

**TABLE 8.3** Nonlinear Regression Models of Test Scores

**Dependent variable: average test score in district; 420 observations.**

Regressor	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Student–teacher ratio ( <i>STR</i> )	−1.00 (0.27)	−0.73 (0.26)	−0.97 (0.59)	−0.53 (0.34)	64.33 (24.86)	83.70 (28.50)	65.29 (25.26)
$STR^2$					−3.42 (1.25)	−4.38 (1.44)	−3.47 (1.27)
$STR^3$					0.059 (0.021)	0.075 (0.024)	0.060 (0.021)
% English learners	−0.122 (0.033)	−0.176 (0.034)					−0.166 (0.034)
% English learners $\geq$ 10%? (Binary, <i>HiEL</i> )			5.64 (19.51)	5.50 (9.80)	−5.47 (1.03)	816.1 (3277)	
$HiEL \times STR$			−1.28 (0.97)	−0.58 (0.50)		−123.3 (50.2)	
$HiEL \times STR^2$						6.12 (2.54)	
$HiEL \times STR^3$						−0.101 (0.043)	
<b>Included Economic Control Variables</b>							
% eligible for subsidized lunch	Y	Y	N	Y	Y	Y	Y
Average district income (logarithm)	N	Y	N	Y	Y	Y	Y
<b>95% Confidence Intervals for the Effect of Reducing <i>STR</i> by 2</b>							
No <i>HiEL</i> interaction	[0.93,3.06] [0.46,2.48]						
22 to 20					[0.61, 3.25]	[0.54, 3.26]	
20 to 18					[1.64, 4.36]	[1.55, 4.30]	
<i>HiEL</i> = 0			[−0.38, 4.25] [−0.28, 2.41]				
22 to 20					[0.40, 3.98]		
20 to 18					[1.22, 4.99]		
<i>HiEL</i> = 1			[1.48, 7.50] [0.80, 3.63]				
22 to 20					[−0.98, 2.91]		
20 to 18					[−0.72, 4.01]		
<b>F-Statistics and p-Values on Joint Hypotheses</b>							
All <i>STR</i> variables and interactions = 0			5.64 (0.004)	5.92 (0.003)	6.31 ( $< 0.001$ )	4.96 ( $< 0.001$ )	5.91 (0.001)
$STR^2, STR^3 = 0$					6.17 ( $< 0.001$ )	5.81 (0.003)	5.96 (0.003)
$HiEL \times STR, HiEL \times STR^2,$ $HiEL \times STR^3 = 0$						2.69 (0.046)	
<i>SER</i>	9.08	8.64	15.88	8.63	8.56	8.55	8.57
$\bar{R}^2$	0.773	0.794	0.305	0.795	0.798	0.799	0.798

These regressions were estimated using the data on K–8 school districts in California, described in Appendix 4.1. Regressions include an intercept and the economic control variables indicated by “Y” or exclude them if indicated by “N” (coefficients not shown in the table). Standard errors are given in parentheses under coefficients, and *p*-values are given in parentheses under *F*-statistics.