Early Retirement Incentives and Student Achievement

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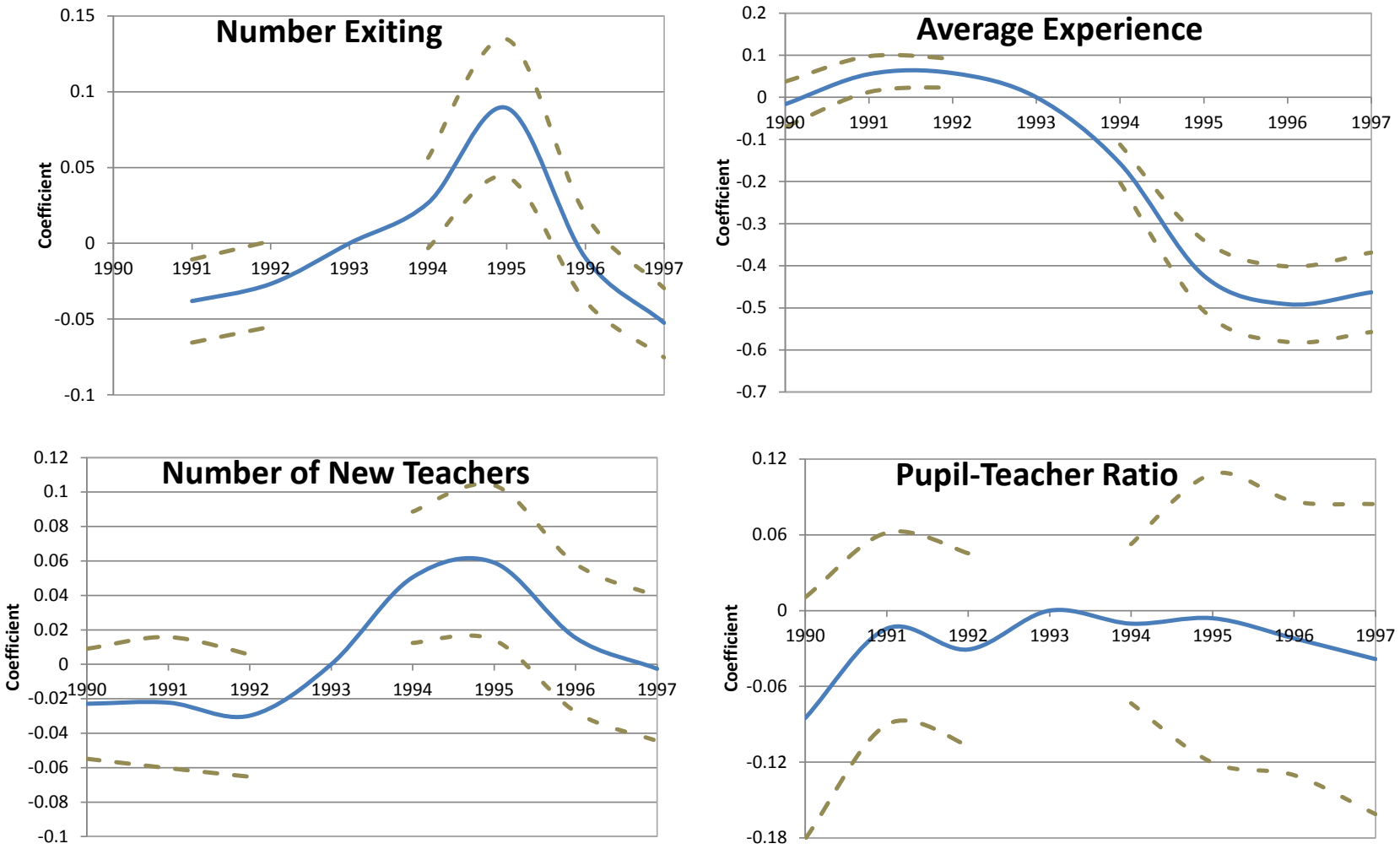
Online Appendix

Table A-1. OLS Estimates of the Effect of the Early Retirement Incentive Program on the Number of Teachers of Difference Experience Levels in Disadvantaged Schools

	Independent Variable: Post*Number ≥ 15			
Teacher Experience Level	Low Income	Low White	Low Math	Low Reading
1	-0.060**	-0.024	-0.062**	-0.008
	(0.025)	(0.027)	(0.027)	(0.005)
2	-0.009	0.024	-0.006	0.002
	(0.027)	(0.030)	(0.032)	(0.031)
3	0.015	-0.005	-0.001	-0.003
	(0.023)	(0.023)	(0.022)	(0.021)
4	0.012	0.025	0.013	0.011
	(0.028)	(0.027)	(0.023)	(0.023)
5	0.032	0.064**	0.056**	0.057**
	(0.027)	(0.020)	(0.024)	(0.023)
6-9	0.014	0.032	0.027	0.021
	(0.049)	(0.040)	(0.043)	(0.042)
10-14	-0.024	0.014	0.001	-0.015
	(0.043)	(0.035)	(0.043)	(0.046)
15-19	-0.291**	-0.269**	-0.268**	-0.267**
	(0.051)	(0.054)	(0.053)	(0.052)
20-24	-0.023	-0.104*	-0.104	-0.114*
	(0.070)	(0.056)	(0.071)	(0.070)
25-29	-0.121**	-0.137**	-0.008**	-0.174**
	(0.052)	(0.048)	(0.003)	(0.056)
30-34	0.006	0.007	-0.163**	0.010
	(0.024)	(0.029)	(0.056)	(0.033)
35-39	0.003	-0.004	0.001	0.0004
	(0.019)	(0.014)	(0.033)	(0.018)
40+	-0.005	-0.002	0.012	-0.007
	(0.004)	(0.005)	(0.018)	(0.005)

Notes: Data come from the 1990-1995 TSR combined with school-level Illinois State Board of Education data on test scores. The table shows estimates of β_1 from equation (1) in the text, using as dependent variables the number of teachers with a given level of experience in each grade and year. Each cell presents results from a separate regression. Teachers who teach multiple grades are included in the estimates for each grade in which they teach. The lowest income, percent white and baseline score schools are the bottom 25% of schools on each measure, measured in the pre-treatment period. All estimates include controls for the demographic variables included in Table 1 (except for the variable on which the sample is cut), the total number of teachers interacted with a *Post* indicator, school-by-grade fixed effects, grade-by-year fixed effects and a quadratic in school-grade-year enrollment. Standard errors clustered at the school-grade level are in parentheses: ** indicates statistical significance at the 5% level and * indicates statistical significance at the 10% level.

Figure A-1. Event Study Estimates of the Effect of the Early Retirement Incentive Program on Teacher Composition



Notes: Estimates and 95% confidence intervals from interactions of year fixed effects and the number of teachers with 15 or more years of experience. Years are indexed by the calendar year in which a school year ends. The 1993 coefficient is set to zero, so there is no standard error bound for this year. Estimates include grade-by-year and school-by-grade fixed effects, the demographic characteristics shown in Table 1, and interactions between year fixed effects and the number of teachers in each grade. The pupil-teacher ratio estimates do not control for enrollment.

Appendix B. Cost-Benefit Calculations

The cost-benefit calculations reported in Section 6 depend on parameters we have chosen using our data. This are described in turn:

How Much Earlier Do Teachers Retire Because of the ERI?: We first calculate the number of teachers with each level of experience in the pre-ERI period and the exit rates of teachers with each given level of experience in both the pre-ERI and during-ERI periods. Using the number of teachers with each level of accrued experience in the pre-ERI period as the baseline, for each given level of starting experience (e.g. 15 years of service, 16 years of service, etc.), we create conditional density functions for the fraction of teachers that exit the system with each passing year. We perform this calculation for both the period pre-ERI and the period over which the ERI was offered. We then examine the median of this distribution before and during the ERI for each level of experience of at least 15 years. By this measure, the median teacher with 15 years of service or more is retiring with 32 years of experience in the pre-ERI period and retires 5 years earlier, with 27 years of experience in the ERI period.

Median Retirement Age Pre-ERI: Using the pre-ERI level of experience for the median exiting teacher described above, we estimate the median retirement age assuming a teacher starts her career at age 28 and does not have any employment breaks due to childrearing or other reasons. The median experience level of a retiring teacher with 15 or more years of experience is 32 years, which would make her 60 years old under this assumption. We further assume that pensions are paid out until age 87, on average. This means teachers receive their pension payments for 27 years pre-ERI and for 32 years post-ERI.

Salary Levels: We use average teacher salaries of all teachers with a given level of experience in 1992, the year before the ERI was introduced.

Lump-Sum Payment Calculations: Lump-sum payments are made by the district and teacher, separately, for each teacher taking up the ERI. Districts pay 12% of the highest salary, which we assume is the salary in 1992, for each year purchased. Since the median teacher purchases 5 years, we assume districts pay 60% of the 1992 salary of a teacher with 27 years of experience. Teachers must pay 4% of this salary for each year purchased, which is 20% of the 1992 salary for a teacher with 27 years of experience if she purchases 5 years of experience.

Interest Rate: We assume an interest rate throughout of 3%.

Percentage of Salary Paid: The pension system includes a formula for the cumulative percentage of salary paid by the pension: 1.67% of salary for the first 10 years, 1.91% for the next 10 years, 2.1% for the following 10 years, and 2.3% thereafter. A teacher with

32 years of experience, which is the median purchased experience level of teachers retiring under the ERI, will receive 61.4% of her highest salary in benefits every year (=10*.0167+10*.0191+10*.021+2*.023). We use the average salary of a teacher with 27 years of experience in 1992 to calculate these benefits. Note that the median teacher retiring under ERI has 27 years of experience but is treated as if she has 32 years due to the ERI program. This is why the experience levels used to calculate the payout rate and the base salary differ.