

Appendix F

Methodological Details on the Analysis of Student Achievement Results

Chapter 12 reported the results of some fairly sophisticated statistical analysis of scores from the Pennsylvania System of School Assessment (PSSA). In order to keep the chapter accessible to most readers, we avoided detailed discussion of those methods. This appendix provides additional detail on these methods. Specific topics include

- ❑ Measurement of student achievement
- ❑ Calculating the filtered scores used in Chapter 12
- ❑ Summarizing the trends in the filtered scores reported in Chapter 12

This appendix aims to present these methods in terms that are clear to the attentive but nonexpert reader. A more technical and mathematical exposition of these methods may be obtained from the authors.

F.1 Measuring Student Achievement

In selecting an achievement measure, the controlling criterion was the need to find an assessment that would facilitate comparisons among charter schools and between charter and noncharter public schools. The PSSA is, to our knowledge, the only assessment that is administered in all Pennsylvania charter and noncharter public schools. Since the 1995-96 academic year, the PSSA has assessed students in grades 5, 8, and 11 in both mathematics and reading. A writing assessment for sixth and ninth graders was phased in gradually, with approximately 66 percent of schools participating in 1995-96, 75 percent in 1996-97, 75 percent in 1997-98, and 92 percent in 1998-99.¹ However, no writing data are reported in files for the 1999/2000, 2000/01, and 2001/02 academic years. Thus, we have not included writing scores in this analysis.

¹ School participation rates were calculated from raw data files of writing scores provided by PDE. Beginning in the 2000-01 school year, all public schools are required to participate in the grade 6, 9, and 11 PSSA writing assessments.

Score Formats

PDE documents and data files report PSSA scores in two formats. First, they report the percentage of students in a given school or district scoring in each of four groups that correspond roughly to quartiles.² Second, PDE files report a scaled score whose range is approximately 1000-1600. Beginning in 2000, few schools scored slightly above or below these values. While each student receives such a score, public data files include only aggregate mean values for each school.

For all analyses we focused on scaled scores rather than quartile percentages, because mean scaled scores can simultaneously capture change in all four quartiles. Indeed, it can be shown that the percentage of students falling in one quartile can change without changing the percentage in all of the remaining quartiles. Thus, analyses that focus on a single quartile (e.g., those that establish a “cut point” such as the bottom quartile as the primary measure) risk missing significant changes in student achievement.

During the first year of its administration (1995-96), scaled scores were constructed so that the mean was 1300 and the standard deviation 100. All subsequent versions of the test have been statistically equated to the 1995-96 version. This means that the scale is “anchored” in the 1995-96 test and any increases or decreases in scaled scores reflect actual changes in student achievement, not just changes in the distribution of scores across the Commonwealth. Operationally, a 1300 in any subsequent year represents the mean for the 1995-96 academic year.³ PSSA scores, then, allow evaluators to compare students in one school with students from another school. They also allow evaluators to assess growth or decline over time at the school level, subject to the limitations imposed by the need to rely on school-level mean scores.⁴ As discussed in Chapter 12, PSSA scores may not be used to track individual student progress from one year to the next. The filtering methodology outlined in this appendix is designed to compensate partially for this feature of the PSSA.

Data Sources

PSSA scores for the 1997-98, 1998-99, 1999-2000, and 2000-01 academic years came from raw data files posted on the PDE Web site. Scores for the 2001-02 academic

² The quartiles are anchored in the 1995-96 results. Thus, in subsequent years PDE has referred these as “group scores” since they are no longer quartiles in the strict sense.

³ Equating also implies that after 1995-96 there can be more or fewer than 25 percent of students in any one of the four “quartiles.” For this reason subsequent to 1995-96 the normative distribution is referred to as the top, high-middle, low-middle, and bottom groups rather than “quartiles” per se. We continue to use the term “quartile” for ease in exposition.

⁴ The PSSA, however, does not provide a developmental metric. That is, one cannot say, for instance, that a 1310 on the grade 8 math examination represents 10 points worth of gain over a 1300 on the grade 5 math examination. Strictly speaking, all the scores can tell us is where a given student stands in relation to his or her peers who took the examination in 1995-96.

year were provided to us directly by PDE.⁵ Data on other attributes of charter and noncharter schools (e.g., concentration of low income students) came from raw data files associated with the Pennsylvania School Profiles, the National Center for Education Statistics' (NCES) Common Core of Data (CCD), and from special runs provided by PDE.

Table F:1 shows the number of schools reporting test scores for each subject area and grade level during the 5 years of the Commonwealth's charter school initiative. The number of schools reporting PSSA scores reflects two trends outlined in Chapter 3. First, there are generally more charter schools serving students at the elementary and middle school levels. Second, the increasing number of schools reporting scores over time reflects the growth in the movement over time.

For some of the analyses reported in Chapter 12, we used school-level aggregate scores. These scores are simply the unweighted mean of scores reported by a given school for all grade levels and subject areas.⁶ Use of the aggregate scores helps simplify the exposition in Chapter 12. Using the aggregate scores also increases the number of schools included in the analyses, since a school must report scores in only one subject and grade to be included in the analysis. As discussed in Chapter 12, we also conducted analyses by grade level and subject area to ensure that aggregation did not mask important variations.

Table F:1 Number of Charter Schools Participating in the PSSA by Subject/Grade

<i>Portion of the PSSA</i>	<i>Number of Schools Tested</i>				
	<i>1997-98</i>	<i>1998-99</i>	<i>1999-2000</i>	<i>2000-01</i>	<i>2001-02</i>
Math 5	1	9	18	24	38
Reading 5	1	9	18	24	38
Math 8	3	8	14	23	36
Reading 8	3	8	14	23	36
Math 11	2	5	11	14	27
Reading 11	2	5	11	14	27
School-Level Aggregate Scores	4	16	31	40	60

⁵ We owe a particular debt of gratitude to Gerald Bennett and Leonard Lock for providing the data files to us in a timely manner.

⁶ We sought to weight the aggregate values by grade level enrollments. However, missing grade level enrollment data on a number of schools made this impossible. As a result, the aggregate scores might give too much weight to grade levels with few students and too little to grade levels with many students.

F.2 Calculating the Filtered Scores

As discussed in Chapter 12, unadjusted PSSA scores are inadequate for assessing the charter school impact on student achievement. Since achievement scores reflect both (a) school effectiveness and (b) student background characteristics, evaluators must find some way to distinguish the two. We have employed a statistical technique for filtering out student background characteristics. The filters operate by comparing each charter school's PSSA score(s) with a comparison group of schools that are demographically and geographically similar to the charter school. The filtered scores, then, are the difference between the charter school score and the score "predicted" by the matched comparison group.

In the remainder of this section we expound the filtering methodology in two ways. First, we provide a graphical exposition. Second, we describe (in relatively nontechnical language) the formal statistical technique used to create the comparison groups.

Graphical Exposition of the Filtering Method

Figure F:1 provides a graphical illustration of how the filtering method works. For each of the 5 years illustrated there are two bell-shaped curves. The larger curves represent the distribution of PSSA scores for all noncharter public schools. The smaller curves represent the PSSA score distribution of a smaller comparison group of noncharter public schools. The comparison schools are selected on the basis of income, race, urbanicity, concentration of special education students, enrollment, and participation rates on the PSSA. In addition, the comparison distributions are restricted to noncharter public schools in districts that sponsor charter schools. This ensures that the comparison group is matched, not only on readily measurable factors such as income, but also on less tangible factors that are correlated with location.⁷ The dashed lines show the means of each distribution.

The filtered score, as represented in the diagram, is the "distance" between the score reported by the charter school (represented by "CS") and mean of the comparison distribution (represented by the vertical line at the center of the smaller bell curve). Thus, if the charter school score is higher than the mean of the comparison distribution, the filtered score will be positive. Similarly, if the charter school score is lower than the mean of the comparison distribution, the filtered score will be negative. Inasmuch as the comparison schools are similar to the charter schools in all relevant respects (save for charter status, of course), the difference between the two will provide a reasonable estimate of the charter school's impact on student achievement.⁸ As discussed in Chapter 12, the filtered

⁷ For instance, inclusion of the geographical parameter in the comparison strategy allows for the possibility that low income has different effects in rural and urban areas.

⁸ Comparing charter school scores with those of a distribution of comparison schools—as opposed to a single comparison school—is desirable in that the results are less dependent upon the particular qualities of a single comparison school, which might itself be an outlier.

scores for most charter schools lie well below the mean for all noncharter public schools but just slightly below the mean of their customized comparison groups.

The process of filtering out student background factors requires the analyst to fully specify all relevant variables on which charter and noncharter schools might be different. Since it is unlikely that we have captured all of those characteristics, the filtered scores are not foolproof. Nonetheless, they provide a reasonable estimate of trends in school effectiveness.

The analysis in Chapter 12, however, relies not on single filtered scores but on temporal trends in those scores. Thus, for each school, a unique comparison group is estimated for each year. This allows the analysis to capture the impact of changes in student population and distinguish them from temporal changes due to increasing (or decreasing) school effectiveness.

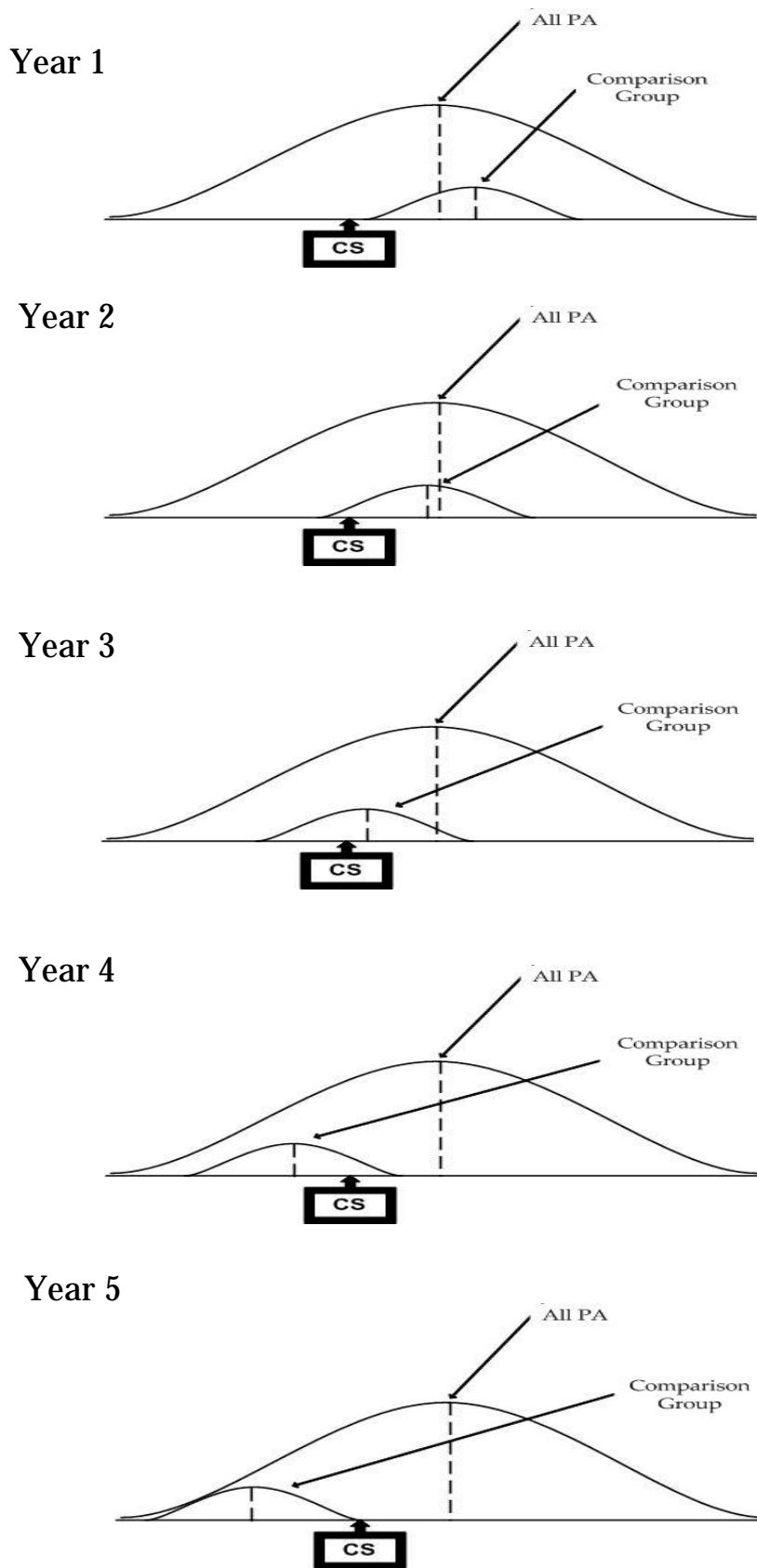


Figure F:1

The illustration in Figure F:2 shows a case in which the charter school's achievement level remains the same over the five year period (just below the mean of the distribution of all noncharter public schools) but in which the school's comparison group shifts downward. This downward shift in the comparison group distribution is due to the school enrolling increasingly disadvantaged students over time. The end result is that the charter school's filtered scores trend up considerably over the five years, even as its unadjusted scores remain constant. The filtered scores, therefore, make allowances

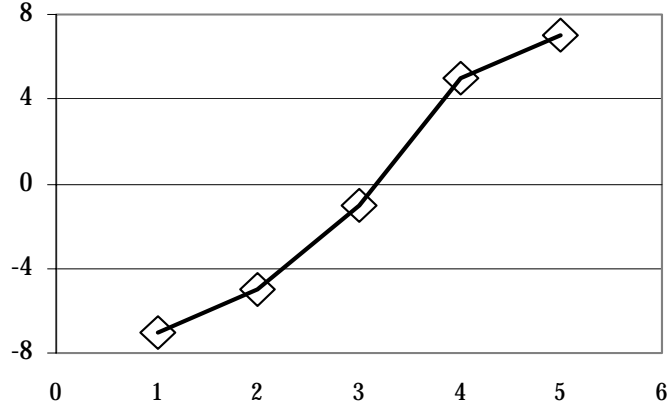


Figure F:2 Trend in Filtered Scores Resulting From Hypothetical Illustration in Figure F:1

for the fact that the charter school has faced an increasingly high degree of difficulty over time. Figure F:2 shows the trend in filtered scores that results from the hypothetical illustration in Figure F:1.

A More Technical Exposition

The most intuitive approach to constructing the comparison distributions above would be to define ranges on each of the variables (e.g., 40 to 50 percent eligibility for free/reduced-price lunch) and group the schools according to these ranges. The analyst would compare each charter school's PSSA pass rate (or percentage of students at or above standards) with the pass rates of other schools in its cohort group. The procedure would be essentially the same if the analyst wished to add more demographic variables to the construction of the groups.

There are, however, a number of practical problems with this intuitive approach. First, it requires the analyst to make some rather arbitrary decisions about the ranges used to sort the cases. It is not clear, for instance, whether the income group should be constructed by deciles (e.g., 0 to 10 percent, 11 to 20 percent, etc.), by quintiles (0 to 20 percent, 21 to 40 percent, etc.), or some other range. Second, the intuitive approach can be burdensome when using many demographic variables since it requires the analyst to specify a large number of mutually exclusive and logically complete categories. The regression model provides a convenient alternative to this approach. Instead of using a set of rules to mechanically select a comparison group, regression models allow for statistical controls that enable the analyst to compare each charter school's score with demographically similar schools.

Assume, as an illustration, that the analyst wants to create comparison groups based only on the concentration of low income students in a school. In this case, the analyst would simply regress the PSSA score against income for all noncharter

public schools. Explained in intuitive terms, the regression procedure simply finds the line (mathematical function) that best relates income to PSSA scores. Mathematically, this entails finding the line that minimizes the distance between each data point in two-dimensional space and the regression line.

Figure F:3 provides a graphical example. The top line running from northwest to southeast is the regression line for all noncharter public schools. The regression line can be viewed as the set of predicted pass rates for each level of income. Alternatively, the regression line may be viewed as the set of mean PSSA scores for comparison schools at each level of income.⁹

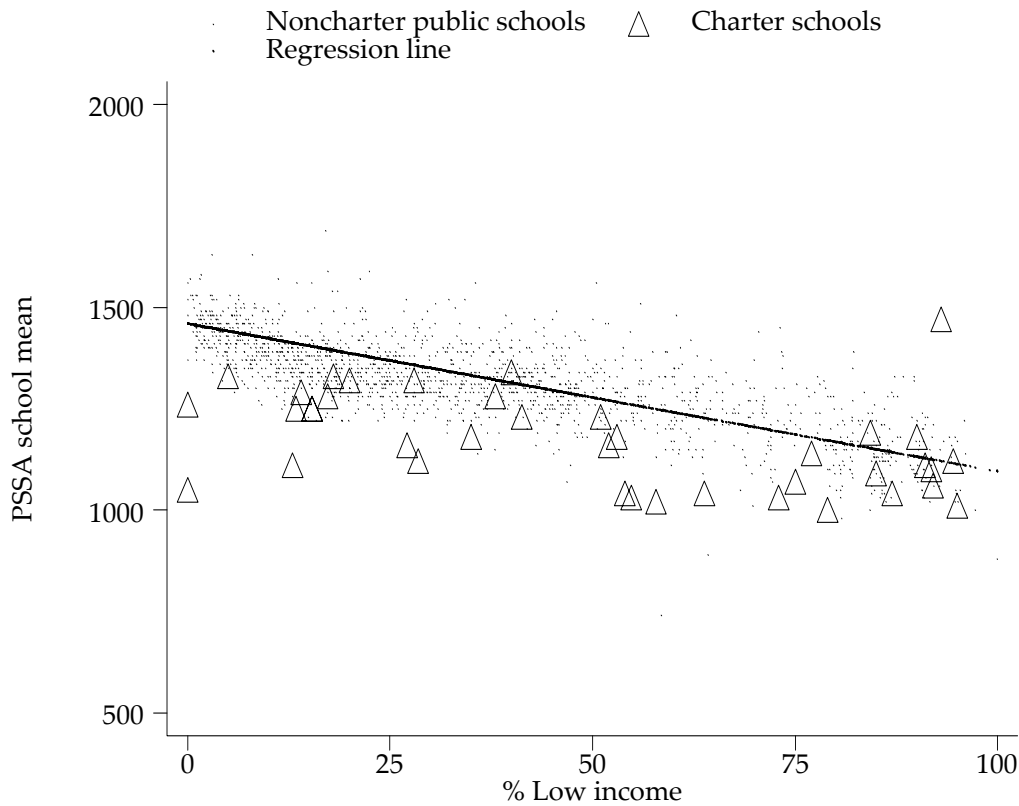


Figure F:3 Illustration of Using Regression to Calculate Filtered PSSA Scores

Regression estimates can also be represented mathematically as a line. Generally, a regression of PSSA scores on income may be written as

$$PSSA_i = a + b_1 INCOME_i + e_i$$

where $PSSA_i$ is the pass rate for a given school i , a is a constant intercept term, $INCOME_i$ is the concentration of low income students in a given school i , b_1 is the

⁹ Visually, the prediction line in this example does not exactly minimize the differences between observed and predicted values because the graph holds other demographic factors in the model at their mean values.

slope coefficient of the regression line, and e_i the “residual” (or unexplained variation) for a given school i .¹⁰ The regression shown in Figure F:3 can be represented mathematically by

$$PSSA_i = 1460 - (3.6 * INCOME_i) + e_i$$

To get the filtered score, we calculate the difference between observed pass rate and the pass rate predicted by the model. Put another way, it is the difference between the charter school’s pass rate and that of its demographically matched comparison group.

As an example, consider a charter school with 21 percent FRL students and a pass rate of 1310 percent on the PSSA. To generate the residual value for this school, we simply substitute its reported concentration of low income students (21 percent) into the equation. This yields a predicted pass rate of 59 percent.

$$PSSA = 1384 = 1460 - (3.6 * 21)$$

Since the residual is the observed pass rate minus the predicted pass rate, we can derive the residual by subtracting its predicted score of 1384 percent from its observed score of 1310. This generates a residual of -74, which tells us that the school’s score was 74 points lower than that of the typical school in its demographic cohort.

The procedure for generating comparisons based on more than one demographic variable requires a related, though more complex, approach called multivariate regression. The basic idea, however, remains the same. Graphically, the multivariate regression model is extended into multidimensional space, with an additional dimension for each demographic variable added. Fortunately, computers can easily think in multiple dimensions and can generate the regression estimates using matrix algebra (see, e.g., Kmenta, 1986).¹¹

In any regression model, the accuracy of the predicted values (and thereby the residuals) depends upon the choice of independent variables. For this report, the evaluation team relied on standard models of student achievement found in the production function literature and elsewhere. These models include, among other things, prior achievement levels, family income and education, race, mobility and, more recently, previous educational experiences. The data files available for this evaluation included standard measures of family income, race, and a limited number of other characteristics. However, they either did not include or had too

¹⁰ The residuals are usually assumed to be normally distributed, have a constant variance, uncorrelated with the explanatory variables (e.g. income), and uncorrelated one with the other.

¹¹ If Y is an $n \times 1$ vector of observed pass rates and X is an $n \times k$ matrix (where n is the number of observations and k the number of demographic variables) of observations on the demographic variables, the multiple regression coefficient is given by:

$$\beta = (X'X)^{-1}(X'Y)$$

many missing values on such factors as family education, prior achievement, and so on. Moreover, we were not able to obtain any information on students' precharter achievement levels. The final model employed in the regression analysis modeled PSSA scores as a function of family income, race, concentration of special education students, enrollment, PSSA participation rate, and urbanicity. Table F:2 provides the operationalizations for each of these variables.

Table F:2 Operationalization of Variables in Regression Models

<i>Variable</i>	<i>Operationalization</i>	<i>Data Source</i>
Family income	Percent of students in school <i>i</i> eligible for free or reduced-price lunch	PDE data files
Race	Percent of black, Asian, Hispanic, and Indian students in school <i>i</i> . (Percent white students was captured in the intercept term)	PDE data files for 2000-01 and 2001-02. Common Core of Data for 1997-98, 1998-99, and 1999-2000.
Special education status	Percent of students in school <i>i</i> with an Individualized Education Plan (IEP) under the Individuals with Disabilities in Education Act (IDEA)	Common Core of Data
Urbanicity	U.S. Census Bureau's 8-point urbanicity classification (entered as individual dummy variables to address nonlinearity)	Common Core of Data
PSSA participation rate	Percent students eligible to take the PSSA exam who returned exams	PDE files
School enrollment	The logarithm of total school enrollment	PDE files

In a small number of cases there were missing values on one or more variables for charter schools. Where there were a sufficient number of nonmissing observations for a given school, we estimated the missing values by calculating the trend in these values over time and predicting or interpolating the missing values based on the estimated trends.¹² Where there were not enough nonmissing observations, we simply entered the mean of the nonmissing observations for the missing value(s).¹³

In all instances, the regression models were estimated only on noncharter public schools in districts sponsoring charter schools. This allowed us to control

¹² Trends were estimated by linear and quadratic regressions.

¹³ The variables were entered additively into regression models that were estimated using weighted least squares (WLS), which gives more weight to larger schools than smaller schools. As is typical of aggregated data, ordinary least squares (OLS) estimates showed evidence of heteroskedasticity; the WLS estimates were largely free of heteroskedasticity. Other diagnostics revealed no serious violations of standard Gauss-Markov assumptions. Readers may contact Dr. Nelson for more technical detail on estimation and diagnostics.

for charter-noncharter differences that are not fully captured by the variables in Table F:2 but are correlated with location.¹⁴

F.3 Summarizing Trends in Filtered Scores

The techniques described in the previous section yielded a filtered (i.e., residual) score for each grade and subject area (e.g., fifth grade math, eighth grade reading, etc.) in each charter school reporting PSSA data. As discussed in Chapter 12, we were mainly interested in observing changes in these filtered scores over time. We undertook a number of steps to summarize and interpret trends in the filtered scores. First, as discussed above, we created aggregate filtered scores for each school by taking the simple unweighted average of filtered scores for each subject and grade. Second, for each consecutive pair of years (e.g., 1997-98 to 1998-99, 1999-2000 to 2000-01, 2000-01 to 2001-02) we calculated a change score.¹⁵ Averaging these change scores yields annual average changes, which were used as a single summary indicator of the achievement growth of each school relative to its comparison groups. In order to get an overall summary estimate of growth in all of the Commonwealth's charter schools, we took the average of average annual gains across all charter schools. These were weighted by enrollment and the number of years in each school's trend line.

The remainder of this appendix provides school-by-school graphs of filtered scores over time. The first two pages of graphs (Figures F:4 and F:5) plot filtered scores against time. The horizontal line at zero is the score at which charter school performance is exactly the same as its comparison group of schools. Scores above the zero line indicate that the charter school performed better than its comparison group, while scores below the zero line indicate that the charter school performed below its comparison group.

The second two pages of graphs (Figures F:6 and F:7) are included to show how the filtered scores are derived from the difference between charter school scores and those of their comparison schools. These graphs include two trends—one for the charter school and the other for the comparison schools. Since the comparison school is customized for each year, the trends in comparison schools should not be interpreted as changes in a stable cohort of schools. Unlike the first two pages of graphs, the score metric in these graphs is the PSSA scaled score, which typically ranges from approximately 1000 to 1600.

Tables F:3 and F:4 include specific data for individual schools. Table F:3 contains PSSA results for math and reading over the past five years. Actual and predicted scores are included as well as the difference between the two. This table also provides a map of the data that actually exists. As one can see, many of the schools have very little data available due to the newness of the school or the fact that it does not enroll students at grades levels included in the PSSA. Table F:4 contains the average annual change score for each charter school.

¹⁴ We also estimated the regressions on noncharter public schools in Intermediate Units with charter schools. In almost all cases, the results were, for practical purposes, indistinguishable.

¹⁵ In statistical parlance, these are simply the first differences.

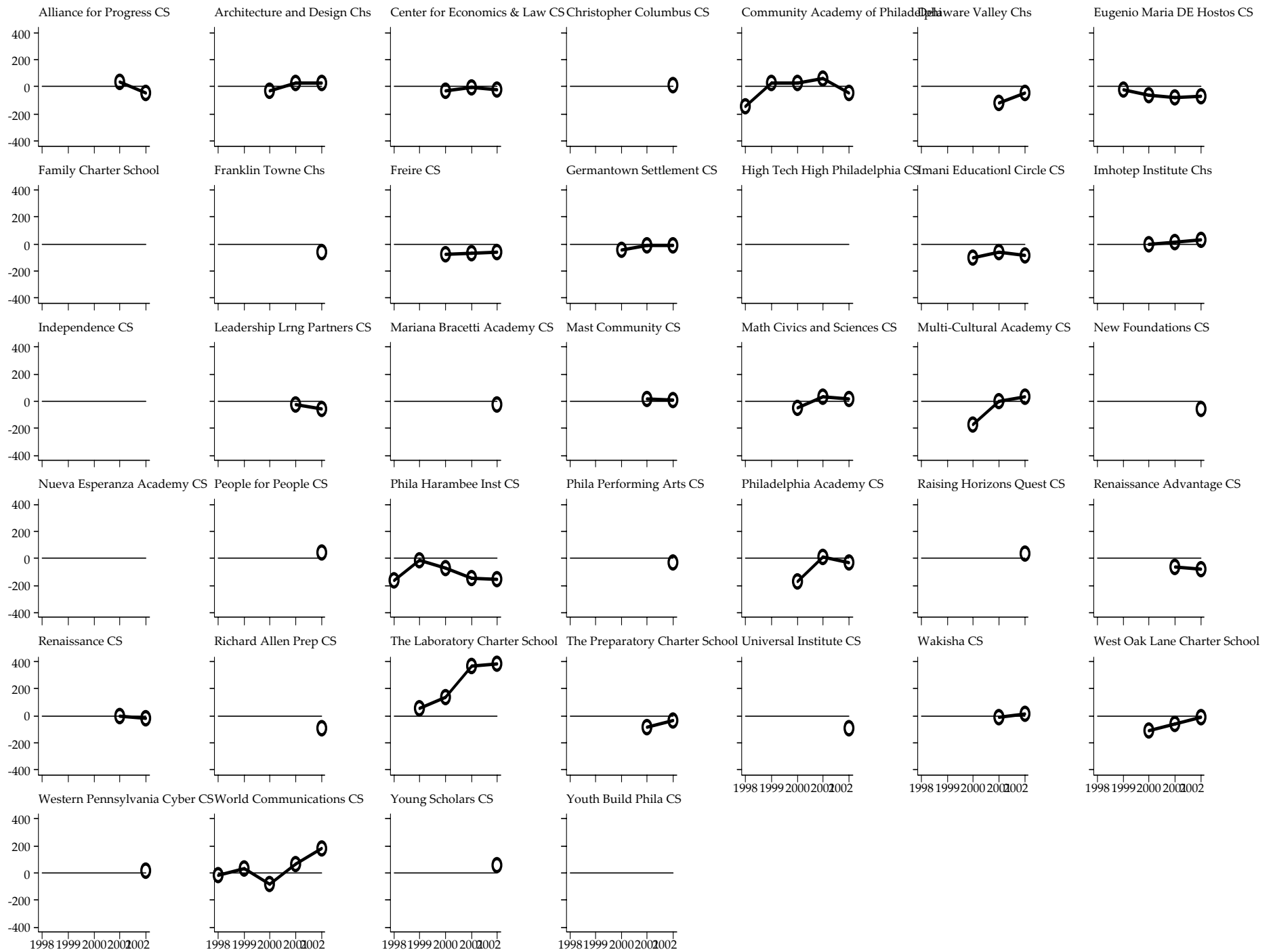


Figure F:4 Trends in Filtered Scores by School

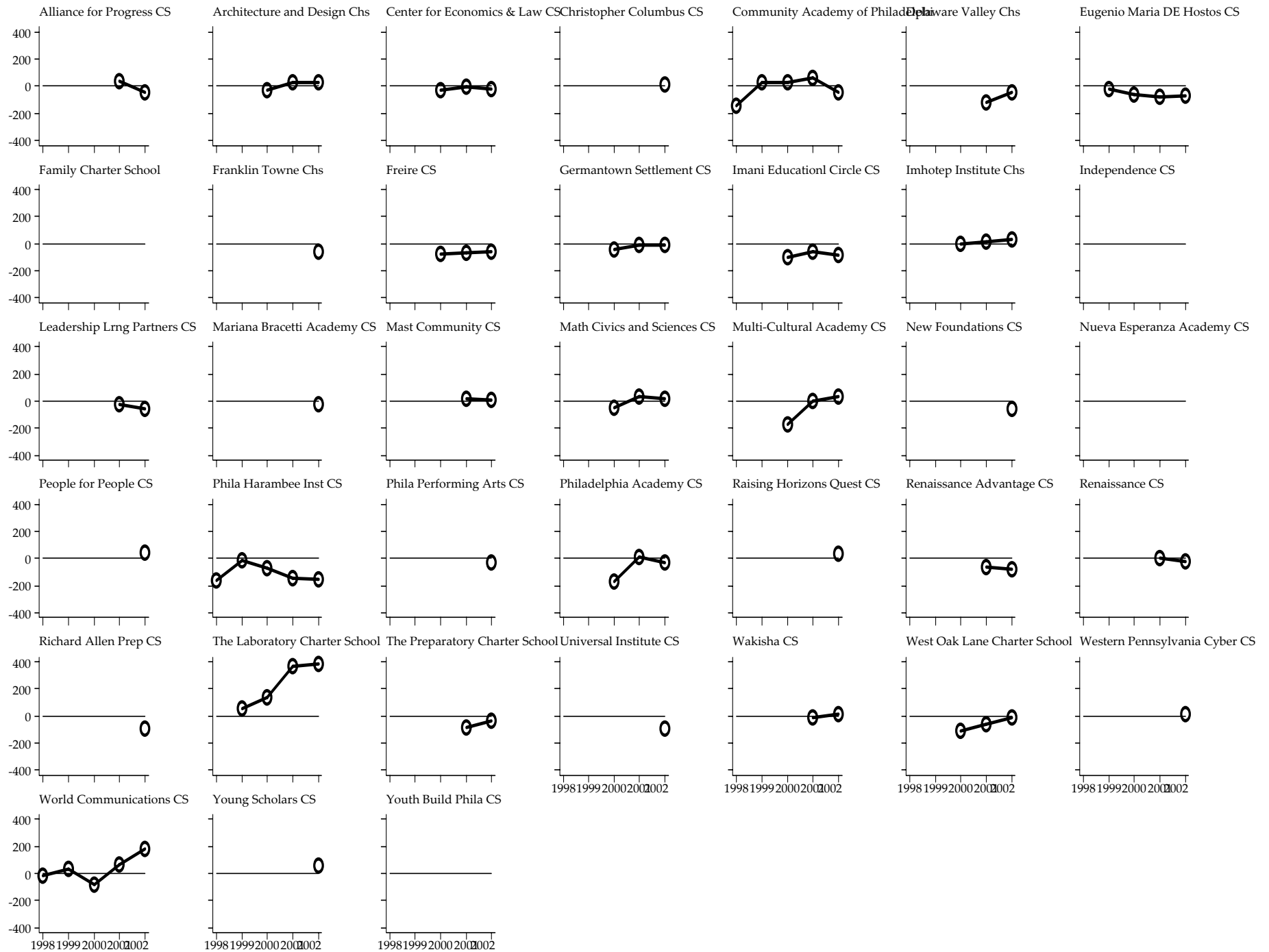


Figure F:5 Trends in Filtered Scores by School

—○— Mean observed score

—+— Mean predicted score

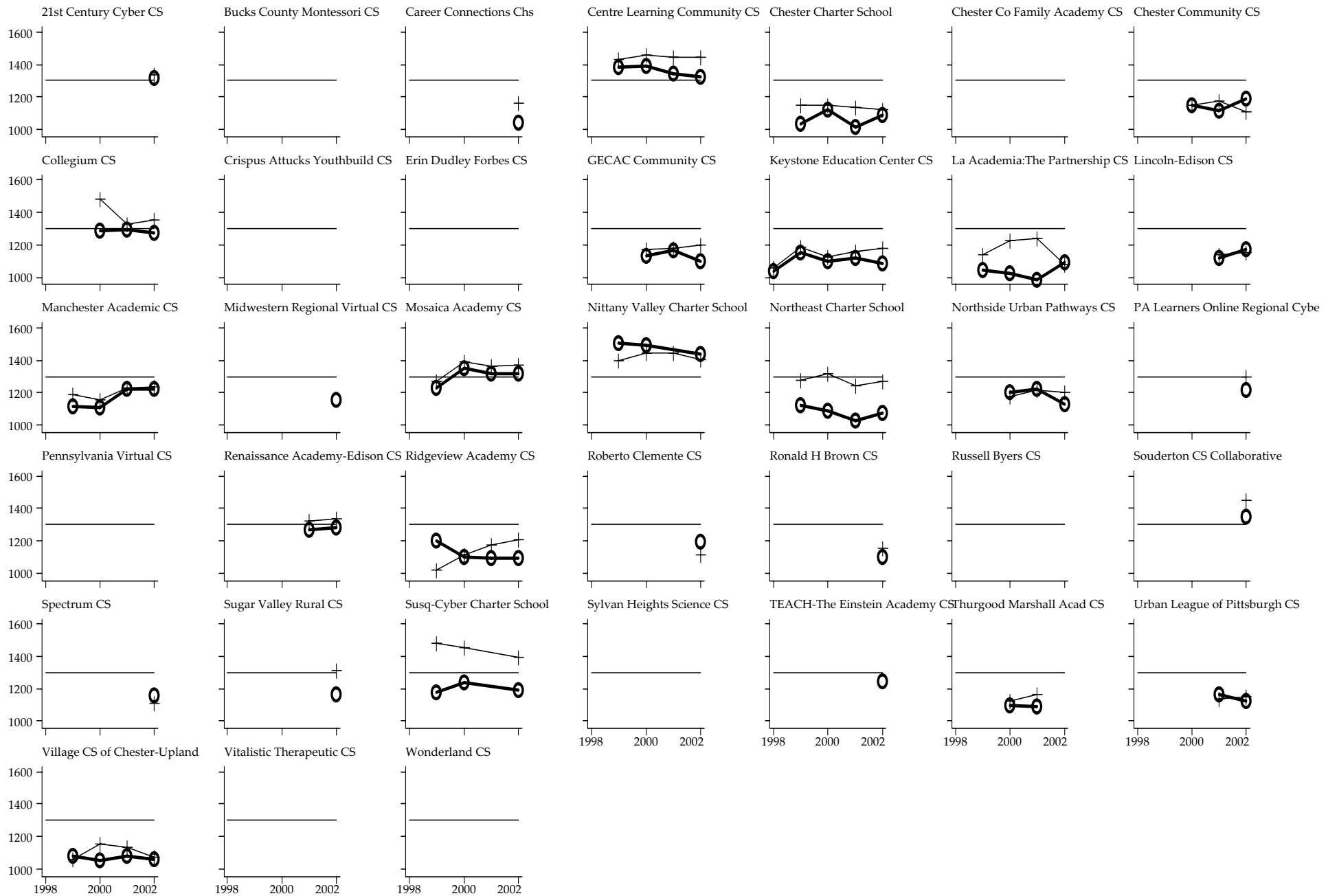


Figure F:6 Trends in PSSA Scaled Scores for Charter and Comparison Schools, by School

—○— Mean observed score

—+— Mean predicted score

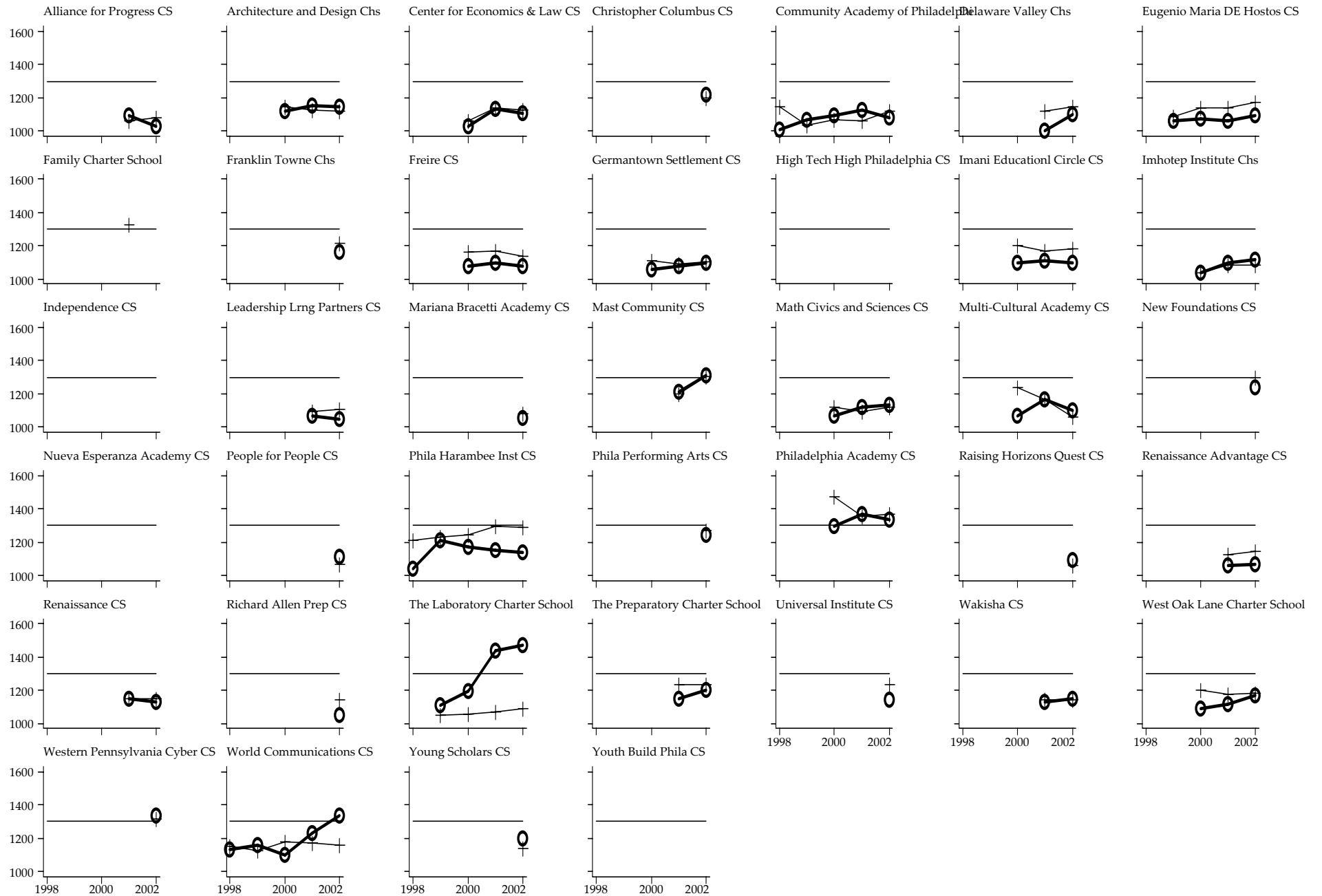


Figure F:7 Trends in PSSA Scaled Scores for Charter and Comparison Schools, by School

Table F:3
Charter School PSSA Scores by School, Year and Test

School Name	Year	Enrollment	Math Grade 5			Reading Grade 5			Math Grade 8			Reading Grade 8			Math Grade 11			Reading Grade 11		
			Actual	Predicted	Difference	Actual	Predicted	Difference	Actual	Predicted	Difference	Actual	Predicted	Difference	Actual	Predicted	Difference	Actual	Predicted	Difference
Christopher Columbus CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Christopher Columbus CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Christopher Columbus CS	2000	328	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Christopher Columbus CS	2001	424	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Christopher Columbus CS	2002	507	1180	1197.9	-17.9	1250	1201.2	48.8	.	.	.	.	.	.	.	.	.	.	.
Collegium CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Collegium CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Collegium CS	2000	70	1290	1498.6	-208.6	1280	1461.1	-181.1	.	.	.	.	.	.	.	.	.	.	.
Collegium CS	2001	533	1280	1326.5	-46.5	1310	1325.9	-15.9	.	.	.	.	.	.	.	.	.	.	.
Collegium CS	2002	647	1250	1358.7	-108.7	1230	1360.7	-130.7	1290	1343.1	-53.1	1310	1355.7	-45.7	.	.	.	.	.
Community Acad. of Phila. CS	1998	180	.	.	.	.	.	.	.	.	.	.	.	.	1000	1169.9	-169.9	1010	1122.1	-112.1
Community Acad. of Phila. CS	1999	260	.	.	.	.	.	.	1050	1028.1	21.9	1050	966.1	83.9	1040	1082.1	-42.1	1130	1068.9	61.1
Community Acad. of Phila. CS	2000	270	.	.	.	.	.	.	1080	1070.8	9.2	1100	1034.5	65.5	1110	1114.8	-4.8	1090	1053.6	36.4
Community Acad. of Phila. CS	2001	277	.	.	.	.	.	.	1080	1116.0	-36.0	1130	1094.5	35.5	1110	990.6	119.4	1190	1053.6	136.4
Community Acad. of Phila. CS	2002	419	.	.	.	.	.	.	1100	1144.2	-44.2	1090	1123.7	-33.7	1050	1116.7	-66.7	1070	1106.1	-36.1
Crispus Attucks Youthbuild CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crispus Attucks Youthbuild CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crispus Attucks Youthbuild CS	2000	44	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crispus Attucks Youthbuild CS	2001	50	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crispus Attucks Youthbuild CS	2002	60	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Delaware Valley Chs	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Delaware Valley Chs	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Delaware Valley Chs	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Delaware Valley Chs	2001	250	.	.	.	.	.	.	.	.	.	.	.	.	1030	1097.7	-67.7	970	1144.9	-174.9
Delaware Valley Chs	2002	356	.	.	.	.	.	.	.	.	.	.	.	.	1080	1154.5	-74.5	1120	1140.5	-20.5
Erin Dudley Forbes CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Erin Dudley Forbes CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Erin Dudley Forbes CS	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Erin Dudley Forbes CS	2001	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Erin Dudley Forbes CS	2002	30	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Eugenio Maria DE Hostos CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Eugenio Maria DE Hostos CS	1999	105	1050	1132.9	-82.9	1070	1036.5	33.5	.	.	.	.	.	.	.	.	.	.	.	.
Eugenio Maria DE Hostos CS	2000	178	1070	1167.2	-97.2	1080	1114.3	-34.3	.	.	.	.	.	.	.	.	.	.	.	.
Eugenio Maria DE Hostos CS	2001	206	1020	1155.4	-135.4	1010	1103.2	-93.2	1100	1149.3	-49.3	1110	1144.3	-34.3	.	.	.	.	.	.
Eugenio Maria DE Hostos CS	2002	208	1070	1205.0	-135.0	1110	1172.5	-62.5	1100	1161.7	-61.7	1100	1136.5	-36.5	.	.	.	.	.	.
Family Charter School	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Family Charter School	1999	84	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Family Charter School	2000	122	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Family Charter School	2001	122	.	1312.9	.	.	1344.3	.	.	.	.	.	.	.	.	.	.	.	.	.
Family Charter School	2002	169	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Franklin Towne Chs	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Franklin Towne Chs	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Franklin Towne Chs	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Franklin Towne Chs	2001	456	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Franklin Towne Chs	2002	686	.	.	.	.	.	.	.	.	.	.	.	.	1140	1228.3	-88.3	1180	1203.5	-23.5
Freire CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Freire CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Freire CS	2000	110	.	.	.	.	.	.	1070	1154.9	-84.9	1090	1164.2	-74.2	.	.	.	.	.	.
Freire CS	2001	160	.	.	.	.	.	.	1100	1165.4	-65.4	1100	1177.9	-77.9	.	.	.	.	.	.
Freire CS	2002	207	.	.	.	.	.	.	1100	1143.6	-43.6	1050	1125.7	-75.7	.	.	.	.	.	.

Table F:3
Charter School PSSA Scores by School, Year and Test

School Name	Year	Enrollment	Math Grade 5			Reading Grade 5			Math Grade 8			Reading Grade 8			Math Grade 11			Reading Grade 11		
			Actual	Predicted	Difference	Actual	Predicted	Difference	Actual	Predicted	Difference	Actual	Predicted	Difference	Actual	Predicted	Difference	Actual	Predicted	Difference
Manchester Academic CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Manchester Academic CS	1999	124	1090	1211.0	-121.0	1140	1169.0	-29.0	.	.	.	.	.	.	.	.	.	.	.	.
Manchester Academic CS	2000	156	1100	1162.6	-62.6	1120	1153.1	-33.1	.	.	.	.	.	.	.	.	.	.	.	.
Manchester Academic CS	2001	165	1210	1228.7	-18.7	1180	1238.0	-58.0	1210	1210.6	-0.6	1300	1243.8	56.2	.	.	.	.	.	.
Manchester Academic CS	2002	159	1230	1232.9	-2.9	1300	1240.0	60.0	1160	1229.0	-69.0	1210	1238.5	-28.5	.	.	.	.	.	.
Mariana Bracetti Academy CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Mariana Bracetti Academy CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Mariana Bracetti Academy CS	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Mariana Bracetti Academy CS	2001	159	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Mariana Bracetti Academy CS	2002	601	.	.	.	.	.	.	1070	1107.8	-37.8	1040	1057.6	-17.6	.	.	.	.	.	.
Mast Community CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Mast Community CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Mast Community CS	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Mast Community CS	2001	950	1190	1183.5	6.5	1240	1164.8	75.2	1230	1226.6	3.4	1240	1199.5	40.5	1150	1193.5	-43.5	1220	1211.7	8.3
Mast Community CS	2002	1029	1340	1268.7	71.3	1380	1273.3	106.7	1360	1317.9	42.1	1310	1296.0	14.0	1240	1346.5	-106.5	1240	1321.4	-81.4
Math Civics and Sciences CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Math Civics and Sciences CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Math Civics and Sciences CS	2000	688	1070	1114.5	-44.5	1090	1126.5	-36.5	1070	1117.2	-47.2	1050	1111.0	-61.0	.	.	.	.	.	.
Math Civics and Sciences CS	2001	748	1130	1076.2	53.8	1150	1066.5	83.5	1100	1121.1	-21.1	1110	1107.1	2.9	.	.	.	.	.	.
Math Civics and Sciences CS	2002	840	1140	1078.9	61.1	1130	1088.2	41.8	1150	1147.8	2.2	1150	1135.1	14.9	1100	1136.9	-36.9	1130	1120.4	9.6
Midwestern Regional Virtual CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Midwestern Regional Virtual CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Midwestern Regional Virtual CS	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Midwestern Regional Virtual CS	2001	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Midwestern Regional Virtual CS	2002	64	1020	.	.	1250	.	.	1140	.	.	1150	.	.	1170	.	.	1210	.	.
Mosaica Academy CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Mosaica Academy CS	1999	450	1240	1277.2	-37.2	1220	1263.1	-43.1	.	.	.	.	.	.	.	.	.	.	.	.
Mosaica Academy CS	2000	501	1350	1394.7	-44.7	1350	1385.2	-35.2	.	.	.	.	.	.	.	.	.	.	.	.
Mosaica Academy CS	2001	539	1310	1358.9	-48.9	1320	1351.6	-31.6	1320	1381.0	-61.0	1320	1375.8	-55.8	.	.	.	.	.	.
Mosaica Academy CS	2002	551	1290	1367.6	-77.6	1290	1362.3	-72.3	1330	1379.4	-49.4	1360	1380.3	-20.3	.	.	.	.	.	.
Multi-Cultural Academy CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Multi-Cultural Academy CS	1999*	121	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Multi-Cultural Academy CS	2000	150	.	.	.	.	.	.	.	.	.	.	.	.	1060	1293.7	-233.7	1070	1186.8	-116.8
Multi-Cultural Academy CS	2001	165	.	.	.	.	.	.	.	.	.	.	.	.	1130	1126.4	3.6	1200	1204.0	-4.0
Multi-Cultural Academy CS	2002	165	.	.	.	.	.	.	.	.	.	.	.	.	1080	1079.8	0.2	1120	1046.3	73.7
New Foundations CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
New Foundations CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
New Foundations CS	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
New Foundations CS	2001	355	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
New Foundations CS	2002	387	1180	1308.3	-128.3	1250	1308.6	-58.6	1260	1294.7	-34.7	1260	1278.6	-18.6	.	.	.	.	.	.
Nittany Valley Charter School	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nittany Valley Charter School	1999	48	1520	1461.7	58.3	1460	1431.9	28.1	1580	1344.1	235.9	1450	1364.6	85.4	.	.	.	.	.	.
Nittany Valley Charter School	2000	48	1470	1505.0	-35.0	1480	1459.7	20.3	1510	1380.0	130.0	1500	1429.7	70.3	.	.	.	.	.	.
Nittany Valley Charter School	2001	48	.	1474.8	.	.	1474.7	.	.	1385.7	.	.	1446.6	.	.	.	.	.	.	.
Nittany Valley Charter School	2002	48	1330	1452.9	-122.9	1260	1425.0	-165.0	1560	1365.6	194.4	1600	1378.9	221.1	.	.	.	.	.	.
Northeast Charter School	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Northeast Charter School	1999	20	.	.	.	.	.	.	.	.	.	.	.	.	1140	1241.0	.	1110	1314.0	.
Northeast Charter School	2000	40	.	.	.	.	.	.	.	.	.	.	.	.	1140	1335.8	-195.8	1040	1293.7	-253.7
Northeast Charter School	2001	57	.	.	.	.	.	.	.	1213.1	.	.	1191.4	.	1070	1234.8	-164.8	980	1323.1	-343.1
Northeast Charter School	2002	59	.	.	.	.	.	.	1150	1266.1	-116.1	1230	1221.9	8.1	1030	1292.5	-262.5	880	1299.7	-419.7

Table F:3
Charter School PSSA Scores by School, Year and Test

School Name	Year	Enrollment	Math Grade 5			Reading Grade 5			Math Grade 8			Reading Grade 8			Math Grade 11			Reading Grade 11		
			Actual	Predicted	Difference	Actual	Predicted	Difference	Actual	Predicted	Difference	Actual	Predicted	Difference	Actual	Predicted	Difference	Actual	Predicted	Difference
Northside Urban Pathways CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Northside Urban Pathways CS	1999	122	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Northside Urban Pathways CS	2000	139	.	.	.	.	.	.	1130	1160.2	-30.2	1200	1199.3	0.7	1280	1162.9	117.1	1190	1167.1	22.9
Northside Urban Pathways CS	2001	139	.	.	.	.	.	.	1230	1233.0	-3.0	1280	1270.9	9.1	1200	1152.4	47.6	1170	1213.1	-43.1
Northside Urban Pathways CS	2002	199	.	.	.	.	.	.	1140	1200.8	-60.7	1100	1189.0	-89.0	1150	1205.0	-55.0	1130	1213.8	-83.7
Nueva Esperanza Academy CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nueva Esperanza Academy CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nueva Esperanza Academy CS	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nueva Esperanza Academy CS	2001	203	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nueva Esperanza Academy CS	2002	326	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PA Learners Online Reg.Cyber CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PA Learners Online Reg.Cyber CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PA Learners Online Reg.Cyber CS	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PA Learners Online Reg.Cyber CS	2001	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PA Learners Online Reg.Cyber CS	2002	384	1260	1304.6	-44.6	1240	1318.7	-78.7	1180	1302.7	-122.7	1200	1268.9	-68.9	1200	1330.5	-130.5	1230	1260.9	-30.9
Pennsylvania Virtual CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pennsylvania Virtual CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pennsylvania Virtual CS	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pennsylvania Virtual CS	2001	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pennsylvania Virtual CS	2002	744	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
People for People CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
People for People CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
People for People CS	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
People for People CS	2001	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
People for People CS	2002	364	1100	1067.8	32.2	1120	1066.4	53.6	.	.	.	.	.	.	.	.	.	.	.	.
Phila Harambee Inst CS	1998	220	1140	1210.0	-70.0	1030	1165.0	-135.0	1000	1248.0	-248.0	1000	1206.0	-206.0	.	.	.	.	.	.
Phila Harambee Inst CS	1999	224	1100	1259.0	-159.0	1150	1240.0	-90.0	1250	1197.0	53.0	1350	1210.0	140.0	.	.	.	.	.	.
Phila Harambee Inst CS	2000	231	1150	1250.9	-100.9	1180	1252.5	-72.5	1170	1221.2	-51.2	1190	1238.7	-48.7	.	.	.	.	.	.
Phila Harambee Inst CS	2001	240	1130	1284.9	-154.9	1110	1313.4	-203.4	1170	1262.9	-92.9	1190	1313.3	-123.3	.	.	.	.	.	.
Phila Harambee Inst CS	2002	261	1110	1269.6	-159.6	1140	1289.1	-149.1	1130	1283.4	-153.4	1160	1302.9	-142.9	.	.	.	.	.	.
Phila Performing Arts CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Phila Performing Arts CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Phila Performing Arts CS	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Phila Performing Arts CS	2001	300	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Phila Performing Arts CS	2002	351	1230	1271.6	-41.6	1250	1265.9	-15.9	.	.	.	.	.	.	.	.	.	.	.	.
Philadelphia Academy CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Philadelphia Academy CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Philadelphia Academy CS	2000	625	1350	1468.7	-118.7	1340	1485.2	-145.2	1220	1421.0	-201.0	1280	1507.7	-227.7	.	.	.	.	.	.
Philadelphia Academy CS	2001	649	1420	1351.6	68.4	1360	1363.9	-3.9	1350	1342.6	7.4	1340	1368.0	-28.0	.	.	.	.	.	.
Philadelphia Academy CS	2002	654	1320	1374.0	-54.0	1330	1377.5	-47.5	1340	1354.8	-14.8	1360	1361.5	-1.5	.	.	.	.	.	.
Raising Horizons Quest CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Raising Horizons Quest CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Raising Horizons Quest CS	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Raising Horizons Quest CS	2001	302	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Raising Horizons Quest CS	2002	414	1060	1055.4	4.6	1120	1060.9	59.1	.	.	.	.	.	.	.	.	.	.	.	.
Renaissance Acad.-Edison CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Renaissance Acad.-Edison CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Renaissance Acad.-Edison CS	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Renaissance Acad.-Edison CS	2001	659	1250	1317.1	-67.1	1300	1318.9	-18.9	1280	1346.6	-66.6	1250	1296.9	-46.9	.	.	.	.	.	.
Renaissance Acad.-Edison CS	2002	731	1280	1323.6	-43.6	1270	1328.5	-58.5	1290	1345.9	-55.9	1290	1351.1	-61.1	.	.	.	.	.	.

Table F:3
Charter School PSSA Scores by School, Year and Test

School Name	Year	Enrollment	Math Grade 5			Reading Grade 5			Math Grade 8			Reading Grade 8			Math Grade 11			Reading Grade 11		
			Actual	Predicted	Difference	Actual	Predicted	Difference	Actual	Predicted	Difference	Actual	Predicted	Difference	Actual	Predicted	Difference	Actual	Predicted	Difference
Renaissance Advantage CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Renaissance Advantage CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Renaissance Advantage CS	2000	472	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Renaissance Advantage CS	2001	633	1040	1121.8	-81.8	1080	1126.3	-46.3	.	.	.	.	.	.	.	.	.	.	.	.
Renaissance Advantage CS	2002	611	1030	1136.3	-106.3	1100	1146.4	-46.4	.	.	.	.	.	.	.	.	.	.	.	.
Renaissance CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Renaissance CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Renaissance CS	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Renaissance CS	2001	153	.	.	.	.	.	.	1120	1145.7	-25.7	1180	1153.4	26.6	.	.	.	.	.	.
Renaissance CS	2002	177	.	.	.	.	.	.	1110	1155.6	-45.6	1150	1143.9	6.1	.	.	.	.	.	.
Richard Allen Prep CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Richard Allen Prep CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Richard Allen Prep CS	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Richard Allen Prep CS	2001	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Richard Allen Prep CS	2002	177	1040	1142.0	-102.0	1060	1140.0	-80.0	.	.	.	.	.	.	.	.	.	.	.	.
Ridgeview Academy CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ridgeview Academy CS	1999	164	.	.	.	.	.	.	1130	1014.0	116.0	1140	984.0	156.0	1230	1038.0	192.0	1290	1031.0	259.0
Ridgeview Academy CS	2000	189	.	.	.	.	.	.	1060	1160.6	-100.6	1050	1231.8	-181.8	1150	955.6	194.4	1140	1110.6	29.4
Ridgeview Academy CS	2001	209	.	.	.	.	.	.	1100	1273.5	-173.5	1060	1273.6	-213.6	1110	1045.1	64.9	1100	1089.5	10.5
Ridgeview Academy CS	2002	194	.	.	.	.	.	.	1110	1244.2	-134.2	1080	1220.3	-140.3	1090	1175.3	-85.3	1090	1179.7	-89.7
Roberto Clemente CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Roberto Clemente CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Roberto Clemente CS	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Roberto Clemente CS	2001	100	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Roberto Clemente CS	2002	123	.	.	.	.	.	.	1140	1168.4	-28.4	1220	1140.5	79.5	1230	1053.8	176.2	1190	1073.6	116.4
Ronald H Brown CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ronald H Brown CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ronald H Brown CS	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ronald H Brown CS	2001	448	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ronald H Brown CS	2002	465	1090	1158.0	-68.0	1110	1153.0	-43.0	.	.	.	.	.	.	.	.	.	.	.	.
Russell Byers CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Russell Byers CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Russell Byers CS	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Russell Byers CS	2001	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Russell Byers CS	2002	150	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Souderton CS Collaborative	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Souderton CS Collaborative	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Souderton CS Collaborative	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Souderton CS Collaborative	2001	64	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Souderton CS Collaborative	2002	85	1330	1457.9	-127.9	1360	1444.4	-84.4	.	.	.	.	.	.	.	.	.	.	.	.
Spectrum CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Spectrum CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Spectrum CS	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Spectrum CS	2001	19	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Spectrum CS	2002	21	.	.	.	.	.	.	950	1156.4	-206.4	890	1173.0	-283.0	1430	988.8	441.2	1370	1117.2	252.8
Sugar Valley Rural CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sugar Valley Rural CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sugar Valley Rural CS	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sugar Valley Rural CS	2001	173	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sugar Valley Rural CS	2002	214	1280	1345.2	-65.2	1280	1343.6	-63.6	1150	1320.8	-170.8	1070	1294.1	-224.0	1130	1286.5	-156.5	1080	1295.7	-215.7

Table F:3
Charter School PSSA Scores by School, Year and Test

School Name	Year	Enrollment	Math Grade 5			Reading Grade 5			Math Grade 8			Reading Grade 8			Math Grade 11			Reading Grade 11		
			Actual	Predicted	Difference	Actual	Predicted	Difference	Actual	Predicted	Difference	Actual	Predicted	Difference	Actual	Predicted	Difference	Actual	Predicted	Difference
Wakisha CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Wakisha CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Wakisha CS	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Wakisha CS	2001	297	.	.	.	.	.	.	1110	1148.1	-38.1	1140	1132.2	7.8	.	.	.	.	.	.
Wakisha CS	2002	370	.	.	.	.	.	.	1150	1145.2	4.8	1150	1131.3	18.7	.	.	.	.	.	.
West Oak Lane Charter School	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
West Oak Lane Charter School	1999	548	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
West Oak Lane Charter School	2000	621	1060	1192.5	-132.5	1120	1205.1	-85.1	.	.	.	.	.	.	.	.	.	.	.	.
West Oak Lane Charter School	2001	560	1120	1170.9	-50.9	1110	1179.5	-69.5	.	.	.	.	.	.	.	.	.	.	.	.
West Oak Lane Charter School	2002	576	1160	1173.8	-13.8	1170	1187.0	-17.0	.	.	.	.	.	.	.	.	.	.	.	.
Western Pennsylvania Cyber CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Western Pennsylvania Cyber CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Western Pennsylvania Cyber CS	2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Western Pennsylvania Cyber CS	2001	505	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Western Pennsylvania Cyber CS	2002	1146	1320	1295.0	25.0	1380	1298.0	82.0	1340	1347.9	-7.9	1380	1335.1	44.9	1240	1334.3	-94.3	1340	1295.5	44.5
Wonderland CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Wonderland CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Wonderland CS	2000	26	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Wonderland CS	2001	34	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Wonderland CS	2002	34	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
World Communications CS	1998	270	.	.	.	.	.	.	1110	1164.3	-54.3	1150	1136.2	13.8	.	.	.	.	.	.
World Communications CS	1999	467	.	.	.	.	.	.	1160	1128.0	32.0	1160	1125.4	34.6	.	.	.	.	.	.
World Communications CS	2000	482	.	.	.	.	.	.	1100	1176.1	-76.1	1100	1159.8	-59.8	1100	1217.6	-117.6	1090	1155.4	-65.4
World Communications CS	2001	418	.	.	.	.	.	.	1200	1153.7	46.3	1220	1150.3	69.7	1220	1165.0	55.0	1280	1207.9	72.1
World Communications CS	2002	387	.	.	.	.	.	.	1220	1164.3	55.7	1290	1151.8	138.2	1470	1161.4	308.6	1360	1149.8	210.2
Young Scholars CS	1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Young Scholars CS	1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Young Scholars CS	2000	61	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Young Scholars CS	2001	120	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Young Scholars CS	2002	192	.	.	.	.	.	.	1180	1147.9	32.1	1210	1134.2	75.8	.	.	.	.	.	.
Youth Build Phila CS	1998	149	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Youth Build Phila CS	1999	175	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Youth Build Phila CS	2000	210	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Youth Build Phila CS	2001	225	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Youth Build Phila CS	2002	225	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

* Note that the 1999 PSSA results for Multi-Cultural Academy were not available.

Table F:4
Charter School PSSA Change Scores

<i>School Name</i>	<i>Number of Change Scores</i>	<i>Average Annual Change Scores</i>			
		<i>average</i>	<i>st dev</i>	<i>min</i>	<i>max</i>
21st Century Cyber CS	0	.	.	.	.
Alliance for Progress CS	1	-82.0	.	-82.0	-82.0
Architecture and Design Chs	2	26.3	39.6	-1.7	54.2
Bucks County Montessori CS	0	.	.	.	.
Career Connections Chs	0	.	.	.	.
Center for Economics & Law CS	2	5.2	25.2	-12.6	23.0
Centre Learning Community CS	3	-24.7	10.3	-36.5	-17.5
Chester Charter School	3	27.8	110.7	-100.0	93.9
Chester Co Family Academy CS	0	.	.	.	.
Chester Community CS	2	40.5	142.9	-60.5	141.5
Christopher Columbus CS	0	.	.	.	.
Collegium CS	2	55.2	153.4	-53.3	163.6
Community Academy of Philadelphia CS	4	24.0	116.4	-109.0	172.3
Crispus Attucks Youthbuild CS	0	.	.	.	.
Delaware Valley Chs	1	73.8	.	73.8	73.8
Erin Dudley Forbes CS	0	.	.	.	.
Eugenio Maria DE Hostos CS	3	-16.4	22.9	-41.0	4.2
Family Charter School	0	.	.	.	.
Franklin Towne Chs	0	.	.	.	.
Freire CS	2	9.9	3.0	7.9	12.0
GECAC Community CS	2	-31.0	79.5	-87.3	25.2
Germantown Settlement CS	2	17.8	29.7	-3.2	38.7
High Tech High Philadelphia CS	0	.	.	.	.
Imani Educationl Circle CS	2	10.5	50.7	-25.4	46.3
Imhotep Institute Chs	2	15.3	2.3	13.7	17.0
Independence CS	0	.	.	.	.
Keystone Education Center CS	4	-18.6	24.4	-51.2	7.1
La Academia:The Partnership CS	3	38.0	202.5	-103.3	270.0
Leadership Lrng Partners CS	1	-35.5	.	-35.5	-35.5
Lincoln-Edison CS	1	43.8	.	43.8	43.8
Manchester Academic CS	3	21.6	24.2	-4.9	42.6
Mariana Bracetti Academy CS	0	.	.	.	.
Mast Community CS	1	-7.4	.	-7.4	-7.4
Math Civics and Sciences CS	2	31.4	64.6	-14.3	77.1
Midwestern Regional Virtual CS	0	.	.	.	.
Mosaica Academy CS	3	-4.9	4.8	-9.4	0.2
Multi-Cultural Academy CS	2	106.1	97.5	37.2	175.1
New Foundations CS	0	.	.	.	.
Nittany Valley Charter School	1	-55.5	.	-55.5	-55.5

Table F:4
Charter School PSSA Change Scores

<i>School Name</i>	<i>Number of Change Scores</i>	<i>Average Annual Change Scores</i>			
		<i>average</i>	<i>st dev</i>	<i>min</i>	<i>max</i>
Northeast Charter School	3	-15.0	49.7	-72.2	18.0
Northside Urban Pathways CS	2	-49.9	35.2	-74.8	-25.0
Nueva Esperanza Academy CS	0	.	.	.	.
PA Learners Online Regional Cyber CS	0	.	.	.	.
Pennsylvania Virtual CS	0	.	.	.	.
People for People CS	0	.	.	.	.
Phila Harambee Inst CS	4	3.4	102.2	-75.3	150.8
Phila Performing Arts CS	0	.	.	.	.
Philadelphia Academy CS	2	71.9	158.7	-40.4	184.1
Raising Horizons Quest CS	0	.	.	.	.
Renaissance Academy-Edison CS	1	-4.9	.	-4.9	-4.9
Renaissance Advantage CS	1	-12.3	.	-12.3	-12.3
Renaissance CS	1	-20.3	.	-20.3	-20.3
Richard Allen Prep CS	0	.	.	.	.
Ridgeview Academy CS	3	-97.7	85.8	-195.4	-34.5
Roberto Clemente CS	0	.	.	.	.
Ronald H Brown CS	0	.	.	.	.
Russell Byers CS	0	.	.	.	.
Souderton CS Collaborative	0	.	.	.	.
Spectrum CS	0	.	.	.	.
Sugar Valley Rural CS	0	.	.	.	.
Susq-Cyber Charter School	1	85.5	.	85.5	85.5
Sylvan Heights Science CS	0	.	.	.	.
TEACH-The Einstein Academy CS	0	.	.	.	.
The Laboratory Charter School	3	107.0	110.8	12.8	229.1
The Preparatory Charter School	1	55.1	.	55.1	55.1
Thurgood Marshall Acad CS	1	-47.2	.	-47.2	-47.2
Universal Institute CS	0	.	.	.	.
Urban League of Pittsburgh CS	1	-50.3	.	-50.3	-50.3
Village CS of Chester-Upland	3	-12.7	96.2	-123.6	47.4
Vitalistic Therapeutic CS	0	.	.	.	.
Wakisha CS	1	26.9	.	26.9	26.9
West Oak Lane Charter School	2	46.7	2.8	44.8	48.7
Western Pennsylvania Cyber CS	0	.	.	.	.
Wonderland CS	0	.	.	.	.
World Communications CS	4	49.6	114.5	-113.0	140.5
Young Scholars CS	0	.	.	.	.
Youth Build Phila CS	0	.	.	.	.