# Web Supplement: Comparing Regression Models

In "New Student Funding Seeks to Alter School Budget Disparities," we presented a regression model for the current year per student allocation under Fair Student Funding, repeated in the table. In this supplement, we contrast the results of that regression model with a model for the per student allocation under full FSF without caps or hold harmless provisions. By comparing the coefficients, we can see how the relationship would change if FSF were fully in place.

Under full implementation, we would expect to find no significant relationship between staffing and per student spending, a negative relationship between enrollment and per student spending (due to the foundation allocation, which is larger, per student, at small schools), and positive relationships between student need measures and per student spending. Further, we would expect that the coefficients would be larger for student need characteristics with higher weights, such as special education. Lastly, since DOE targeted extra funding at middle school students through FSF, we would expect schools with grades six to eight to spend more per student, while elementary schools would receive less per student.

We find that the relationship of the percent of English Language Learners to per student expenditure becomes stronger while the relationship of the percent of low academic achievement and the percent of special education students is a little weaker, but still highly statistically significant and positive. The relationship of poverty to per student spending inverts and we see schools with higher shares of students in poverty receive more per student, all else equal.

The lower levels of funding predicted for elementary schools, all else equal, is moderated, while the increase for middle schools change only slightly. Lastly, we find that under fully implemented FSF the effects of average teacher salary loses significance, while the relationships of pupil-teacher ratio and enrollment to per student spending becomes weaker.

It was surprising that the coefficient for the pupil-teacher ratio remained fairly large and statistically significant when modeling full FSF allocations, which should be determined by student needs, school size, and grade composition. Upon closer examination, we found that the pupil-teacher ratio coefficient in the fully implemented FSF model presented above is capturing part of the effect of the student need and school size measures with which it is correlated. The pupil-teacher ratio is positively correlated with school enrollment and negatively associated with the percent of students in poverty, self-contained special education, and low academic achievement. When we ran the regression without the two teacher staffing variables (not shown), we found that the estimates for the coefficients for the measures of student needs and school size increase in magnitude in the expected direction.

## Coefficients for Regression Models

*Dependent Variables: Per Student Allocation by Funding Formulas*

| School Measure | FSF Allocation, 2008 | Full FSF Formula, 2008 |
|---|---|---|
| Average Teacher Salary, 2008 | 0.052*** | 0 |
| | (0.005) | (0.003) |
| Pupil-Teacher Ratio, 2006 | -249.660*** | -106.220*** |
| | (13.342) | (8.649) |
| Enrollment, 2006 | -0.474*** | -0.194*** |
| | (0.045) | (0.029) |
| Percent Students in Poverty, 2006 | -4.757*** | 3.752*** |
| | (1.326) | (0.859) |
| Percent Students English Language Learners, 2006 | 4.305* | 9.804*** |
| | (1.894) | (1.228) |
| Percent Self-Contained Special Education, 2006 | 109.545*** | 90.397*** |
| | (6.596) | (4.276) |
| Percent Students Low Academic Achievement, 2006 | 16.668*** | 13.704*** |
| | (2.090) | (1.355) |
| Has Elementary School Grades | -575.804*** | -256.068*** |
| | (60.573) | (39.268) |
| Has Middle School Grades | 140.165** | 149.028*** |
| | (47.062) | (30.509) |
| Intercept | 6,516 | 6,724 |
| | (426) | (276) |
| N | 1237 | 1237 |
| $R^2$ | 0.6535 | 0.6934 |

NOTES: FSF Allocation, 2008 is the actual per student allocation for 2008, representing implementation of FSF *with caps and hold harmless*. Full FSF Formula, 2008 is the per student allocation under the FSF formula *without caps or hold harmless.*

Standard errors given in parentheses.

*, **, *** mean statistically significant at the .05, .01, and .001 levels, respectively.

SOURCES: IBO; Department of Education.

Comparing schools that would receive the highest and lowest per student allocations under fully implemented FSF, we found that the most significant drivers of higher per student spending in the top quintile were the percent of students in self-contained special education classes and the percent with low academic achievement. The difference in the percent of students in poverty was the next most important driver, while the difference in the percent of English Language Learners had the smallest impact of the student need measures. Differences in school size played a small role, mainly because the per student foundation allocation is bigger at smaller schools.