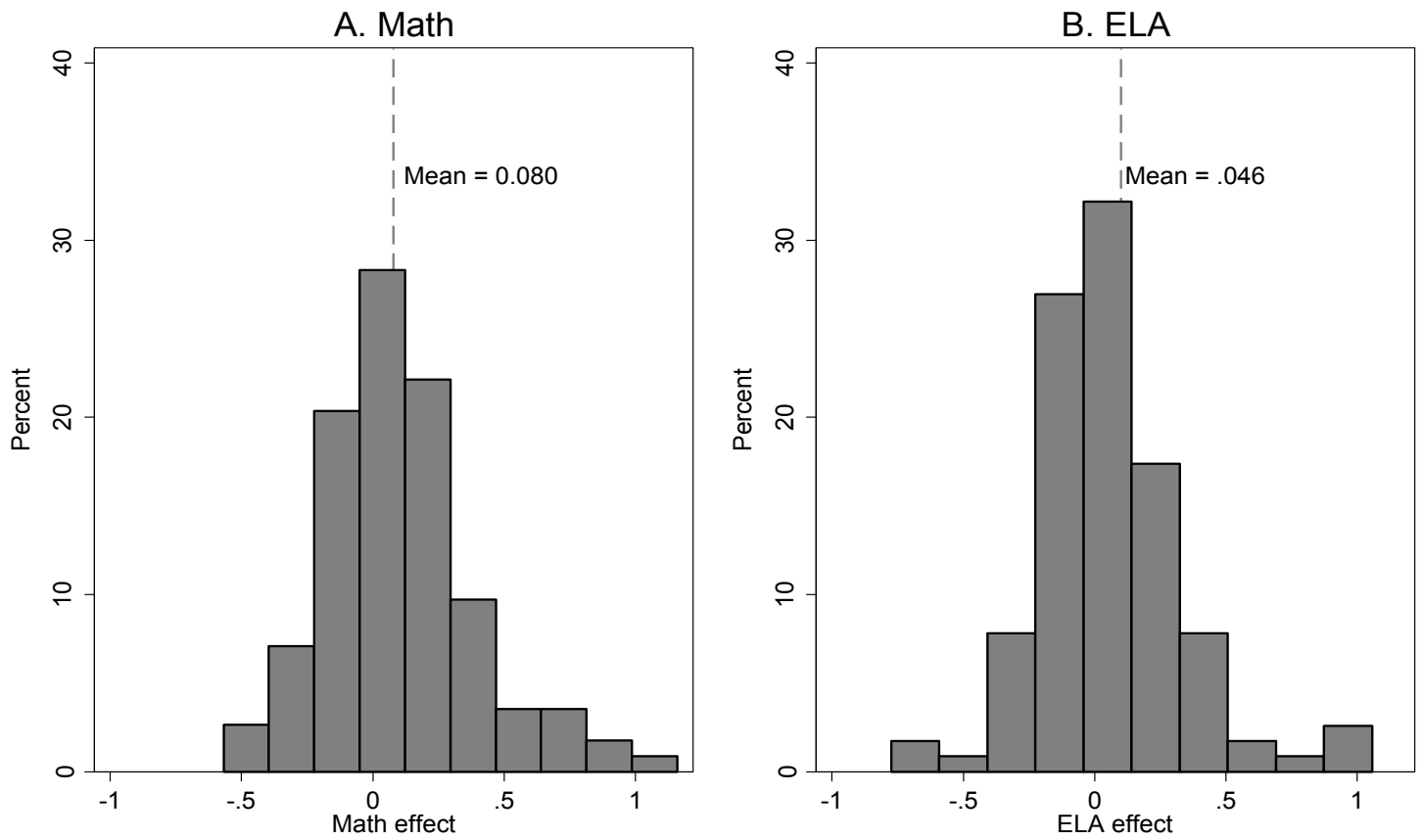


Appendix Table 1: Details on Studies that Contribute School-Level Data to Our Analyses

Paper (1)	Setting (2)	Abbreviation (3)	Lottery Estimates (4)	Notes on Conversion of Lottery Estimates to Per-Year 2SLS Effects (5)	Available School Characteristic Data (6)
Panel A: Multi-Site Studies					
Angrist, Pathak, and Walters (AEJ: Applied Economics, 2013)	Massachusetts	MA	23 schools	n/a	Extensive survey and administrative data
Clark Tuttle, Gleason Knechtel, Nichols-Barrer, Booker, Chojnacki, Coen, and Goble (Mathematica, 2015)	KIPP elementary schools	KIPP 2015	8 schools	2SLS estimates calculated from raw data accessed through a data use agreement with the KIPP Foundation, divided by 3 to convert to per year estimates	Extensive survey and administrative data, currently not possible to link to school effects
Clark Tuttle, Gill, Gleason, Knechtel, Nichols-Barrer, Resch (Mathematica, 2013)	KIPP middle schools	KIPP 2013	12 schools	Year 2 estimates divided by 2, then divided by the overall first stage of 0.6	n/a
Dobbie and Fryer (AEJ: Applied Economics, 2013)	New York City	NYC	29 schools	n/a	School characteristics summarized in 9 dummy variables
Furgeson, Gill, Haimson, Killewald, McCullough, Nichols-Barrer, Teh, Verbitsky-Savitz, Bowen, Demeritt, Hill, and Lake (Mathematica, 2012)	Charter schools that were members of CMO's in 14 states	CMO	6 sites (2 sites have 1 school each, 3 sites have 3 schools each, and 1 site has 8 schools)	Year 1 impacts divided by individual first stages, and in the case of one estimate that was a year 3 estimate, divided by 3	Index of 2 charter school practices: (1) intensive teacher coaching and (2) comprehensive behavior policy; only in observational data
Gleason, Clark, Clark Tuttle, Dwoyer, & Silverberg (IES, 2010)	15 unidentified states	IES	35 schools	Per year 2SLS estimates calculated from raw data accessed through an NCES restricted used data licence	Extensive survey and administrative data
Panel B: Single-Site Studies					
Abdulkadiroglu, Angrist, Hull, and Pathak (NBER Working Paper, 2014)	UP Academy Boston	UP	1 school	n/a	n/a
Curto and Fryer (Journal of Labor Economics, 2014)	SEED School	SEED	1 school	n/a	n/a

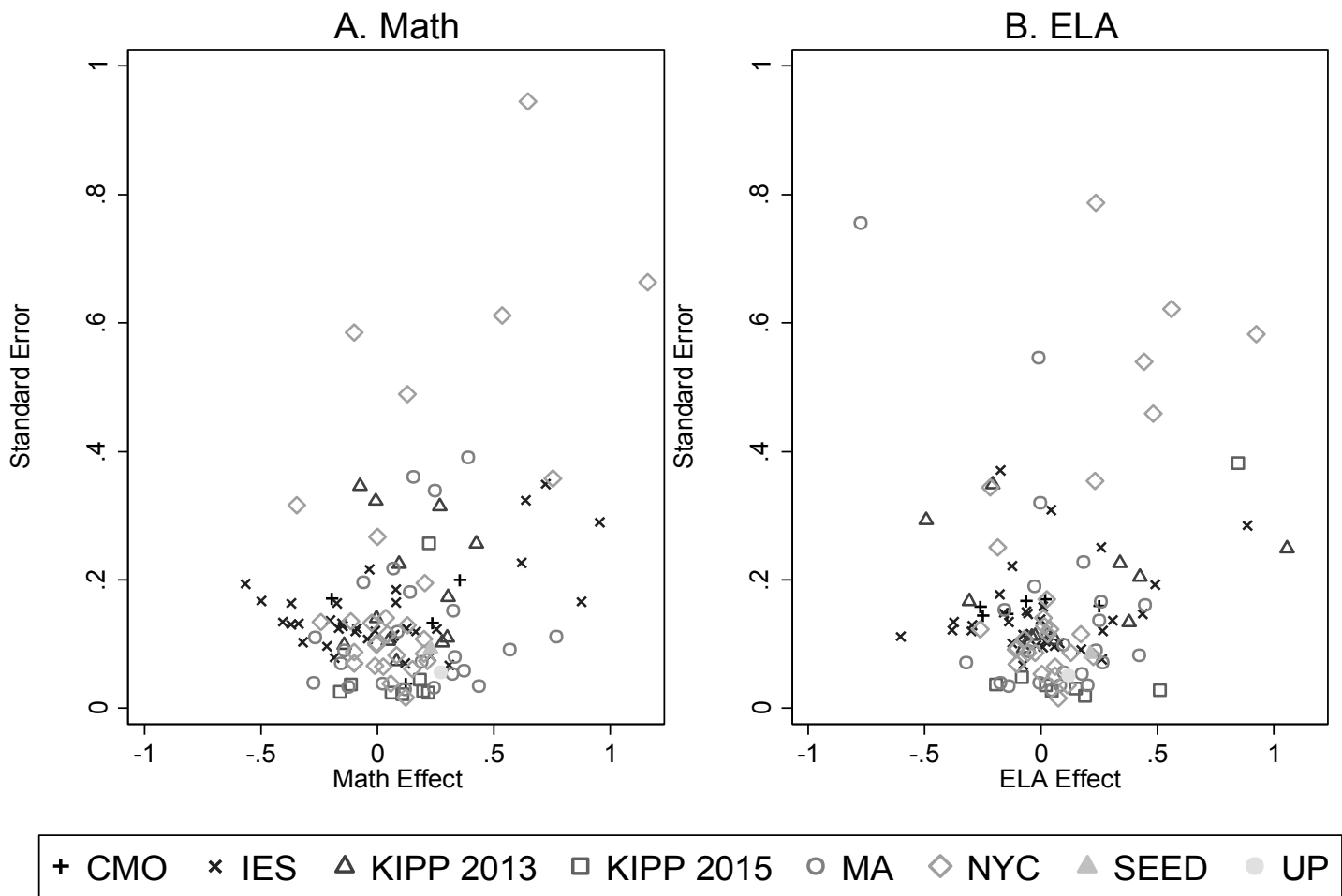
Notes: Lottery estimates refers to per-year 2SLS estimates of charter school impacts, with calculation differences noted in the table. In the 2013 KIPP study, for the 3 schools missing year 2 outcomes, year 3 outcomes were substituted, dividing by 3 instead of 2 for the per year effect. Studies from Table 1 that are not included in our analyses are either studies that are superseded by another paper (for example, the Boston schools are included in the Massachusetts study, and the NYC 2009 study is replaced by the more recent 2013 study) or have characteristics that are incompatible with our analysis (Hoxby and Rockoff (2004) cannot be converted to standard deviations and Hastings et al. (2012) cannot be converted to per year effects).

Appendix Figure 1: Distribution of School-Level Charter Effects



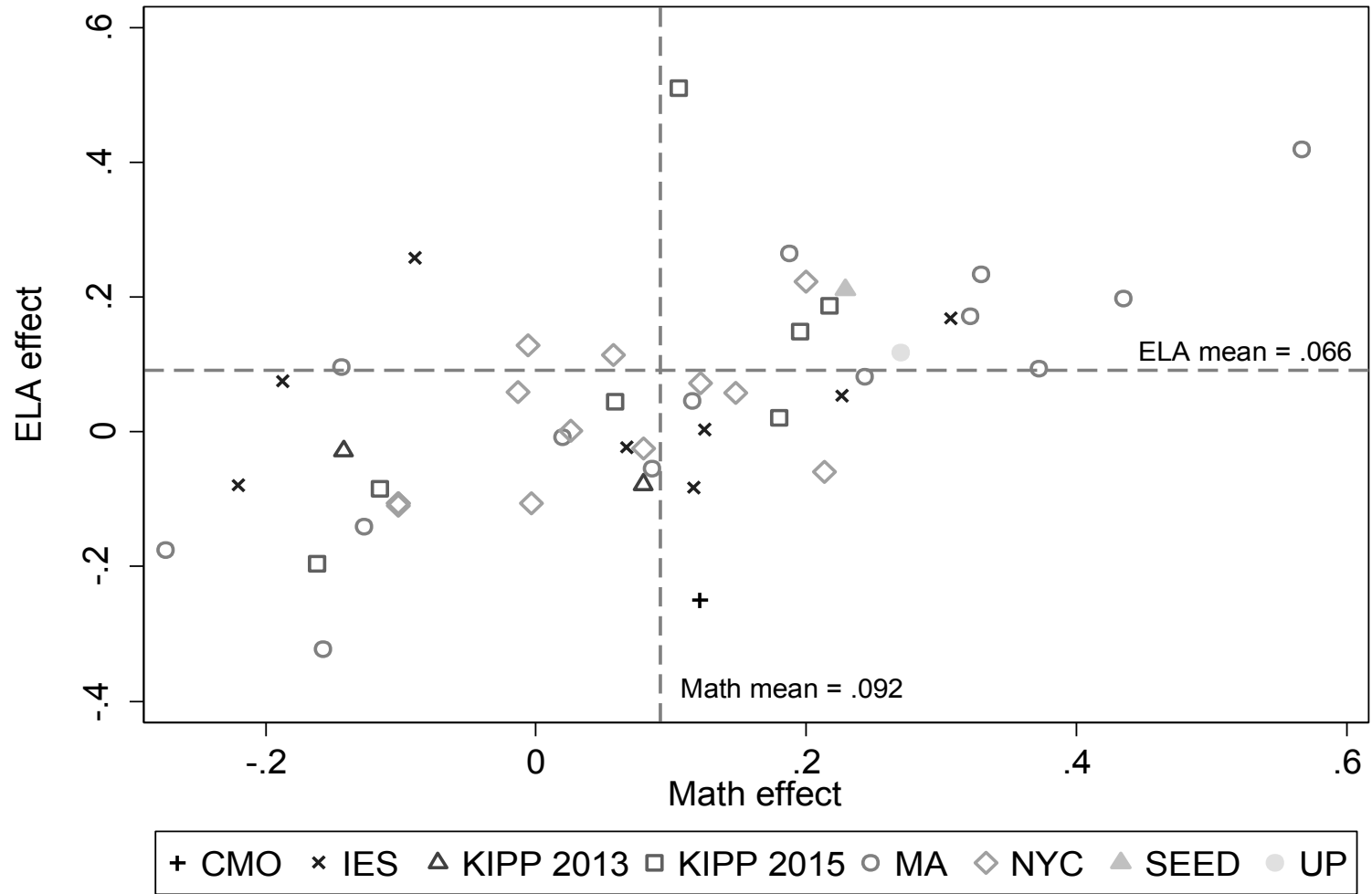
Notes: This graph shows the distribution of school-level lottery-based charter school effects, where the effects are per-year school-level second stage point estimates for the 113 schools that contribute to our analysis. The means are weighted means of the school-level estimates, weighted by the inverse of the standard error of each estimate. The following studies are included in this figure: CMO, IES, KIPP 2013, KIPP 2015, Massachusetts, NYC, UP and SEED. See Table 2 for details on these studies and for notes on modifications of published point estimates which put estimates on the same scale.

Appendix Figure 2: School-Level Charter School Effects vs. their Standard Errors



Notes: This graph shows school-level lottery-based charter school effects, where the effects are per-year school-level second stage point estimates, plotted against the standard error of the school-level estimate. The following studies are included in this figure: CMO, IES, KIPP 2013, KIPP 2015, Massachusetts, NYC, SEED, and UP. See Table 2 for details on these studies and for notes on modifications of published point estimates which put estimates on the same scale.

Appendix Figure 3: Distribution of School-Level Charter Effects, Restricted to More Precise Estimates



Notes: The notes for this figure are the same as those for Figure 1, except that the school level estimates that contribute to this figure are restricted to those with standard errors less than or equal to 0.1 in either subject, which restricts to 42 schools.

Appendix Table 2: Definition of Variables across Studies

	IES (1)	Massachusetts (2)	NYC (3)
Panel A: Variables for Table 3			
Teacher Feedback	= 1 if school has at least two requirements for teacher hires (temporary certification, full certification, relevant major, graduate of education program, and/or pass a test)	=1 if new teachers are observed at least twice a month and veteran teachers are observed at least once a month	= 1 if school gives teachers feedback ≥ 10 times per semester
Instruction (Data Driven/Differentiated)	=1 if school uses ability grouping for some or all students in math or English	= 1 if school uses informal tests to gauge understanding (5 on scale of 1 to 5)	= 1 if school administers ≥ 5 interim assessments & uses ≥ 4 differentiation strategies
Instructional Time	= 1 if school is held for more than 1260 hours (days*minutes per day)	= 1 if school is held for more than 1347 hours (days*minutes per day)	= 1 if school has 25% more instructional time than a traditional public school
High Quality Tutoring	=1 if school reports having a tutoring program	= 1 if all students in school participate in in-school or after-school tutoring or school hires paid staff exclusively as tutors	= 1 if tutoring ≥ 4 times per week & tutoring groups ≤ 6
High Expectations	= 1 if school has uniforms & school informs parents of bad behavior	= if school self reports being "No Excuses" (≥ 4 on scale of 1 to 5)	= 1 if school prioritizes high academic and behavioral expectations for all students
Index of Practice Inputs	Sum of the above 5 variables standardized to be mean 0, standard deviation 1.		
Class Size	= 1 if class size < 13.61	= 1 if class size < 11.65	= 1 if class size < 13
Per Pupil Expenditures	= 1 if PPE $> \$7,160$	= 1 if PPE $> \$12,345.5$	= 1 if PPE $> \$15,000$
Highly Qualified Teachers	= 1 if percent of teachers highly qualified $> 96.83\%$	= 1 if percent of teachers highly qualified $> 84.95\%$	= 1 if percent of teachers with advanced degree $> 11\%$
Teachers with Certification	= 1 if percent of teachers certified $> 85.71\%$	= 1 if percent of teachers certified $> 65.95\%$	= 1 if percent of certified teachers $> 89\%*$
Index of Resource Inputs	Sum of the above 4 variables standardized to be mean 0, standard deviation 1.		
Panel B: Additional Variables for Tables 4 and 5			
Urban	= 1 if NCES location code indicates "Large City"	=1 if town is any of: Boston, Brockton, Cambridge, Chelsea, Chicopee, Everett, Fall River, Fitchburg, Framingham, Haverhill, Holyoke, Lawrence, Leominster, Lowell, Lynn, Malden, New Bedford, Pittsfield, Quincy, Revere, Somerville, Springfield, Taunton, or Worcester	n/a
Counterfactual Mean	Average test score of the noncharter schools attended by lottery applicants in the year and grade level after charter school application; school averages are weighted by number of students attending and the test score is the mean of standardized math and reading average proficiency levels	Average test score of the noncharter schools attended by lottery applicants in the year and grade level after charter school application; school averages are weighted by number of students attending and the test score is the mean of the math and ELA z-scores	n/a
High Suspensions	=1 if in top quartile of suspensions (suspension rate $> 10\%$)	=1 if in top quartile of suspensions (suspension rate $> 17\%$)	n/a

Notes: *Reversed from Dobbie & Fryer so that all resource inputs are in the same direction. Inflection points are determined by the within-sample mean.