NATIONAL CENTER FOR EDUCATION EVALUATION AND REGIONAL ASSISTANCE
Institute of Education Sciences

DO LOW-INCOME STUDENTS HAVE EQUAL ACCESS TO THE HIGHEST-PERFORMING TEACHERS?

This appendix describes the methods and provides further detail to support the evaluation brief, "Do Low-Income Students Have Equal Access to the Highest-Performing Teachers?"

Identifying highest-performing teachers using value-added analysis

For this analysis, we defined highest-performing teachers as those whose value-added estimates in English language arts (ELA), math, or both put them in the top 20 percent of all eligible teachers in their teacher pool within their district. The three teacher pools we considered were: (1) elementary (math and ELA), (2) middle school math, and (3) middle school ELA. Highest-performing teachers achieved the strongest learning gains with their students based on two or more years of teachers' data in ELA and/or math.[1] To be eligible, a teacher had to teach in a tested grade and subject for at least two years, and be teaching in the most recent academic year.[2]

Since elementary teachers are typically responsible for teaching both ELA and math, we measured their performance by combining value added results for ELA and math. To do this, we separately standardized the ELA and math value added estimates and then used the average of the two estimates to rank teachers and identify the highest-performing teachers. The correlation between ELA and math value added estimates for elementary teachers ranged from 0.39 to 0.77 across the eight districts in the elementary analysis.

The value-added estimates are generated using a student-level regression model with test score at the end of each year (post-test) as the outcome and test score at the end of the previous year (pre-test) as a key control variable. The model, shown in Equation (1), includes teacher fixed effects as the object of interest. We estimated the value-added model using student-level data in eight of the districts in this analysis, where we included the following student background indicator variables as additional controls: special education status, free or reduce price lunch eligibility (FRL), English language learner status, over age for grade, and race/ethnicity. We included a classroom level control for the percentage of student turnover to capture the disruptive effects of student mobility. For the other two districts—referred to as Districts C and D—information on the ranking of teachers was provided by the districts themselves, which had contracted with an outside vendor, the SAS Institute, a North Carolina-based software company, to identify their highest-performing teachers.[3] We used the existing measures in these districts

[1] Two districts provided just two years of growth data. Another provided four years of data. The remaining districts provided three years of data.

[2] Using multiple years of data to estimate teacher value-added indicators provides more precise estimates than merely using a single year of data (Koedel and Betts 2009; Chiang and Schochet 2009). However, restricting the analysis to teachers with at least two or three years of complete data in a tested grade or subject reduces the number of teachers in the sample. Less than full representation of teachers in this analysis potentially underestimates differences in teacher quality by school poverty level.

[3] The SAS value-added model uses a mixed model regression analysis but differs from our approach in that it does not include student characteristics as controls or adjust for student mobility. For details on the SAS model, see Sanders et al. (1997).

because the appropriate and most policy-relevant value added measure to use when identifying the distribution of top-tier teachers include those adopted by the districts themselves.

To identify teachers as highest performing, we first estimated a value-added model, which is a student achievement growth model that includes indicators for the student's teacher. The student-level model can be expressed by the following equation:

$$(1)\quad Y_{i,t} = \lambda_{t-1} * Y_{i,t-1} + \alpha * X_{i,t} + \beta * D_{i,t} + e_{i,t}$$

where, $Y_{i,t}$ is the posttest score for student *i* in year *t*, $Y_{i,t-1}$ is the pretest for student *i* in year *t-1* that is assumed to capture prior inputs into student achievement, $X_{i,t}$ is a vector of control variables for individual student background characteristics such as gender, race/ethinicity, free/reduced price lunch status, English language learner status, special education status etc. $D_{i,t}$ is a vector of dosage variables that includes one variable for each teacher-year, and $e_{i,t}$ is the error term. Each dosage variable equals the percentage of the year student *i* in year *t* was taught by that teacher. The value of any element of $D_{i,t}$ is zero if student *i* was not taught by that teacher in year *t*. The λ_{t-1}, α, and β are parameters to be estimated. The performance measures are contained in the vector β, which contains the coefficients of the dosage variables $D_{i,t}$.

We estimated Equation (1) separately for each district and each of three pools of teachers: elementary, middle school math, and middle school English language arts (ELA). For each district we had at least three years of data, i.e. *t* = 2006, 2007, and 2008 in many cases, although some teachers were included if they contributed two years of data.

We corrected for measurement error in the pretest by fitting an errors-in-variables regression model.[4] We obtained the reliability for each test from either the test publisher or the school district whenever available. We employed a two-stage procedure. In the first stage, we estimate the following errors-in-variables regression model using the average reliability of the test across grades and years:

$$(2)\quad Y_{i,t} = \lambda_{t-1} * Y_{i,t-1} + \alpha * X_{i,t} + \beta * D_{i,t} + e_{i,t}$$

The control variables for student background characteristics in Equation (2) are identical to those used in (1). Using $\hat{\lambda}_{t-1}$, the estimated value for the coefficient of the pretest, we calculate the estimated adjusted gain for each student in each year:

$$(3)\quad \hat{G}_{i,t} = Y_{i,t} - \hat{\lambda}_{t-1} * Y_{i,t-1}$$

[4] We implement this model using the eivreg command in Stata.

The second stage regression model pools the data from all years and uses the adjusted gain as the dependent variable:

$$\hat{G}_{i,t} = \alpha * X_{i,t} + \beta_t * D_{i,t} + e_{i,t} \tag{4}$$

In Equation (4), we accounted for the correlation in outcomes for students in different years by using robust standard errors (Huber 1967, White 1980). This method underestimates the standard errors of β because it treats $\hat{\lambda}_{t-1}$ as identical to its true value, λ_{t-1}; if $\hat{\lambda}_{t-1}$ is estimated precisely, this will be negligible. Substituting Equation (3) into (4), rearranging terms, and treating $\hat{\lambda}_{t-1}$ as λ_{t-1} gives Equation (1).

After estimating Equation (4) to obtain performance measures from the β coefficients, we apply a shrinkage procedure outlined in Morris (1983) to calculate empirical Bayes performance measures and standard errors. Using this procedure, the empirical Bayes estimate of each performance measure is approximately the precision-weighted average of the original performance measure (an individual element of the β vector) and the mean of all the point estimates (all the elements of β):

$$\beta_i^{EB} \approx \left(\frac{\frac{1}{\sigma_i^2}}{\frac{1}{\sigma_i^2} + \frac{1}{\sigma_\beta^2}} \right) \beta_i + \left(\frac{\frac{1}{\sigma_\beta^2}}{\frac{1}{\sigma_i^2} + \frac{1}{\sigma_\beta^2}} \right) \mu_\beta \quad , \tag{5}$$

Where β_i^{EB} is the empirical Bayes estimate of an element of the β vector, β_i is the original point estimate, σ_i is the standard error of the original point estimate, μ_β is the mean of all the point estimates, and σ_β is the standard deviation of all the point estimates.

Due to the precision weighting of the original estimate and the mean of all the point estimates, the empirical Bayes performance measure is designed to place relatively more weight on the mean when the original estimate has a high standard error.

We estimated alternative specifications of the value added model to test the sensitivity of the findings. In an analysis with half of the ten districts, we examined the correlation between the value added indicators estimated with and without a measurement error correction. Across the five districts, the correlation was between 0.91 and 0.99 for elementary school teachers and between 0.77 and 0.98 for middle school teachers. The high correlations may be due to high reliability of the pre-tests, which in turn produces a small correction, or because there is a weak correlation between the pre-test score (the variable measured with error) and teachers. We also reproduced the findings when the value added estimates were not adjusted using Empirical Bayes shrinkage and the results were robust to this alternative specification.

Classifying Schools Based on Student Disadvantage

Our analysis examined the distribution of teachers across high- and low-poverty schools. We ranked schools by grade span (elementary separate from middle school) within each district based on the percentage of their students eligible for free and reduced price lunch (FRL), an indicator of poverty. After ranking schools, we divided them into five equal sized groups, or quintiles, for the analysis.[5] The first quintile represented the highest-poverty schools and the fifth quintile the lowest-poverty schools in the district. The differences between the highest and lowest quintiles varied by district. The actual FRL percentages are shown by district, quintile, and school type in Table A.1.

Table A.1. Average Percent of Students Eligible for Free or Reduced Price Lunch, by Quintile

	Elementary					Middle School				
	High poverty				Low poverty	High poverty				Low poverty
	1	2	3	4	5	1	2	3	4	5
District A	89	77	60	31	11	86	71	53	31	14
District B	100	93	65	63	15	92	64	51	40	24
District C	90	76	59	38	20	78	60	51	38	19
District D	98	96	94	90	49	95	92	88	81	48
District E	99	94	88	78	54	99	95	89	81	52
District F	62	49	41	33	17	58	46	40	32	19
District G	97	91	80	61	45	92	89	77	62	46
District H	91	80	48	13	4	87	67	37	12	6
District I	NA	NA	NA	NA	NA	99	92	82	70	46
District J	NA	NA	NA	NA	NA	90	84	77	63	39
All Districts Combined	92	84	73	57	33	91	82	73	60	37

Note: The first quintile (1) represents the highest-poverty schools and the fifth quintile (5) the lowest.

Sample sizes and hypothesis tests

We tried to address the question of whether the observed variation in prevalence of highest-performing teachers across schools is random or systematic. In other words, is the uneven distribution due to random fluctuations in the percent of highest-performing teachers across schools, possibly resulting from small sample sizes, or is the distribution unlikely a result of chance differences? To do this, we conducted hypothesis tests to determine whether the distribution of highest-performing teachers observed in each district was consistent with a

[5] We repeated the entire analysis using four equal sized groups of schools in each district (quartiles instead of quintiles). The findings for this alternative analysis are presented below.

uniform distribution, in which each quintile in the district would have approximately the same proportion of highest-performing teachers (20 percent), i.e. teacher quality as captured by prevalence of highest-performing teachers and school quintile are independent. We conducted chi-square tests of the independence of teacher status ("highest performing") and quintile of achievement or poverty (percent FRL). This is the standard independence test one might conduct in a cross-tabulation of these variable pairs.

We first conducted significance tests for the analysis in Figure 1 that combined data from all ten districts. The distribution of highest-performing middle school teachers differed significantly from a uniform distribution when comparing schools by achievement and poverty. However, the results for elementary teachers are only significant when the schools were grouped by school achievement quintile. The results of the tests for individual districts are shown in Table A.2. Table A.3 shows the sample sizes in terms of teachers and schools by district, quintile, and school type.

Table A.2. P-Values from Tests of Independence between Quintile and Percentage of Highest-performing Teachers

	Using Poverty Quintiles			Using Achievement Quintiles		
	Elementary	Middle School Math	Middle School ELA	Elementary	Middle School Math	Middle School ELA
District A	.049	.000	.000	.000	.000	.000
District B	.000	.003	.000	.000	.003	.000
District C	.249	.836	.019	.374	.150	.020
District D	.036	.004	.000	.000	.000	.000
District E	.416	.080	.729	.001	.132	.050
District F	.071	.636	.054	.000	.308	.024
District G	.009	.751	.076	.016	.694	.313
District H	.304	.860	.361	.406	.803	.541
District I	NA	.000	.132	NA	.000	.006
District J	NA	.053	.000	NA	.001	.000
All Districts Combined	.176	.000	.000	.000	.000	.000

Source: Author calculations based on district administrative data.

Note: P-values represent the probability of observing the test statistic if highest-performing teachers were uniformly distributed across quintiles of school achievement or poverty. A p-value below 0.05 (shaded cell) suggests that we can reject the hypothesis that teacher distributions are uniform. NA = Not applicable because no elementary school data provided.

Table A.3. Number of Teachers and Schools, by Poverty Quintile, District, and School Type

	Elementary					Middle School				
	High poverty				Low poverty	High poverty				Low poverty
	1	2	3	4	5	1	2	3	4	5
Number of Teachers										
District A	95	135	145	175	180	95	90	110	95	70
District B	70	90	115	115	115	50	65	75	70	85
District C	25	30	25	45	60	30	30	35	45	60
District D	245	290	305	315	310	95	145	110	100	110
District E	95	85	120	120	125	85	70	120	120	115
District F	125	125	115	100	100	45	95	80	75	80
District G	65	80	80	70	115	50	50	85	75	85
District H	205	235	305	330	325	75	70	100	100	105
District I	NA	NA	NA	NA	NA	300	235	220	225	235
District J	NA	NA	NA	NA	NA	150	180	140	185	180
All Districts Combined	925	1070	1210	1270	1330	975	1025	1075	1090	1125
Number of Schools										
District A	20	20	20	20	20	5	5	5	5	5
District B	10	10	10	5	10	5	5	5	5	5
District C	15	15	15	15	15	5	5	5	5	5
District D	35	35	35	35	35	10	10	10	10	10
District E	20	20	20	20	20	10	10	10	10	10
District F	15	15	15	15	15	5	5	5	5	5
District G	15	15	15	15	10	5	5	5	5	5
District H	10	10	10	10	10	5	5	5	5	5
District I	NA	NA	NA	NA	NA	20	15	20	15	15
District J	NA	NA	NA	NA	NA	15	15	15	15	15
All Districts Combined	140	140	140	135	135	85	80	85	70	80

Notes: The first quintile (1) represents the lowest-achievement schools and the fifth quintile (5) the highest.

Numbers of teachers and schools have been rounded to the nearest 5 to avoid disclosing the identity of the districts.

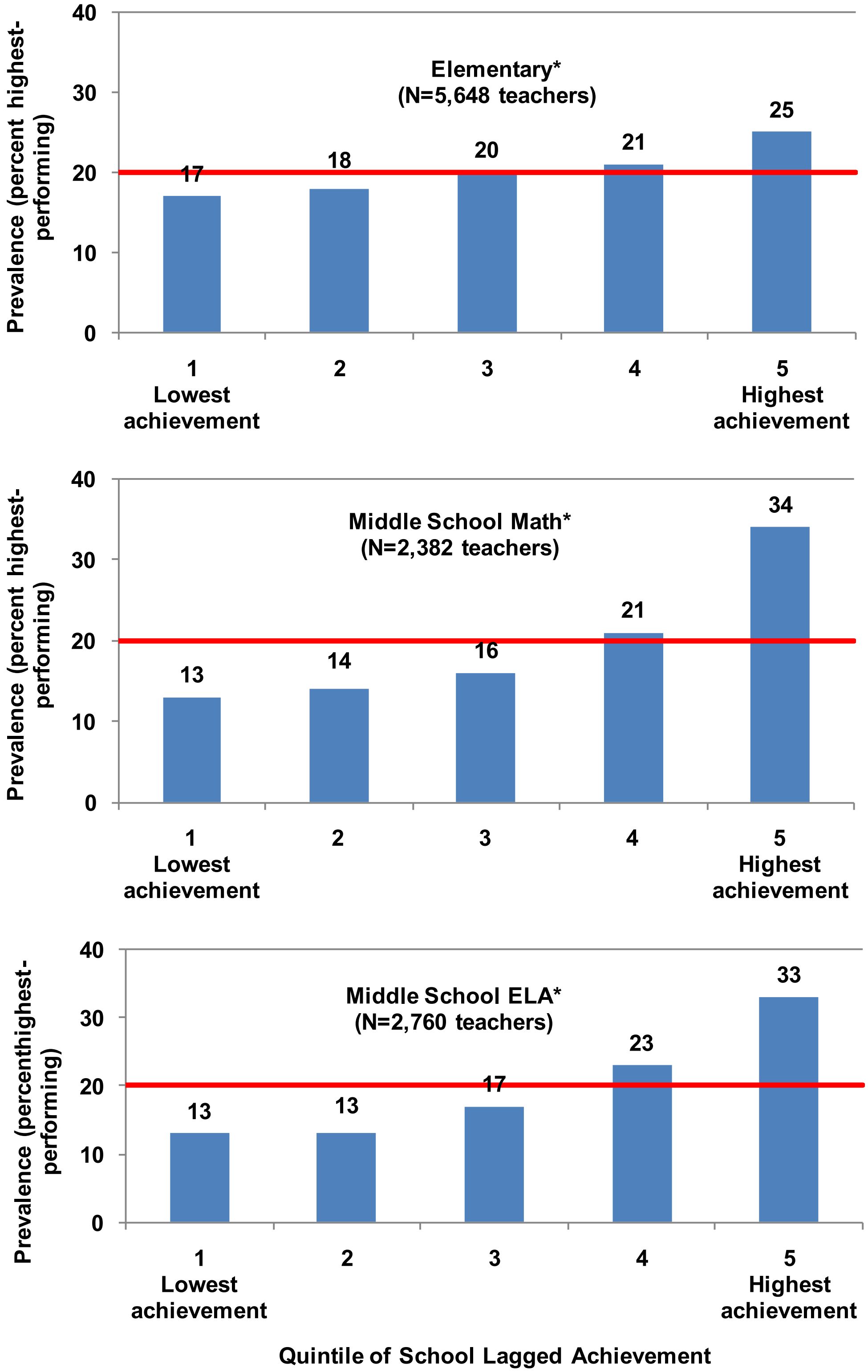
NA=Not available (district did not provide elementary school data).

Robustness of Main Results: Grouping Schools by Achievement and Grouping Them More Coarsely

The main results in the memo were presented using poverty (percent FRL) as the basis for grouping schools into quintiles. We also ranked schools based on the reading and math achievement levels of their students using average test scores or proficiency levels, this being another way to rank order schools by student disadvantage. In order to use a school achievement measure that was less likely to be the product of high- or low-performing teachers we divided schools by their achievement level *measured in the year before the period covered by our value-added analysis*. We refer to these school groups as the prior year school achievement quintiles, although the "prior" year may be 3 or 4 years before the year in which the distribution is described. The first quintile represents the lowest-achieving schools and the fifth quintile the highest-achieving schools, as measured by the prior year's school achievement. The differences between the highest and lowest quintiles varied by district.

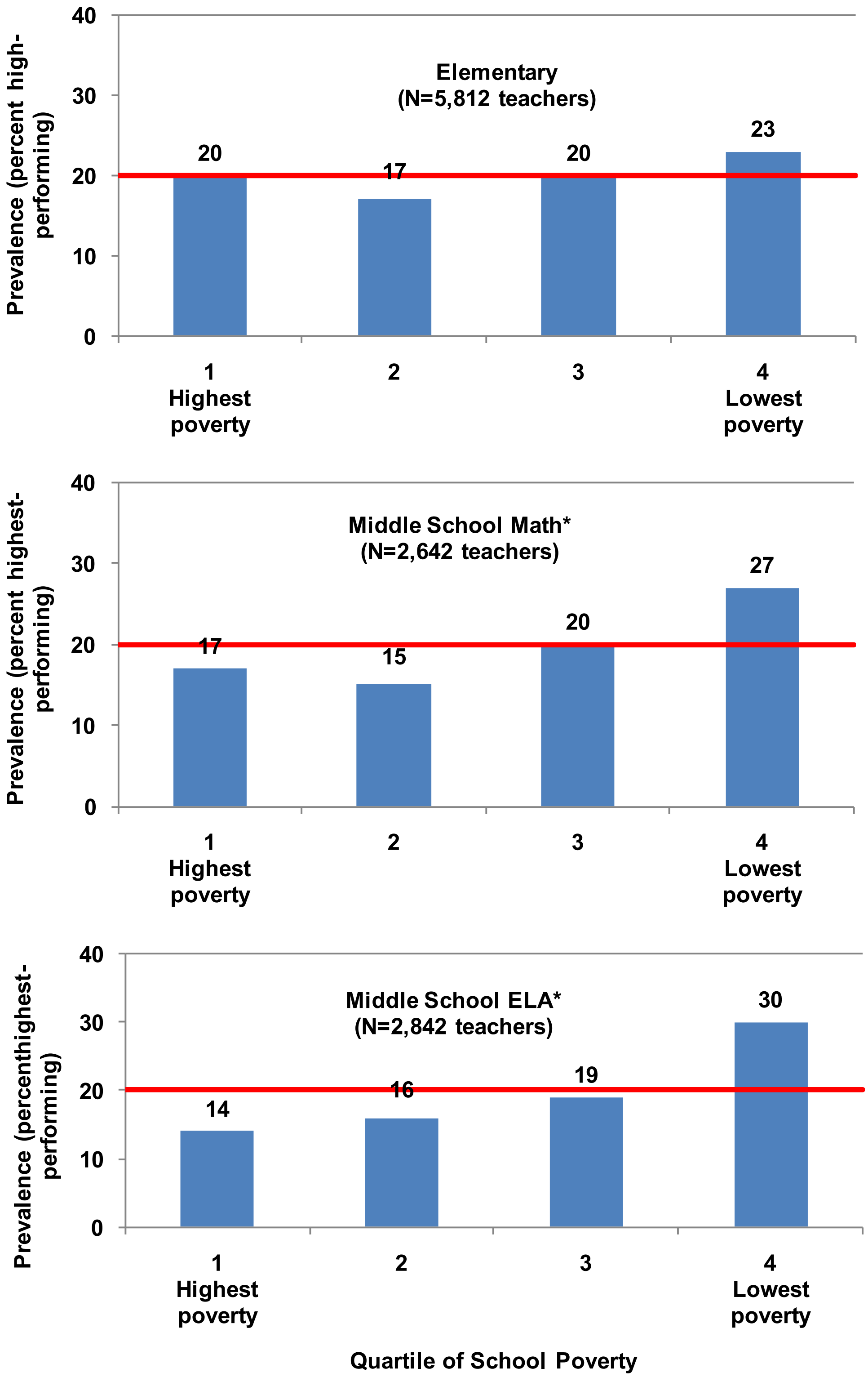
Grouping schools into quintiles was an arbitrary choice, so we also examined the results grouping schools into four instead of five equal-sized groups of schools. Figure A.2 shows the main results by grouping schools into quartiles instead of quintiles.

Figure A.1. Prevalence of Highest-performing Teachers by School Prior Average Achievement Quintile



* Chi-square test of no relationship between quintile and percent highest-performing is rejected at the 0.05 level.

Figure A.2. Prevalence of Highest-performing Teachers by School Average Poverty Quartile



* Chi-square test of no relationship between quintile and percent highest-performing is rejected at the 0.05 level.

Results by district

Figures A.3, A.4, and A.5 show the results disaggregated by school district. We labeled the districts A through J. Districts I and J provided data at the middle school level only. Table A.4 shows the percent highest performing teachers in each district and quintile (corresponding to the figures). Table A.5 shows the average value added, expressed in terms of student-level standard deviations where available for each district by quintile (corresponding to the figures). Figures A.6, A.7, and A.8 show the percentage of highest-performing teachers by district using quintiles formed by prior achievement. Table A.6 compiles all of the information by poverty quintile.

Table A.4. Prevalence of Highest-Performing Teachers, by Poverty Quintile, District, and School Type

District	Elementary					Middle School Math				
	1	2	3	4	5	1	2	3	4	5
A	0.20	0.19	0.16	0.16	0.27	0.06	0.05	0.10	0.29	0.62
B	0.07	0.15	0.22	0.16	0.34	0.13	0.04	0.11	0.29	0.37
C	0.04	0.19	0.28	0.18	0.25	0.25	0.13	0.13	0.18	0.24
D	0.22	0.22	0.24	0.24	0.15	0.09	0.19	0.27	0.04	0.27
E	0.19	0.13	0.22	0.21	0.23	0.19	0.36	0.15	0.09	0.24
F	0.18	0.14	0.18	0.24	0.28	0.15	0.18	0.28	0.14	0.21
G	0.35	0.18	0.23	0.20	0.12	0.26	0.29	0.25	0.18	0.16
H	0.19	0.18	0.18	0.24	0.21	0.23	0.15	0.23	0.22	0.19
I	NA	NA	NA	NA	NA	0.11	0.17	0.25	0.21	0.35
J	NA	NA	NA	NA	NA	0.22	0.13	0.19	0.22	0.30
	Middle School English Language Arts									
A	0.07	0.12	0.14	0.24	0.55					
B	0.07	0.14	0.08	0.19	0.48					
C	0.00	0.13	0.14	0.39	0.30					
D	0.06	0.17	0.10	0.17	0.46					
E	0.22	0.19	0.18	0.14	0.22					
F	0.14	0.23	0.08	0.21	0.33					
G	0.06	0.34	0.23	0.18	0.20					
H	0.29	0.14	0.23	0.26	0.14					
I	0.12	0.20	0.19	0.23	0.23					
J	0.10	0.15	0.14	0.20	0.45					

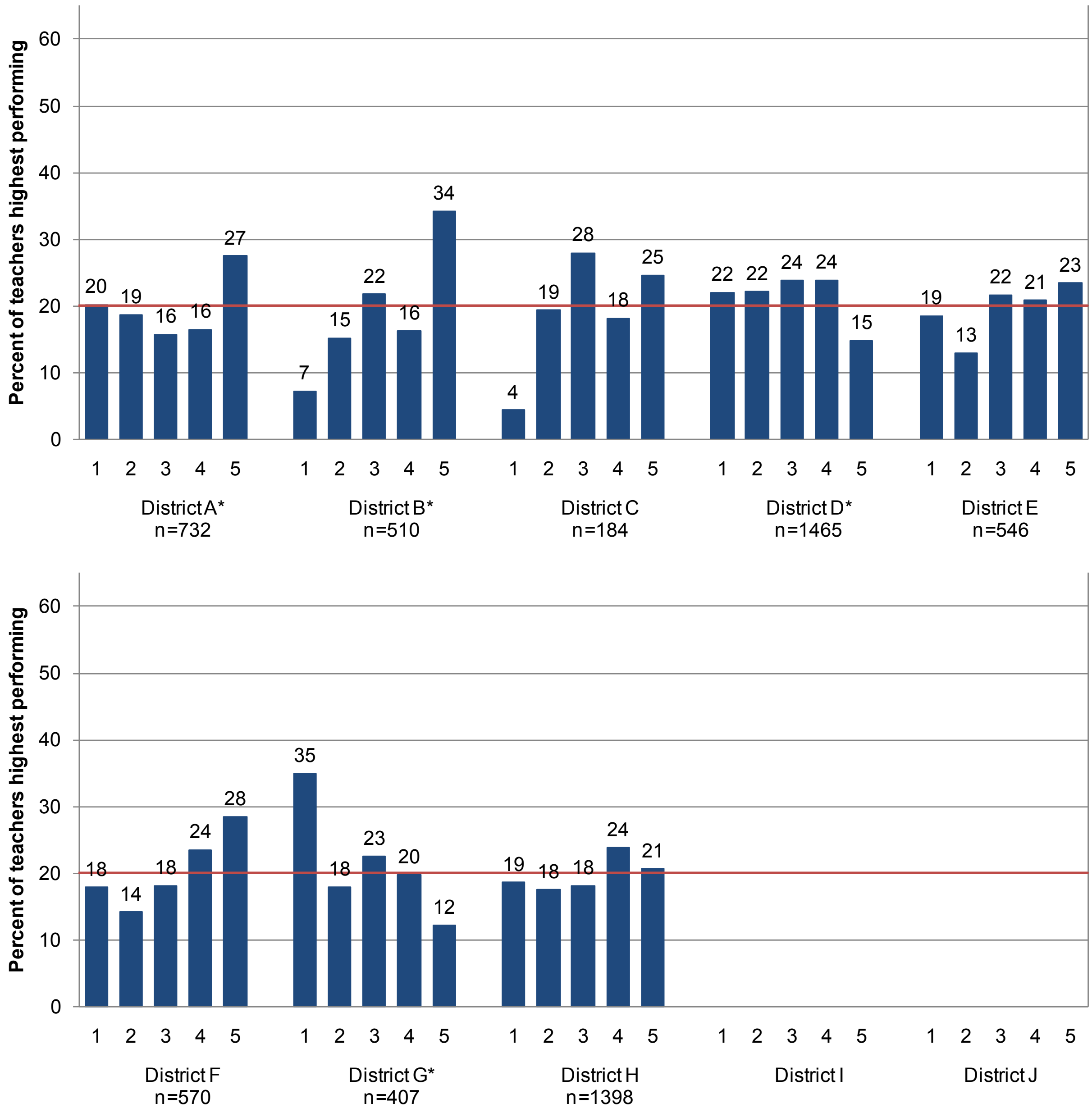
Note: The first quintile (1) represents the highest-poverty schools and the fifth quintile (5) the lowest. NA = Not available (No data provided for elementary schools in Districts I and J).

Table A.5. Average Teacher Value Added, by Poverty Quintile, District, and School Type

District	Elementary					Middle School Math				
	High poverty				Low povert y	High poverty				Low povert y
	1	2	3	4	5	1	2	3	4	5
A	0.01	0.01	0.02	0.01	0.03	-0.06	-0.11	0.01	0.10	0.16
B	-0.04	-0.01	0.02	0.01	0.07	-0.01	-0.04	0.00	0.05	0.10
C	-0.36	0.25	0.26	0.45	0.42	-0.23	-0.23	-0.06	-0.03	0.84
D	-0.01	0.19	0.06	0.04	0.02	0.03	-0.25	0.53	-0.96	1.12
E	0.03	0.02	0.03	0.04	0.06	0.01	0.09	-0.06	-0.07	0.01
F	0.03	-0.02	-0.01	0.04	0.05	-0.02	0.01	0.03	-0.01	0.02
G	0.09	-0.02	0.03	-0.01	-0.01	0.03	0.04	0.00	0.01	0.02
H	0.00	-0.01	0.01	0.02	0.02	0.00	-0.05	-0.01	0.02	0.00
I	NA	NA	NA	NA	NA	-0.01	0.02	0.04	0.03	0.10
J	NA	NA	NA	NA	NA	0.00	0.00	0.01	0.02	0.01
	Middle School English Language Arts									
A	-0.01	-0.01	0.00	0.01	0.06					
B	-0.04	-0.01	-0.03	0.02	0.07					
C	-0.42	0.12	-0.01	0.31	0.23					
D	-0.16	-0.05	-0.34	-0.16	0.99					
E	0.01	0.05	0.01	0.03	0.09					
F	-0.04	0.00	-0.01	0.00	0.03					
G	-0.02	0.03	0.01	-0.01	0.04					
H	0.07	-0.01	0.03	0.04	-0.03					
I	0.00	0.00	0.00	0.01	0.03					
J	-0.03	-0.01	0.00	0.02	0.06					

Note: The first quintile (1) represents the highest-poverty schools and the fifth quintile (5) the lowest. NA = Not available (No data provided for elementary schools in Districts I and J). Average value added is expressed in standard deviations of the student test score distribution, except in Districts C and D, where it is expressed in terms of EVAAS scores, which are scaled using the standard error of the teacher effect estimate.

Figure A.3. Prevalence of Highest-performing Teachers by School Average Poverty Quintile by District: Elementary Grades



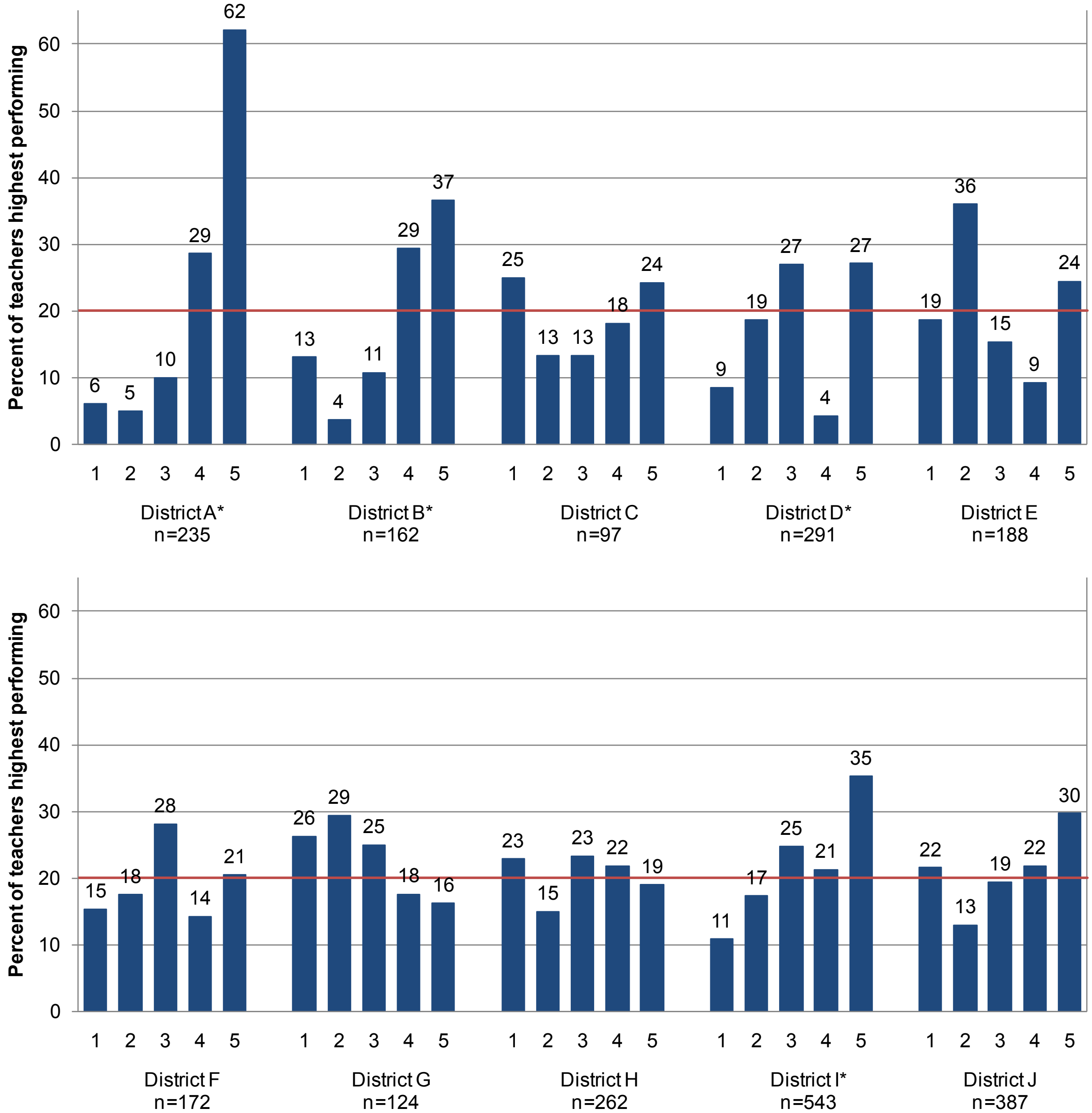
Source: Author calculations based on district administrative data.

Note: The first quintile (1) represents the highest-poverty schools and the fifth quintile (5) the lowest.

n = number of teachers included in the analysis. Data from Districts I and J included middle school grades only.

* Chi-square test of “no relationship” between quintile and percent highest performing is rejected at 0.05 level.

Figure A.4. Prevalence of Highest-performing Teachers by School Average Poverty Quintile by District: Middle School Math



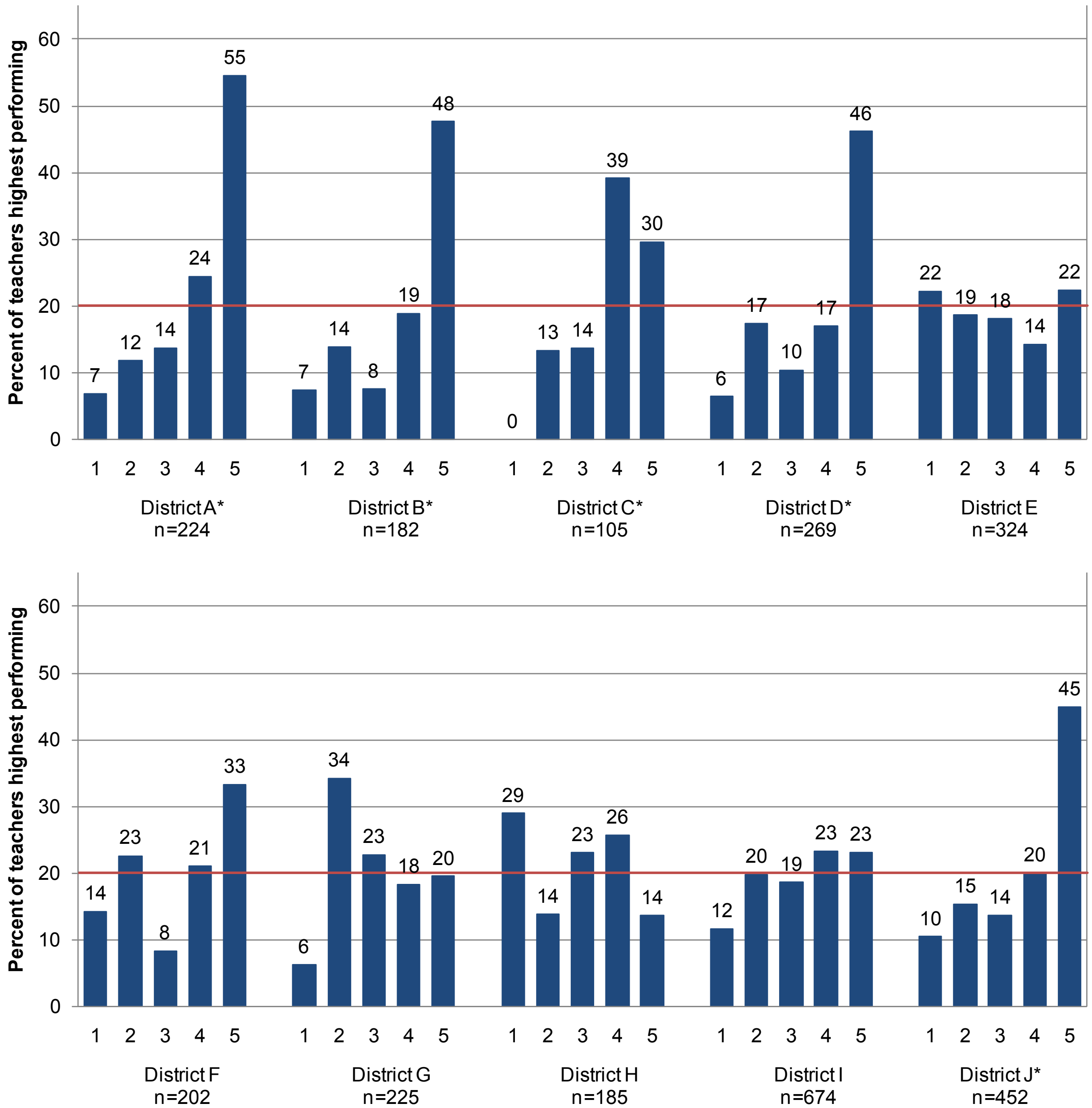
Source: Author calculations based on district administrative data.

Note: The first quintile (1) represents the highest-poverty schools and the fifth quintile (5) the lowest.

n = number of teachers included in the analysis

* Chi-square test of “no relationship” between quintile and percent highest performing is rejected at 0.05 level.

Figure A.5. Prevalence of Highest-performing Teachers by School Average Poverty Quintile by District: Middle School English Language Arts



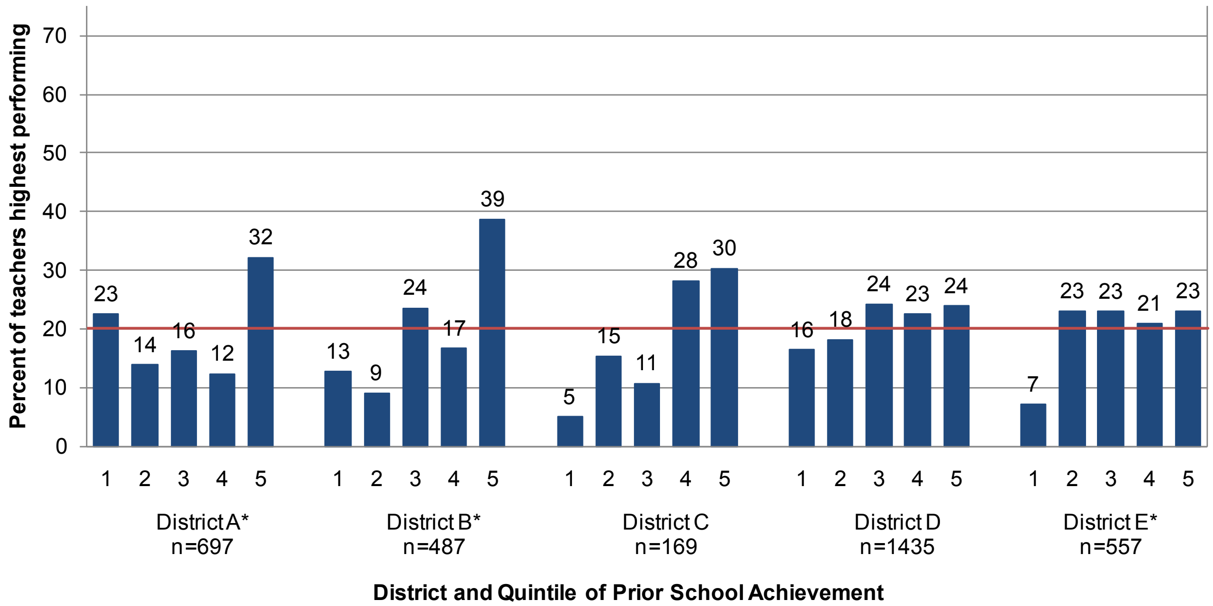
Source: Author calculations based on district administrative data.

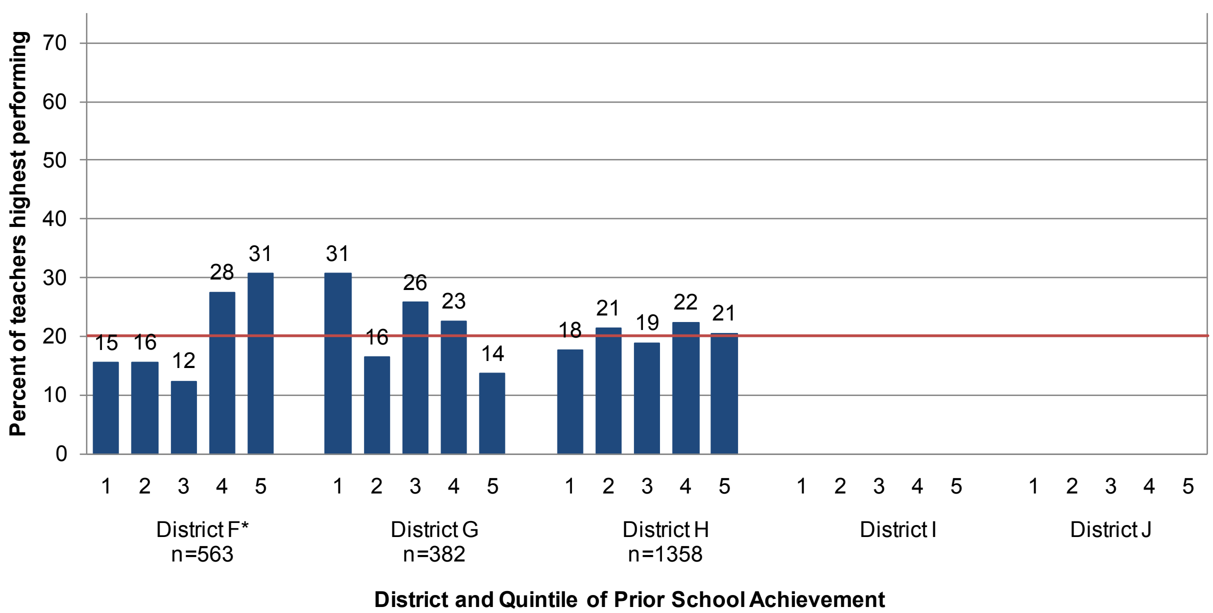
Note: The first quintile (1) represents the highest-poverty schools and the fifth quintile (5) the lowest.

n = number of teachers included in the analysis

* Chi-square test of “no relationship” between quintile and percent highest performing is rejected at 0.05 level.

Figure A.6 Prevalence of Highest-performing Teachers by School Average Prior Achievement Quintile by District: Elementary Grades





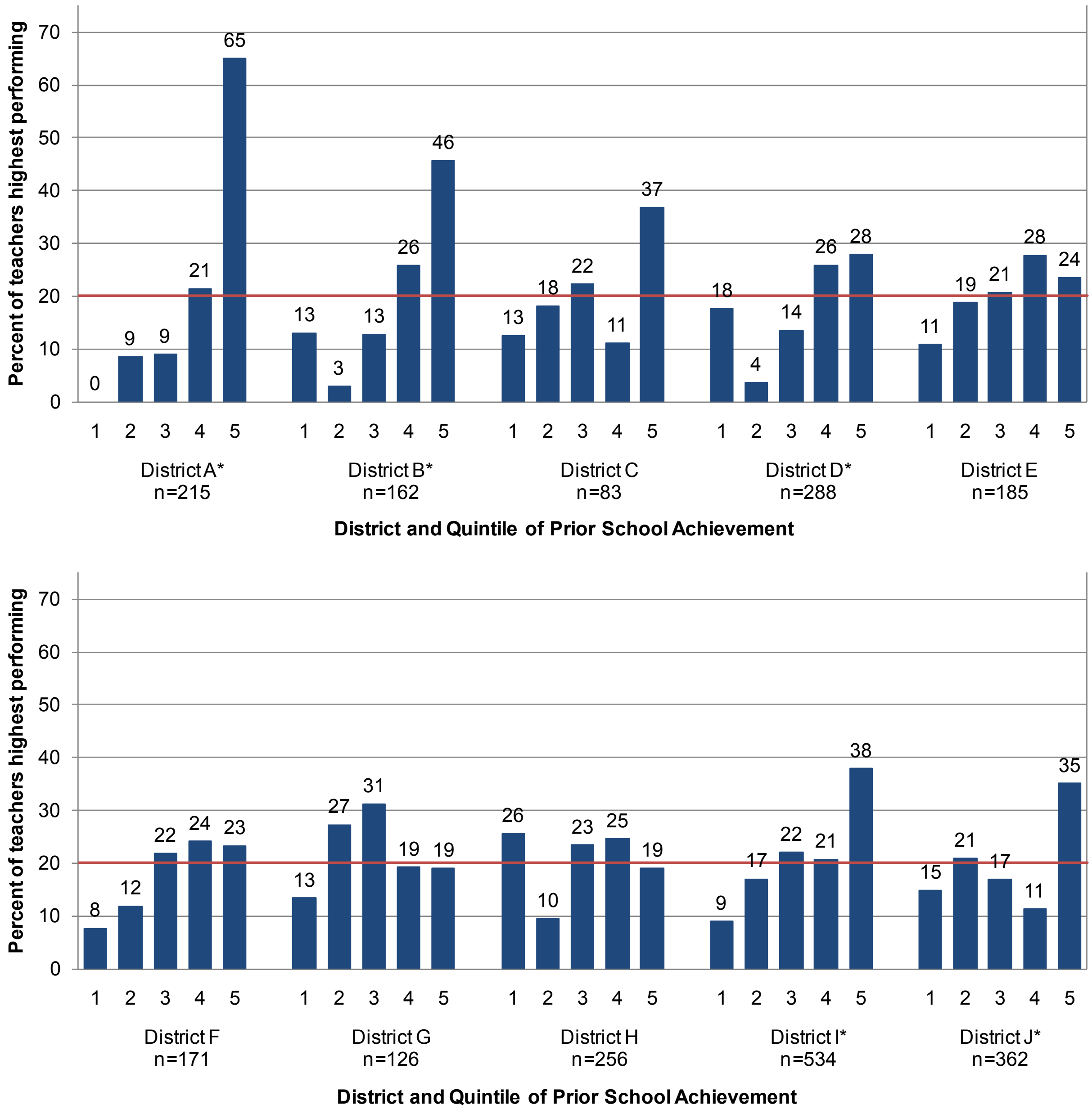
Source: Author calculations based on district administrative data.

Note: The first quintile (1) represents the lowest-achieving schools and the fifth quintile (5) the highest.

n = number of teachers included in the analysis. Data from Districts I and J covered middle school only.

* Chi-square test of “no relationship” between quintile and percent highest performing is rejected at 0.05 level.

Figure A.7. Prevalence of Highest-performing Teachers by School Average Prior Achievement Quintile by District: Middle School Math



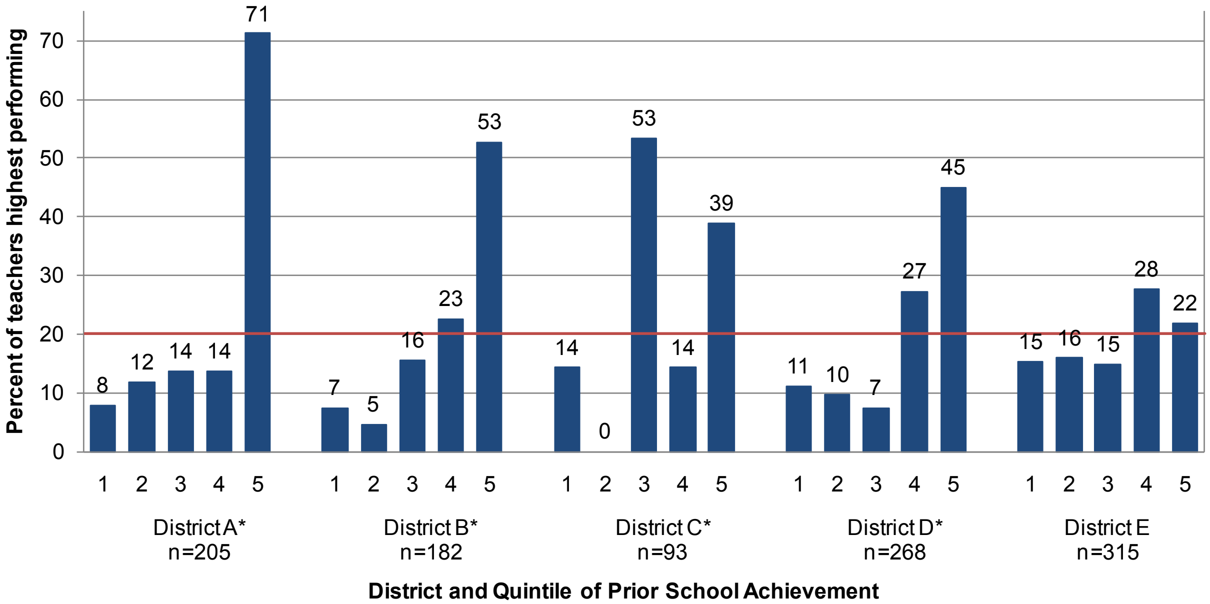
Source: Author calculations based on district administrative data.

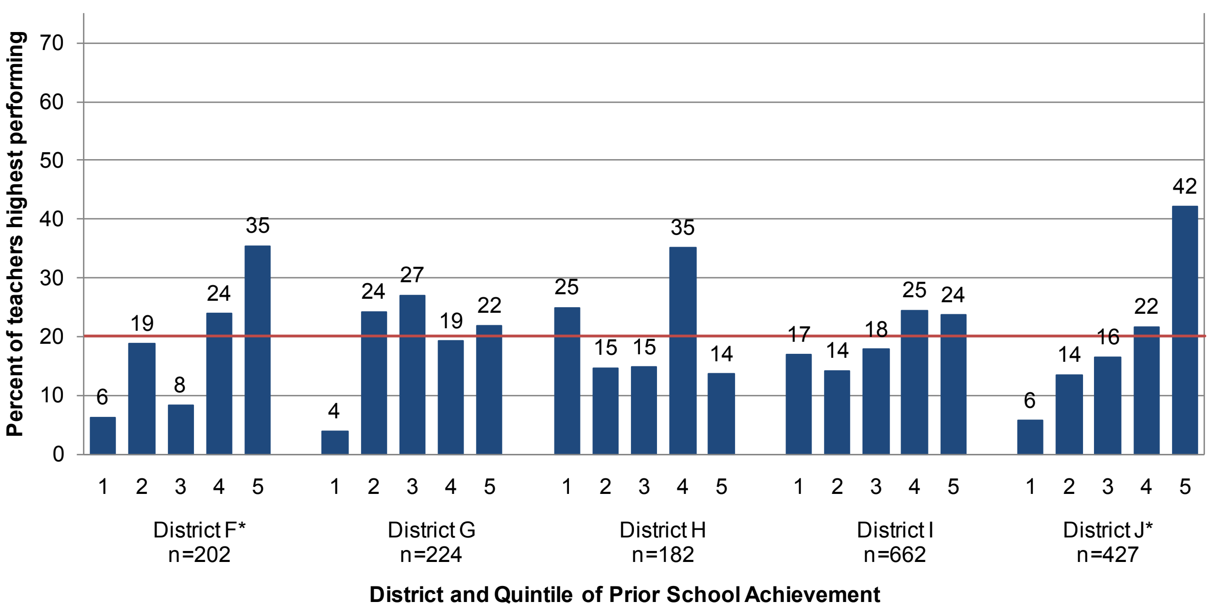
Note: The first quintile (1) represents the lowest-achieving schools and the fifth quintile (5) the highest.

n = number of teachers included in the analysis

* Chi-square test of "no relationship" between quintile and percent highest performing is rejected at 0.05 level.

Figure A.8. Prevalence of Highest-performing Teachers by School Average Prior Achievement Quintile by District: Middle School English language Arts





Source: Author calculations based on district administrative data.

Note: The first quintile (1) represents the lowest-achieving schools and the fifth quintile (5) the highest.

n = number of teachers included in the analysis

* Chi-square test of "no relationship" between quintile and percent highest performing is rejected at 0.05 level.

Table A.6. Characteristics of poverty quintiles by district and pool

District/Statistic		Quintile (elementary school) 1	2	3	4	5
A	Average fraction highest performing	0.20	0.19	0.16	0.16	0.27
	Average value added	0.01	0.01	0.02	0.01	0.03
	Average fraction FRPL	0.90	0.75	0.60	0.30	0.10
	Number of teachers	95	135	145	175	180
	Number of schools	20	20	20	20	20
B	Average fraction highest performing	0.07	0.15	0.22	0.16	0.34
	Average value added	-0.04	-0.01	0.02	0.01	0.07
	Average fraction FRPL	1.00	0.95	0.65	0.35	0.15
	Number of teachers	70	90	115	115	115
	Number of schools	10	10	10	5	10
C	Average fraction highest performing	0.04	0.19	0.28	0.18	0.25
	Average value added	-0.36	0.25	0.26	0.45	0.42
	Average fraction FRPL	0.90	0.75	0.60	0.40	0.20
	Number of teachers	25	30	25	45	60
	Number of schools	15	15	15	15	15
D	Average fraction highest performing	0.22	0.22	0.24	0.24	0.15
	Average value added	-0.01	0.19	0.06	0.04	0.02
	Average fraction FRPL	1.00	0.95	0.95	0.90	0.50
	Number of teachers	245	290	305	315	310
	Number of schools	35	35	35	35	35
E	Average fraction highest performing	0.19	0.13	0.22	0.21	0.23
	Average value added	0.03	0.02	0.03	0.04	0.06
	Average fraction FRPL	1.00	0.95	0.90	0.80	0.55
	Number of teachers	95	85	120	120	125
	Number of schools	20	20	20	20	20
F	Average fraction highest performing	0.18	0.14	0.18	0.24	0.28
	Average value added	0.03	-0.02	-0.01	0.04	0.05
	Average fraction FRPL	0.60	0.50	0.40	0.35	0.15
	Number of teachers	125	125	115	100	100
	Number of schools	15	15	15	15	15
G	Average fraction highest performing	0.35	0.18	0.23	0.20	0.12
	Average value added	0.09	-0.02	0.03	-0.01	-0.01
	Average fraction FRPL	0.95	0.90	0.80	0.60	0.45
	Number of teachers	65	80	80	70	115
	Number of schools	15	15	15	15	10
H	Average fraction highest performing	0.19	0.18	0.18	0.24	0.21
	Average value added	0.00	-0.01	0.01	0.02	0.02
	Average fraction FRPL	0.90	0.80	0.50	0.15	0.05
	Number of teachers	205	235	305	330	325
	Number of schools	10	10	10	10	10
I	Average fraction highest performing					
	Average value added					
	Average fraction FRPL					
	Number of teachers					
	Number of schools					
J	Average fraction highest performing					
	Average value added					
	Average fraction FRPL					
	Number of teachers					
	Number of schools					

Table A.6 *(continued)*

District/Statistic		Quntile (middle school math) 1	2	3	4	5
A	Average fraction highest performing	0.06	0.05	0.10	0.29	0.62
	Average value added	-0.06	-0.11	0.01	0.10	0.16
	Average fraction FRPL	0.85	0.70	0.55	0.30	0.15
	Number of teachers	50	40	60	50	35
	Number of schools	5	5	5	5	5
B	Average fraction highest performing	0.13	0.04	0.11	0.29	0.37
	Average value added	-0.01	-0.04	0.00	0.05	0.10
	Average fraction FRPL	0.90	0.65	0.50	0.40	0.25
	Number of teachers	25	25	35	35	40
	Number of schools	5	5	5	5	5
C	Average fraction highest performing	0.25	0.13	0.13	0.18	0.24
	Average value added	-0.23	-0.23	-0.06	-0.03	0.84
	Average fraction FRPL	0.80	0.60	0.50	0.40	0.20
	Number of teachers	10	15	15	20	35
	Number of schools	5	5	5	5	5
D	Average fraction highest performing	0.09	0.19	0.27	0.04	0.27
	Average value added	0.03	-0.25	0.53	-0.96	1.12
	Average fraction FRPL	0.95	0.90	0.90	0.80	0.50
	Number of teachers	45	75	65	45	60
	Number of schools	10	10	10	10	10
E	Average fraction highest performing	0.19	0.36	0.15	0.09	0.24
	Average value added	0.01	0.09	-0.06	-0.07	0.01
	Average fraction FRPL	1.00	0.95	0.90	0.80	0.50
	Number of teachers	30	25	40	45	50
	Number of schools	10	10	10	10	10
F	Average fraction highest performing	0.15	0.18	0.28	0.14	0.21
	Average value added	-0.02	0.01	0.03	-0.01	0.02
	Average fraction FRPL	0.60	0.45	0.40	0.30	0.20
	Number of teachers	25	40	30	35	40
	Number of schools	5	5	5	5	5
G	Average fraction highest performing	0.26	0.29	0.25	0.18	0.16
	Average value added	0.03	0.04	0.00	0.01	0.02
	Average fraction FRPL	0.90	0.90	0.75	0.60	0.45
	Number of teachers	20	15	30	15	45
	Number of schools	5	5	5	5	5
H	Average fraction highest performing	0.23	0.15	0.23	0.22	0.19
	Average value added	0.00	-0.05	-0.01	0.02	0.00
	Average fraction FRPL	0.85	0.65	0.35	0.10	0.05
	Number of teachers	35	40	60	65	65
	Number of schools	5	5	5	5	5
I	Average fraction highest performing	0.11	0.17	0.25	0.21	0.35
	Average value added	-0.01	0.02	0.04	0.03	0.10
	Average fraction FRPL	1.00	0.90	0.80	0.70	0.45
	Number of teachers	140	105	105	95	100
	Number of schools	20	15	20	15	15
J	Average fraction highest performing	0.22	0.13	0.19	0.22	0.30
	Average value added	0.00	0.00	0.01	0.02	0.01
	Average fraction FRPL	0.90	0.85	0.75	0.65	0.40
	Number of teachers	65	75	65	85	90
	Number of schools	15	15	15	15	15

Table A.6 *(continued)*

		Quntile (middle school language arts)				
District/Statistic		1	2	3	4	5
A	Average fraction highest performing	0.07	0.12	0.14	0.24	0.55
	Average value added	-0.01	-0.01	0.00	0.01	0.06
	Average fraction FRPL	0.85	0.70	0.55	0.30	0.15
	Number of teachers	45	50	50	45	35
	Number of schools	5	5	5	5	5
B	Average fraction highest performing	0.07	0.14	0.08	0.19	0.48
	Average value added	-0.04	-0.01	-0.03	0.02	0.07
	Average fraction FRPL	0.90	0.65	0.50	0.40	0.25
	Number of teachers	25	35	40	35	40
	Number of schools	5	5	5	5	5
C	Average fraction highest performing	0.00	0.13	0.14	0.39	0.30
	Average value added	-0.42	0.12	-0.01	0.31	0.23
	Average fraction FRPL	0.80	0.60	0.50	0.40	0.20
	Number of teachers	20	15	20	25	25
	Number of schools	5	5	5	5	5
D	Average fraction highest performing	0.06	0.17	0.10	0.17	0.46
	Average value added	-0.16	-0.05	-0.34	-0.16	0.99
	Average fraction FRPL	0.95	0.90	0.90	0.80	0.50
	Number of teachers	45	70	50	55	50
	Number of schools	10	10	10	10	10
E	Average fraction highest performing	0.22	0.19	0.18	0.14	0.22
	Average value added	0.01	0.05	0.01	0.03	0.09
	Average fraction FRPL	1.00	0.95	0.90	0.80	0.50
	Number of teachers	55	45	85	75	65
	Number of schools	10	10	10	10	10
F	Average fraction highest performing	0.14	0.23	0.08	0.21	0.33
	Average value added	-0.04	0.00	-0.01	0.00	0.03
	Average fraction FRPL	0.60	0.45	0.40	0.30	0.20
	Number of teachers	20	55	50	40	40
	Number of schools	5	5	5	5	5
G	Average fraction highest performing	0.06	0.34	0.23	0.18	0.20
	Average value added	-0.02	0.03	0.01	-0.01	0.04
	Average fraction FRPL	0.90	0.90	0.75	0.60	0.35
	Number of teachers	30	35	55	60	40
	Number of schools	5	5	5	5	5
H	Average fraction highest performing	0.29	0.14	0.23	0.26	0.14
	Average value added	0.07	-0.01	0.03	0.04	-0.03
	Average fraction FRPL	0.85	0.65	0.35	0.10	0.05
	Number of teachers	40	30	40	35	45
	Number of schools	5	5	5	5	5
I	Average fraction highest performing	0.12	0.20	0.19	0.23	0.23
	Average value added	0.00	0.00	0.00	0.01	0.03
	Average fraction FRPL	1.00	0.90	0.80	0.70	0.50
	Number of teachers	165	130	115	135	135
	Number of schools	20	15	20	15	15
J	Average fraction highest performing	0.10	0.15	0.14	0.20	0.45
	Average value added	-0.03	-0.01	0.00	0.02	0.06
	Average fraction FRPL	0.90	0.85	0.75	0.65	0.40
	Number of teachers	85	105	75	100	90
	Number of schools	15	15	10	15	10

Table A.6 *(continued)*

Note: NA = Not available (No data provided for elementary schools in Districts I and J). Average value added is expressed in standard deviations of the student test score distribution, except in Districts C and D, where it is expressed in terms of EVAAS scores, which are scaled using the standard error of the teacher effect estimate.

The first quintile (1) represents the highest-poverty schools and the fifth quintile (5) the lowest.

Numbers of teachers and schools have been rounded to the nearest 5 and fraction FRPL rounded to the nearest 0.05 to avoid disclosing the identity of the districts.

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For more information on the full study, please visit:

http://ies.ed.gov/ncee/projects/evaluation/tq_recruitment.asp

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