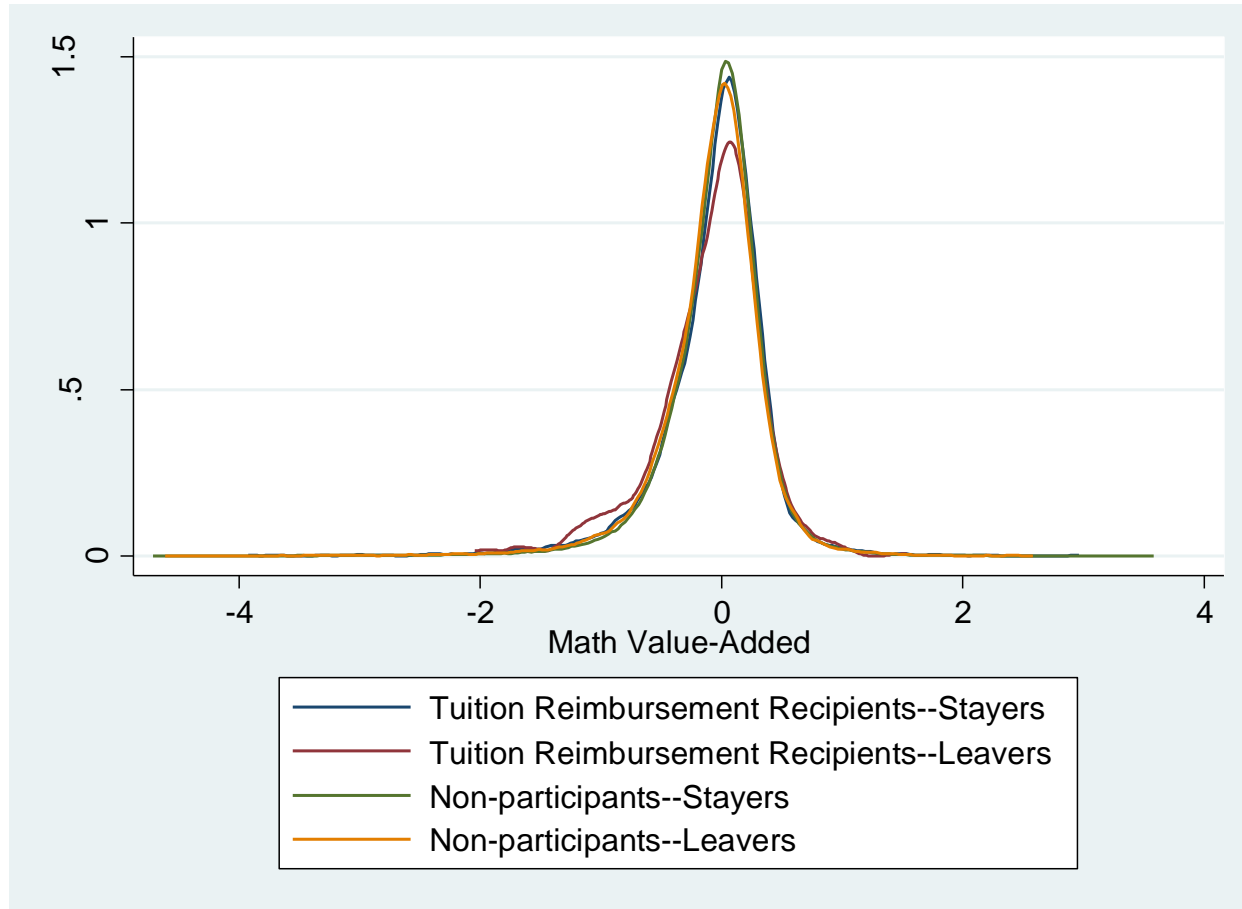
# Results – Effects on Teacher Quality

## Kernel Density Plot of Math Value-Added Distribution by Exit Status and Loan Forgiveness Receipt



# Results – Effects on Teacher Quality

## Kernel Density Plot of Math Value-Added Distribution by Exit Status and Tuition Reimbursement Receipt



# Conclusions

- Loan Forgiveness Program Did Reduce Attrition of Teachers in High-Need Areas
  - Effects stronger in some fields than in others
  - Stronger effects when payouts are higher
- Tuition Reimbursement had Positive but Small Effects on the Likelihood that a Teacher Would Become Certified in a High-Need Area
  - Many recipients already teaching or certified in at least one high-need area prior to reimbursement
- Quality Effects
  - Some evidence that loan forgiveness recipients have lower value-added in math than non-recipients
  - No differences in value-added between tuition-reimbursement recipients and non-recipients
  - No differences between stayers and leavers