



February 2023

K-12 EDUCATION

New Charter Schools Receiving Grants to Open Grew Faster Than Peers

Why GAO Did This Study

Enrollment in charter schools that received CSP grants grew from 213,576 to 1,380,530 students from school years 2006-07 to 2020-21. Education awarded CSP grants to help open new and expand existing charter schools. As with other public schools, charter schools are monitored and regulated at the state or local level.

House Report 116-450 includes a provision for GAO to report on student enrollment trends in CSP grant-recipient charter schools. This report examines (1) enrollment growth at new charter schools that received CSP grants compared to those that did not for 2006–2020 (the most recent available), and (2) enrollment differences in student subpopulations for charter schools receiving such grants compared to other charter and traditional public schools for 2011–2015 (the most recent available that could be matched). GAO reviewed the three main CSP grants intended to open or expand charter schools: CSP State Educational Agencies/State Entities, CSP Charter Management Organizations, and CSP Non-State Educational Agencies/Developers.

GAO conducted a multivariate statistical analysis to match CSP-grant recipient charter schools with similar non-CSP charter schools to compare enrollment growth. GAO conducted another statistical analysis to compare student subpopulation enrollment differences among CSP grant-recipient schools, non-CSP charter schools, and traditional public schools. GAO reviewed relevant federal laws, regulations, and documents and interviewed federal officials. GAO incorporated technical comments from Education as appropriate.

View [GAO-23-106268](#). For more information, contact Jacqueline M. Nowicki at (617) 788-0580 or nowickij@gao.gov.

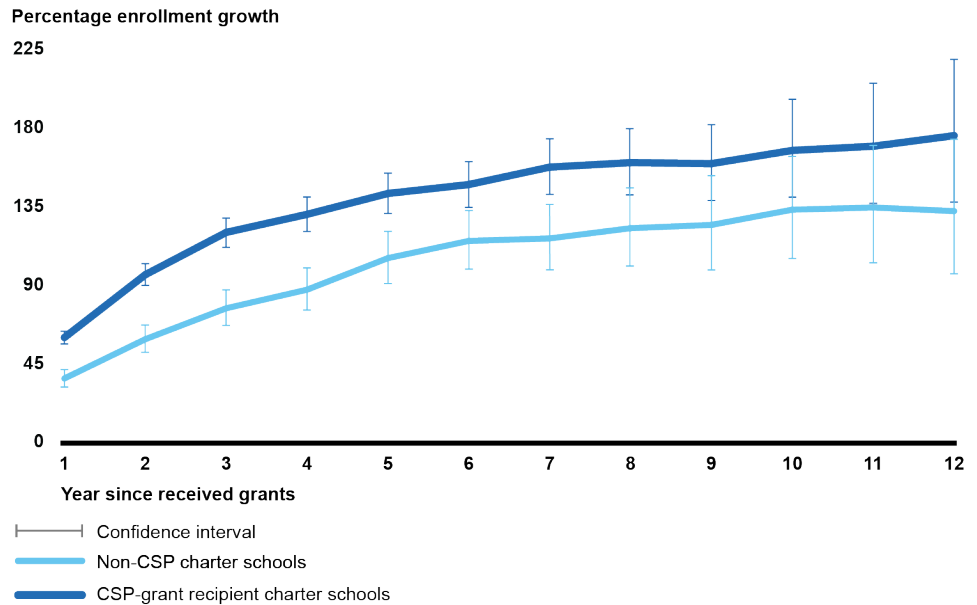
K-12 EDUCATION

New Charter Schools Receiving Grants to Open Grew Faster Than Peers

What GAO Found

The Department of Education Charter Schools Program (CSP) provides grants to open or expand charter schools. Charter schools are publicly funded, semi-autonomous schools of choice. GAO found that charter schools that received CSP grants generally had higher enrollment growth compared to similar charter schools that did not receive grants (see figure). Specifically, GAO’s analysis found about 1.3 to 1.6 times higher enrollment growth, on average, for CSP grant-recipient charter schools within 12 years after receiving the grant. Enrollment growth was higher among middle schools, urban schools, and schools with higher proportions of non-White or low-income students.

Student Enrollment Growth 12 Years after Receiving Charter Schools Program (CSP) Grants Compared to Similar Non-Recipient Charter Schools



Source: GAO matched comparison analysis of the Department of Education’s CSP awards data and school-level characteristics from the Common Core of Data. | [GAO-23-106268](#)

Note: GAO examined data for selected charter schools that received a CSP grant to open or expand in 2006–2020 and matched them to similar, non-CSP charter schools. Over this 14-year period, the maximum period of time GAO could assess enrollment growth was 12 years. Error bars display the 95 percent confidence interval for estimates.

GAO’s analysis found that, compared to traditional public schools, charter schools—whether they received CSP funding or not—enrolled smaller percentages of students with disabilities designated as receiving services under the Individuals with Disabilities Education Act. Researchers have identified potential factors that may contribute to enrollment patterns. For example, students with disabilities and parents may already be connected to programs in traditional public schools. According to researchers, charter schools may use practices that discourage students with disabilities from applying.

Contents

Letter		1
	Background	4
	Schools Receiving Charter Schools Program Awards Generally Had Higher Enrollment Growth Compared to Similar Charter Schools That Did Not	6
	Charter Schools Were Less Likely to Enroll Students Served under IDEA, or White, Asian, or Multiracial Students Compared to Traditional Public Schools	13
Appendix I	Objective, Scope, and Methodology	16
Appendix II	GAO Contacts and Staff Acknowledgments	44
Tables		
	Table 1: Department of Education Charter Schools Program (CSP) Grant Funding, Fiscal Years 2006–2020	5
	Table 2: Student Enrollment by School Type, School Years (SY) 2006-07 and 2020-21	9
	Table 3: Population Coverage Rates by Group for Multivariate Matching Analysis of Charter Schools Program (CSP) Grants, Based on Data for 2006–2020	19
	Table 4: Scoping Decisions to Arrive at Final Population for Multivariate Matching Analysis for Charter Schools Program (CSP) Grants, Based on Data for 2006–2020	22
	Table 5: Unmatched Sample and Comparison Group Matched Exactly on State, Year, Grade, and Locale for Charter Schools Program (CSP), Based on Data for 2006–2020	23
	Table 6: Standardized Mean Difference Before and After Matching for Multivariate Matching Analysis for Charter Schools Program (CSP), Based on Data for 2006–2020	29
	Table 7: Kolmogorov-Smirnov p-Values Before and After Matching for Charter Schools Program (CSP) Multivariate Comparison Analysis, Based on Data for 2006–2020	30
	Table 8: Estimated Average Percentage Growth in Enrollment, by Follow-Up Time and Matched Comparison Group for Multivariate Matching Analysis for Charter Schools Program (CSP), Based on Data for 2006–2020	33

Table 9: Estimated Average Percentage Growth in Enrollment, by Sub-Population, Follow-Up Time, and Matched Comparison Group for Multivariate Matching Analysis for Charter Schools Program (CSP), Based on Data for 2006–2020	34
---	----

Figures

Figure 1: Student Enrollment Growth for Charter Schools Program (CSP) Charter Schools and Similar Non-CSP Charter Schools within 12 Years of Receiving Awards	7
Figure 2: Student Enrollment in Charter Schools Program (CSP) Charter Schools and Non-CSP Charter Schools, by Selected Characteristics, 5 Years after Receiving Awards	11
Figure 3: Student Enrollment in Charter Schools Program (CSP) Charter Schools and Non-CSP Charter Schools in California, Florida, and Texas 5 Years after Receiving an Award	12
Figure 4: Covariate Distributions among Charter Schools Programs (CSP) and Comparison Charter Schools, Matched Exactly on State, Grade, Year, and District, Based on Data for 2006–2020	26
Figure 5: Covariate Distributions among Charter Schools Programs (CSP) and Comparison Charter Schools Matched Exactly on State, Grade, Year, and Locale, Based on Data for 2006–2020	27
Figure 6: Covariate Distributions among Charter Schools Programs (CSP) and Comparison Charter Schools Matched Exactly on State, Grade, and Year, Based on Data for 2006–2020	28

Abbreviations

CCD Common Core of Data
CRDC Civil Rights Data Collection
CSP Charter Schools Program
ESSA Every Student Succeeds Act
IDEA Individuals with Disabilities Education Act

This is a work of the U.S. government and is not subject to copyright protection in the United States. The published product may be reproduced and distributed in its entirety without further permission from GAO. However, because this work may contain copyrighted images or other material, permission from the copyright holder may be necessary if you wish to reproduce this material separately.



February 21, 2023

Chair
Ranking Member
Subcommittee on Labor,
Health and Human Services,
Education, and Related Agencies
Committee on Appropriations
United States Senate

Chair Robert Aderholt
Ranking Member Rosa DeLauro
Subcommittee on Labor,
Health and Human Services,
Education
Committee on Appropriations
House of Representatives

Since 1995, the Department of Education has supported charter schools across the nation through its Charter Schools Program (CSP) grants. Charter schools are publicly funded, semi-autonomous schools of choice. Funded at about \$440 million in fiscal year 2020, these grants generally are designed to help create new charter schools; replicate or expand high-quality charter schools; disseminate best practices to charter schools; and expand opportunities for traditionally underserved students to attend charter schools, among other things.¹ Charter schools have also been able to use these funds to recruit new students. The effectiveness of and funding for charter schools are debated topics. Questions also have been raised about the extent to which charter schools have enrolled students with disabilities and English learners.

The committee report accompanying the House bill for the Departments of Labor, Health and Human Services, and Education, and Related Agencies Appropriations Act, 2021 includes a provision for GAO to report on CSP grants, with a particular focus on CSP grant-recipient charter

¹Education awarded over \$63 million in funding in CSP State Entities and CSP Charter Non-State Educational Agencies/Developers grants in fiscal year 2022. Education did not make new awards under the CSP Charter Management Organizations in fiscal year 2022. We did not assess funding trends for fiscal year 2022 because those data were not available when we conducted our analysis.

schools that eventually closed or never opened, and on student enrollment at CSP grant-recipient charter schools.² In October 2022, we issued our first report in response to this provision.³

This second and final report examines (1) enrollment growth at new charter schools that received CSP grants compared to those that did not, and (2) enrollment differences in student subpopulations for charter schools receiving such grants compared to other charter and traditional public schools.⁴

To identify CSP grant-recipient charter schools, we used Education's CSP awards data for 2006–2020, the most recent years for which complete data were available.⁵ We combined CSP awards data with selected school characteristics data from the Common Core of Data (CCD) to analyze trends in student enrollment among CSP grant-recipient charter schools and non-CSP charter schools.⁶ Specifically, we used a multivariate statistical method (matched comparison analysis) to compare student enrollment growth over time between CSP grant-recipient charter schools and similar non-CSP charter schools from 2006–2020. Our matched analysis focused on new charter schools and not on existing charter schools that received CSP grants to expand enrollment.⁷ Although

²H.R. Rep. No. 116-450, at 246 (2021).

³See [GAO-23-105616](#) *K-12 Education: Charter Schools That Received Federal Funding to Open or Expand Were Generally Less Likely to Close Than Other Similar Charter Schools*, [GAO-23-105616](#) (Washington, D.C.: Oct. 11, 2022).

⁴For the purposes of this report, we examined student enrollment of charter schools that received CSP State Educational Agencies/State Entities grants, CSP Charter Management Organization grants, and CSP Non-State Educational Agencies/Developers grants.

⁵Prior to fiscal year 2006, Education did not systematically collect information on subgrantees (e.g., charter schools that received CSP subgrant awards). Education now collects information from CSP grantees, including the names of charter schools that received funding, award amount, and school status.

⁶Education's CCD is a comprehensive, annual, national database of all public elementary and secondary schools and school districts.

⁷Among CSP grant-recipient charter schools that met our scoping criteria, 85 percent existed for only one year in the CCD prior to receiving grants; of these, 86 percent were "new" in that year. Charter schools that received CSP grants to expand were a relatively small share of charter schools. These more established schools would have had varying histories, and the small sample would have constrained our ability to find comparison schools had we included them in our analysis. See appendix I for more details.

we looked at data over a 14-year period from 2006–2020, the maximum period of time for which we could assess enrollment change was 12 years. This is because we (1) required schools in the matched comparison analysis to be new in the year prior to receiving a grant and (2) designated schools' first year of operation as the year following receipt of a grant. We estimated proportional change in enrollment from the matching baseline year up to 12 follow-up years, separately for the matched CSP grant-recipient and non-CSP charter schools.⁸ We also conducted a regression analysis using CSP awards data, CCD, and the Civil Rights Data Collection (CRDC) to compare enrollment differences for various student groups. We evaluated students with disabilities designated as receiving services under the Individuals with Disabilities Education Act (IDEA) and English learners, in CSP grant-recipient charter schools, non-CSP recipient charter schools, and traditional public schools for 2011–2015.⁹

We assessed the reliability of these data by reviewing existing reports that used the data, conducting our own electronic data tests, reviewing technical documentation, and interviewing federal officials knowledgeable about the CSP awards data, CCD, and the CRDC. We determined that the data were sufficiently reliable for the purposes of our analysis. In addition, we reviewed relevant federal laws, regulations, and guidance and interviewed federal officials. See appendix I for more information on our methodology.

We conducted this performance audit from September 2022 to February 2023 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

⁸The length of the follow-up period varied across the cohorts of grantee schools and their matched comparison schools, depending on when they received grants within our dataset's overall observation period of 2006–2020. See appendix I for more details.

⁹The CRDC is a biennial survey that collects data from all public local educational agencies and schools, including charter schools. CRDC also collects school-level data on students with disabilities and English learners. We analyzed CRDC's most recently available data, including 2011–2015, to examine enrollment for these two groups. Using the school identification number, we combined CSP award data with select CCD and CRDC data for our analyses.

Background

Charter schools are publicly funded schools typically governed by a group or organization under a contract—a charter—with the state, the district, or another entity authorized under state law to grant charters to schools. Charter schools are exempt from significant state or local regulations related to operation and management, but otherwise adhere to regulations of public schools. For example, charter schools cannot charge tuition. As of May 2022, charter schools existed in 42 states, the District of Columbia, Puerto Rico, and Guam. States and school districts are responsible for ensuring that eligible students with disabilities are provided with a free appropriate public education. Education makes an annual determination on the extent to which each state’s special education programs meet federal requirements, and also investigates certain allegations of discrimination.

Education has prioritized funding charter schools in economically distressed communities; schools in urban and rural areas; and schools that serve high-need students among the CSP State Educational Agencies/State Entities grants, CSP Charter Management Organization grants, and CSP Non-State Educational Agencies/Developers grants (see table 1).¹⁰

¹⁰Education publishes notices inviting applications (NIAs) in the Federal Register for the CSP grants. NIAs include priorities, requirements, definitions, and selection criteria for CSP grants. We reviewed available NIAs for fiscal years 2006–2020 to better understand Education’s priorities in awarding grants.

Table 1: Department of Education Charter Schools Program (CSP) Grant Funding, Fiscal Years 2006–2020

CSP grant	Amount awarded	Number of unique grant awards	Number of subgrant awards
Total	\$2.49 billion	563	6,023
CSP State Educational Agencies/State Entities ^a 3- to 5-year grants to state entities, which award subgrants to eligible applicants to open new charter schools or to replicate and expand high-quality charter schools.	\$1.97 billion	91	4,616
CSP Charter Management Organizations (CMO) ^b 3- to 5-year grants awarded to CMOs on a competitive basis to enable them to replicate or expand high-quality charter schools.	\$425 million	237	1,172
CSP Non-State Educational Agencies/Developers ^c 1- to 5-year grants to developers to support opening charter schools, or to replicate and expand high-quality charter schools.	\$105 million	235	235

Source: GAO analysis of the Department of Education’s CSP awards data. | GAO-23-106268

Note: CSP grant recipients report charter school operating status to Education twice a year. We analyzed Education’s CSP awards data as of May 2022.

^aAs of 2015, under the Elementary and Secondary Education Act of 1965, as amended by the Every Student Succeeds Act, the CSP State Entities program has broadened eligible entities to include educational agencies, state charter school boards, state governors, and charter school support organizations. Our analysis consolidates both CSP State Educational Agencies/State Entities grants.

^bA CMO is an organization that operates or manages a network of charter schools linked by centralized support, operations, and oversight. 20 U.S.C. § 7221i(3). CMOs often provide funding to more than one school in their network.

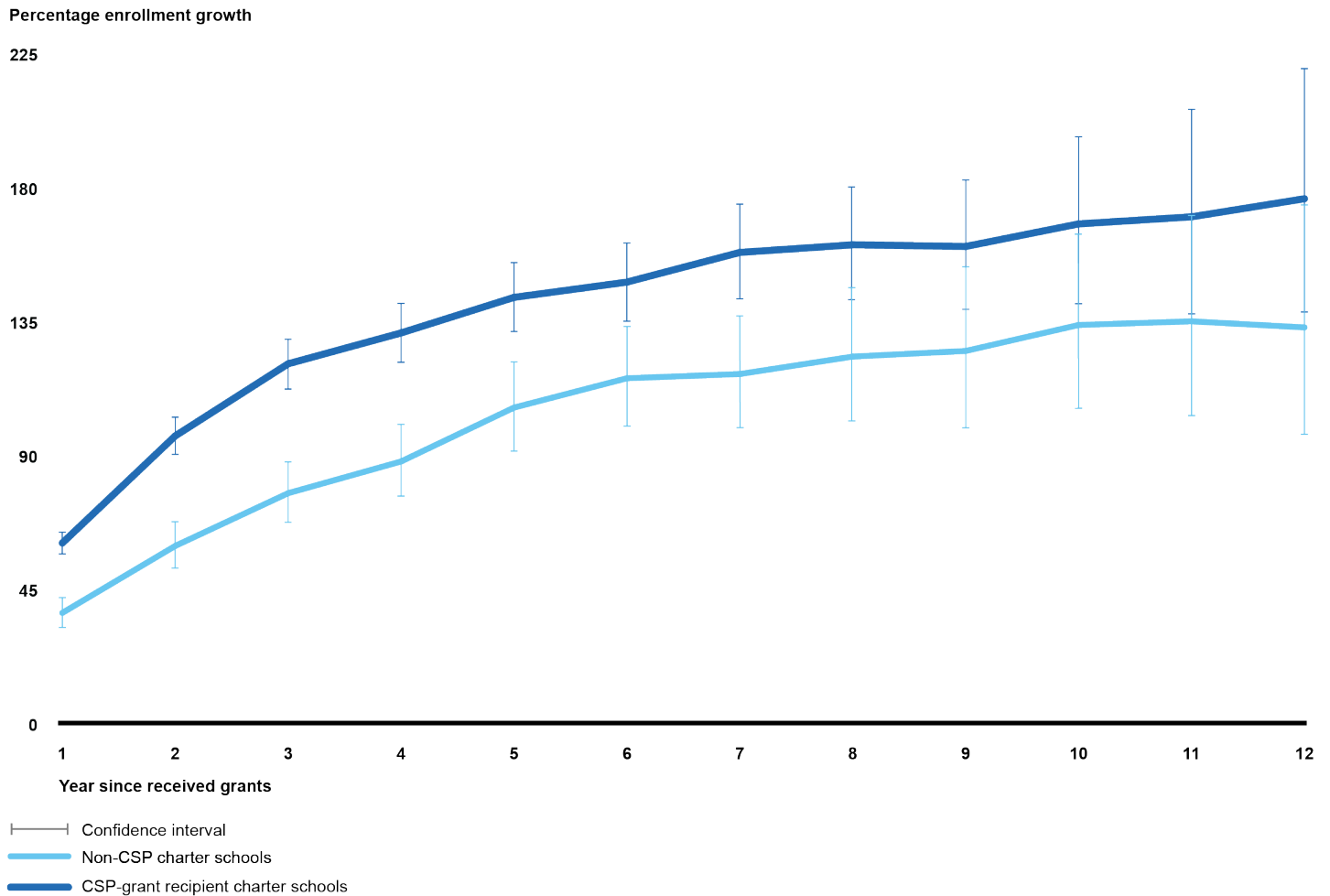
^cA developer is an individual or group of individuals in the community in which a charter school project will be carried out. 20 U.S.C. § 7221i(5). CSP Developers grants are awarded directly to eligible applicants.

Schools Receiving Charter Schools Program Awards Generally Had Higher Enrollment Growth Compared to Similar Charter Schools That Did Not

According to our matched comparison analysis, enrollment growth at CSP grant-recipient charter schools was about 1.3 to 1.6 times higher on average compared to similar charter schools that did not receive awards over a 12-year period (see fig. 1).¹¹

¹¹Our analysis matched selected CSP grant-recipient charter schools that had complete data with similar non-CSP charter schools, based on several characteristics measured in the CCD. These include state, grade level, population density, student demographics, and school size, among others. Our matched analysis focused on new charter schools and not long-established charter schools, as the latter would have received CSP grants for expansion. Beginning with year 8 after receiving the grant, the estimated differences between CSP grant-recipient and non-CSP charter schools were not statistically significant at the 95 percent confidence level. However, the overall pattern of estimates suggested larger enrollment growth among CSP grant-recipient charter schools compared to non-CSP charter schools. See appendix I for more details.

Figure 1: Student Enrollment Growth for Charter Schools Program (CSP) Charter Schools and Similar Non-CSP Charter Schools within 12 Years of Receiving Awards



Source: GAO matched comparison analysis of the Department of Education's CSP awards data and school-level characteristics from the Common Core of Data. | GAO-23-106268

Note: GAO examined data for selected CSP grant-recipient charter schools for 2006 through 2020 and matched them to similar, non-CSP charter schools. Over this 14-year period, the maximum years we could assess enrollment change was 12 years. This is because we (1) required schools in the matched comparison analysis to be new in the year prior to receiving a grant and (2) designated schools' first year of operation as the year following receipt of a grant. Error bars display the 95 percent confidence interval for estimates. We analyzed Education's CSP awards data as of May 2022.

GAO's Matched Comparison Analysis

We matched Charter Schools Program (CSP) grant-recipient charter schools to similar non-CSP charter schools. We matched the charter schools in three ways:

- (Group 1) Year opened, state, locale (urban, suburban, and rural), and grade level (elementary, middle, and high schools). This matched group covered 48 percent of the original population of charter schools in our scope.
- (Group 2) Year opened, state, school district, and grade level. This matched group covered 10 percent of the original population of charter schools in our scope.
- (Group 3) Year opened, state, and grade level. This matched group covered 60 percent of the original population of charter schools in our scope.

Our matched analysis focused on new charter schools and not on existing charter schools that received CSP grants to expand enrollment.

Each analysis paired CSP grant-recipient charter schools that were as similar as possible to non-CSP charter schools on a set of variables including student demographics, number of students in the school, free or reduced-price lunch rates, and exact geographic location. For all three group analyses, we found that CSP grant-recipient charter schools were generally more likely to grow at faster rates than similar non-CSP charter schools.

We focused on reporting results from the first group for the overall results and third group for the subpopulation findings because these analyses controlled for geography and achieved sufficient coverage of our target population. Results from all three groups are in appendix I.

While we controlled for a number of variables to match similar CSP grant-recipient charter schools and non-CSP charter schools, schools may vary in different ways that we cannot control for due to lack of data. For example, CSP grant-recipient charter schools may have been more likely to have the necessary administrative skills or resources to seek and receive CSP awards. These same characteristics could allow CSP grant-recipient charter schools to recruit and retain students. Our analysis is designed to isolate the effects of CSP grant funding, to the extent practical. However, because we could not control for every possible relevant characteristic, differences in student enrollment rates should not be attributed solely to award receipt.

Source: GAO matched comparison analysis of the Department of Education's CSP awards data and selected elements of Common Core of Data. | GAO-23-106268

We examined student enrollment changes in charter schools compared to other public schools (traditional public schools and magnet schools) for school years 2006-07 and 2020-21 (see table 2).

- While the vast majority of K-12 public school students attend other public schools, the share of students attending charter schools grew from school years 2006-07 to 2020-21, and the share of students attending other public schools decreased (see table 2). Overall, charter schools' share of students nearly tripled during this period.
- Enrollment in CSP grant-recipient charter schools grew more than sixfold—from more than 200,000 to 1.4 million. On average, CSP

grant-recipient charter schools enrolled about 293 students each in school year 2006-07, compared to about 448 students in school year 2020-21.

- Enrollment in non-CSP charter schools more than doubled. On average, non-CSP charter schools enrolled about 293 students each in school year 2006-07, compared to about 495 students in school year 2020-21.

Table 2. Student Enrollment by School Type, School Years (SY) 2006-07 and 2020-21

School type	SY 2006-07 student enrollment		SY 2020-21 student enrollment	
	Number of students	Percent of students	Number of students	Percent of students
Total	52,728,568	100 percent	49,377,072	100 percent
All charter schools	1,388,299	2.63 percent	3,720,473	7.53 percent
Charter Schools Program (CSP) grant-recipient charter schools	213,576	0.41 percent	1,380,530	2.80 percent
Non-CSP charter schools	1,174,723	2.23 percent	2,339,943	4.74 percent
Traditional public schools, magnet schools	51,340,269	97.36 percent	45,656,599	92.46 percent

Source: GAO analysis of the Department of Education's Charter Schools Program (CSP) awards data and Common Core of Data for SY 2006-07 and 2020-21. | GAO-23-106268

When we compared student enrollment growth among various subpopulations of schools, we found that CSP grant-recipient charter schools generally had higher enrollment growth in the 5 years after receiving an award than similar non-grant charter schools (see fig. 2).¹² For example:

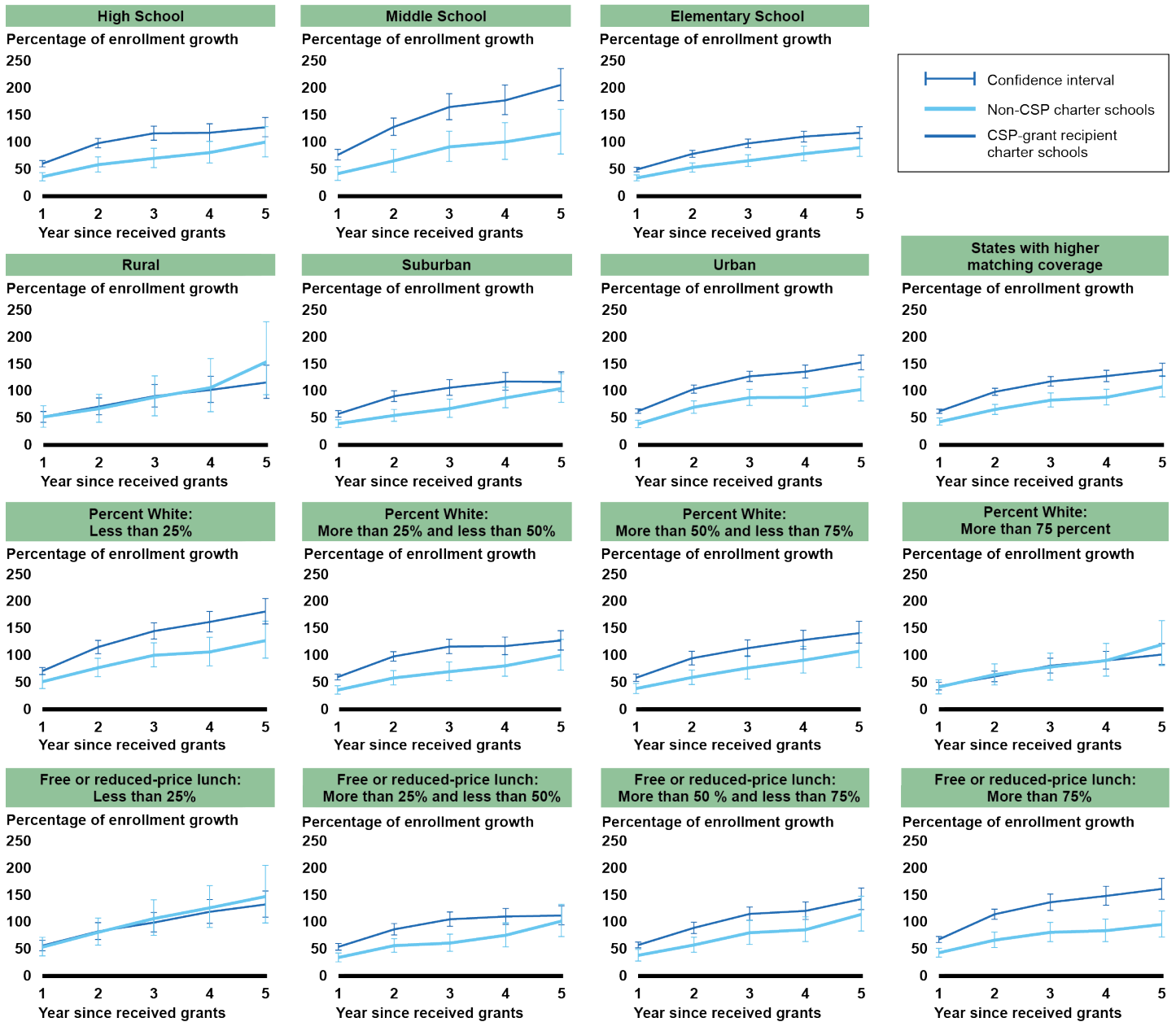
- **Grade level.** CSP grant-recipient charter middle schools had higher enrollment growth than similar non-CSP charter middle schools.
- **Locale.** CSP grant-recipient charter schools in urban areas had higher enrollment growth than similar non-CSP charter schools.
- **Race/ethnicity.** CSP grant-recipient charter schools with higher percentages of non-White students generally had higher enrollment growth than similar non-CSP charter schools.
- **Percentage of students who receive free or reduced-price lunch.** CSP grant-recipient charter schools with 75 percent or more students

¹²In some cases, the estimated differences between CSP grant-recipient and non-CSP charter schools were not statistically significant at the 95 percent confidence level. However, the overall pattern of estimates generally suggested larger enrollment growth among CSP grant-recipient charter schools compared to non-CSP charter schools. See appendix I for results on subpopulations.

on free or reduced-price lunch generally had higher enrollment growth than similar non-CSP charter schools.

In some schools, like those that were rural or low-poverty, CSP grant-recipient charter schools and similar non-CSP charter schools sometimes experienced similar enrollment growth rates.

Figure 2: Student Enrollment in Charter Schools Program (CSP) Charter Schools and Non-CSP Charter Schools, by Selected Characteristics, 5 Years after Receiving Awards



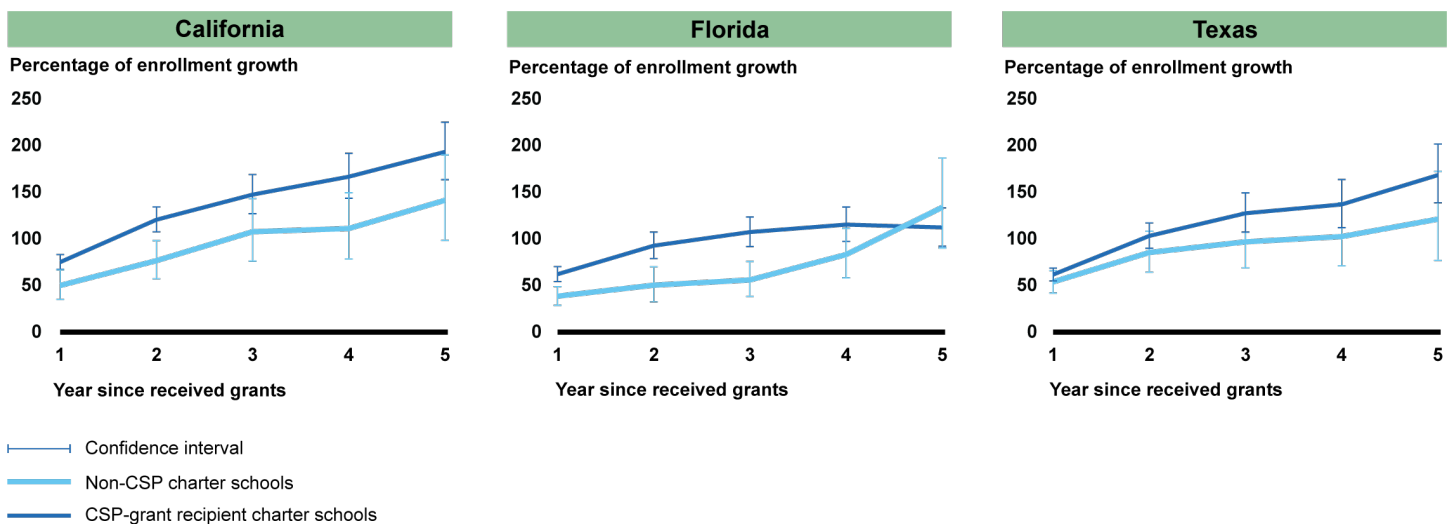
Source: GAO matched comparison analysis of the Department of Education's CSP awards data and school-level characteristics from the Common Core of Data. | GAO-23-106268

Note: GAO examined data for selected charter schools that received CSP awards for 2006 through 2020 and matched them to similar, non-CSP charter schools. Over this 14-year period, the maximum years we could assess enrollment change was 12 years. This is because we (1) required schools in the matched comparison analysis to be new in the year prior to receiving a grant and (2) designated

schools' first year of operation as the year following receipt of a grant. For results on the 12-year period, see appendix I. Error bars display the 95 percent confidence interval for estimates. We analyzed Education's CSP awards data as of May 2022.

We compared student enrollment in each of the three states that received the most CSP awards and funding—California, Florida, and Texas. We found that CSP grant-recipient charter schools in California and Florida generally experienced higher enrollment growth than similar non-grant charter schools over a 5-year period (see fig. 3).¹³ In Texas, we estimated similar but statistically insignificant differences.

Figure 3: Student Enrollment in Charter Schools Program (CSP) Charter Schools and Non-CSP Charter Schools in California, Florida, and Texas 5 Years after Receiving an Award



Source: GAO matched comparison analysis of the Department of Education's CSP awards data and school-level characteristics from the Common Core of Data. | GAO-23-106268

Note: GAO examined data for selected charter schools that received a CSP award for 2006 through 2020 and matched them to similar, non-CSP charter schools. Over this 14-year period, the maximum years we could assess enrollment change was 12 years. This is because we (1) required schools in the matched comparison analysis to be new in the year prior to receiving a grant and (2) designated schools' first year of operation as the year following receipt of a grant. For results on the 12-year period, see appendix I. Error bars display the 95 percent confidence interval for estimates. We analyzed Education's CSP awards data as of May 2022.

¹³In some cases, the estimated differences between CSP grant-recipient and non-CSP charter schools were not statistically significant at the 95 percent confidence level. However, the overall pattern of estimates generally suggested larger enrollment growth among CSP grant-recipient charter schools compared to non-CSP charter schools. See appendix I for results on subpopulations.

Charter Schools Were Less Likely to Enroll Students Served under IDEA, or White, Asian, or Multiracial Students Compared to Traditional Public Schools

Our regression analysis comparing student enrollment and other characteristics in CSP grant-recipient charter schools, non-CSP charter schools, and traditional public schools found:¹⁴

- Schools with higher percentages of students served under the Individuals with Disabilities Education Act (IDEA), White students, Asian students, and multiracial students were more likely to be traditional public schools than charter schools, regardless of whether the charter school received a CSP grant.¹⁵
- Schools receiving funds under Title I, Part A of the Elementary and Secondary Education Act of 1965, as amended, and schools with higher percentages of students served under Section 504 of the Rehabilitation Act of 1973, as amended, and Hispanic and Black students were more likely to be charter schools regardless of whether they received a CSP grant, compared to traditional public schools.¹⁶
- Schools with higher percentages of English learners were more likely to be traditional public schools, and less likely to be non-CSP charter schools. There was no relationship between the percentage of English learners in schools and the likelihood of schools being CSP grant-recipient charter schools.
- There was no meaningful relationship between the percentage of American Indian/Alaska Native students and the likelihood of schools being CSP grant-recipient charter, non-CSP charter, or traditional public schools.

¹⁴We identified statistically significant differences among CSP grant-recipient and non-CSP charter schools and traditional public schools at the 95 percent confidence level. Some results were not statistically significant (i.e., confidence intervals overlapped). For more information on our regression analysis, see appendix I.

¹⁵Student enrollment predictor variables—such as percent of students—were collapsed into five categories, with one comprising schools with no students of a given type and other interval/ratio variables defined by the quartiles of the non-zero observations. The categories differed for each student enrollment variable, depending on its distribution. Regressions evaluated how well the variables predicted school type. For more information, see appendix I.

¹⁶Title I, Part A of the Elementary and Secondary Education Act of 1965, as amended, (Title I) provides financial assistance to local educational agencies (LEAs) and schools with high numbers or high percentages of children from low-income families to help ensure that all children meet challenging state academic standards. Section 504 of the Rehabilitation Act of 1973, as amended, (Section 504) prohibits discrimination on the basis of disability in programs and activities that receive federal financial assistance.

Researchers have investigated potential reasons for student enrollment differences between charter schools and traditional schools for students with disabilities. For example:

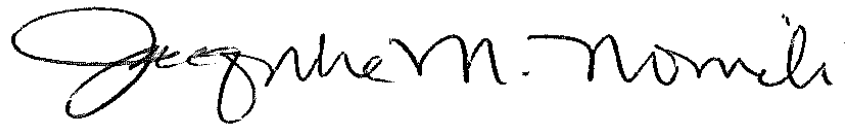
- Related to students with disabilities served under IDEA, researchers from the National Council on Disability have reported that:¹⁷
 - Charter schools may have practices that discourage parents of students with disabilities from applying to the school.
 - Parents of students with disabilities are less likely to apply to charter schools.
 - Students with disabilities may already be connected to specialized programs within traditional public schools. Parents may be more familiar with, or may prefer, the services provided by traditional public schools.
 - Parents may lack information about charter schools, such as the services available at these schools.

All public school districts, including charter schools that operate independently as their own public school district and public school districts that include charter schools, are responsible for complying with relevant federal laws pertaining to students with disabilities.

¹⁷National Council on Disability. *School Choice Series: Charter Schools—Implications for Students with Disabilities*. (Washington, D.C.: November 15, 2018).

We are sending copies of this report to the appropriate congressional committees and the Secretary of Education. In addition, the report is available at no charge on the GAO website at <https://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (617) 788-0580 or nowickij@gao.gov. Contact points for our Office of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix II.

A handwritten signature in black ink that reads "Jacqueline M. Nowicki". The signature is written in a cursive style with a large, looping initial "J".

Jacqueline M. Nowicki, Director
Education, Workforce, and Income Security Issues

Appendix I: Objective, Scope, and Methodology

This report examines (1) enrollment growth at new charter schools that received CSP grants compared to those that did not, and (2) enrollment differences for subpopulations for charter schools receiving such grants compared to other charter schools and traditional public schools.¹

Overall, to conduct this work, we:

1. analyzed enrollment data across CSP grant-recipient and non-CSP charter schools, and traditional public schools, including magnet schools;
2. conducted a multivariate matching analysis (matched comparison analysis) to compare any enrollment growth between CSP grant-recipient charter schools and similar non-CSP charter schools; and
3. conducted a regression analysis to examine how demographic characteristics and receipt of funds under Title I, Part A of the Elementary and Secondary Education Act of 1965, as amended, varied, if any, among CSP grant-recipient charter schools, non-grant recipient charter schools, and traditional public schools.²

We assessed the reliability of our data sources by reviewing documentation about the data, comparing Education’s restricted data files to public-use files, conducting our own electronic data tests, reviewing technical documentation, and interviewing federal officials knowledgeable about the datasets we used. We determined that the data were sufficiently reliable for our purposes.

To inform all aspects of this work, we also reviewed relevant federal laws, regulations, and guidance, such as Education’s CSP notices inviting applications.³ We also interviewed Education officials about the CSP,

¹For the purposes of this report, we examined student enrollment of charter schools that received CSP State Educational Agencies/State Entities grants, CSP Charter Management Organization grants, and CSP Non-State Educational Agencies/Developers grants.

²Title I, Part A of the Elementary and Secondary Education Act, as amended, provides financial assistance to local educational agencies (LEA) and schools with high numbers or high percentages of children from low-income families to help ensure that all children meet challenging state academic standards.

³Education publishes notices inviting applications (NIAs) in the Federal Register for the CSP grants. NIAs include priorities, application requirements, definitions, and selection criteria for CSP grants. We reviewed these NIAs for fiscal years 2006 to 2020 to better understand Education’s priorities in awarding grants.

Common Core of Data (CCD), and Civil Rights Data Collection (CRDC) datasets used in our analyses. Additionally, we interviewed a nongeneralizable selection of representatives from nonfederal entities, such as research entities and advocacy organizations, who were knowledgeable and had researched key topics covered under this study.

Analysis of Student Enrollment Trends

To examine enrollment trends in CSP grant-recipient and non-CSP charter schools, magnet schools, and traditional public schools for school years 2006-07 and 2020-21, we combined Education’s most recent CSP awards data for fiscal years 2006 to 2020 and school-level data from the CCD.⁴ We used the CSP awards data to identify charter schools that received one of three CSP awards: (1) CSP State Educational Agencies/State Entities, (2) CSP Non-State Educational Agencies/Developers, and (3) CSP Charter Management Organization awards. The CCD is administered by Education’s National Center for Education Statistics, and is a comprehensive, annual, national database of all public elementary and secondary schools and school districts. We used the combined data set to compare school-level enrollment numbers among CSP grant-recipient charter schools, non-CSP charter schools, and traditional public schools, including magnet schools. Additionally, we analyzed student enrollment in CSP grant-recipient charter schools and non-CSP charter schools.

Analysis Comparing Enrollment Growth of CSP Grant-Recipient and Similar Non-CSP Charter Schools

We conducted a multivariate matching analysis to examine whether enrollment growth differed between CSP grant-recipient and similar non-CSP charter schools, using Education’s CSP award data joined to its

⁴Education’s data contractor for the CSP—WestEd—has collected data on CSP award sub-grantees on behalf of Education since fiscal year 2006. WestEd collects data from grantees (state entities, developers, and charter management organizations) twice a year and conducts data checks on the self-reported data. We requested information on CSP grant and subgrant recipients for fiscal years 2006 through 2020. Education did not systematically start collecting information from CSP grantees on subgrantees until fiscal year 2006. Education officials told us that WestEd contacted CSP grantees that received an award prior to fiscal year 2006, but it is likely that some subgrantees from fiscal years 1995 through 2005 closed or never opened. As a result, data from fiscal years 1995 through 2005 are incomplete. We used CSP grant recipient data for the period from fiscal years 2006 to 2020. We used this timeframe because Education did not systematically start collecting information from CSP grantees on sub-grantees until fiscal year 2006. We combined the CSP award data with CCD data using the school identification number.

CCD from 2006 through 2020.⁵ We identified comparison groups of non-CSP charter schools that closely resembled CSP grant-recipient charter schools on various characteristics measured in the CCD. We chose these factors, or covariates, based on their potential to be associated with the receipt of grants and with enrollment growth.

Each comparison group required that some covariates match exactly between CSP grant-recipient charter schools and non-CSP charter schools. These exact covariates included:

- **Year charter school first opened.** The year when the charter school was first measured as a new school in the CCD.
- **State.**
- **Grade level.** Elementary, middle, high school, or combination of these.
- **Locale.** Urban, suburban, or rural.
- **School district.**

From these exact covariates, we created three matched comparison groups, using different combinations of the exact covariates:

- **Group 1.** Year opened, state, grade level, and school district.
- **Group 2.** Year opened, state, locale, and grade level.
- **Group 3.** Year opened, state, and grade level.

Requiring an exact match on more covariates limited our analysis sample to a smaller portion of the original population of interest, as shown in table 3. Exactly matching on fewer covariates increased the coverage of our analysis sample, but increased the chance that the comparison schools would be dissimilar.

⁵Our matching analysis used student enrollment data from the CCD, which uses school years. In contrast, Education's CSP awards data, which identified CSP grant-recipient charter schools, is organized by fiscal years.

Appendix I: Objective, Scope, and Methodology

Table 3: Population Coverage Rates by Group for Multivariate Matching Analysis of Charter Schools Program (CSP) Grants, Based on Data for 2006–2020

State	Population	State-grade-year-district exact match	State-grade-year-locale exact match	State-grade-year exact match
AK	1	0 (0.0%)	0 (0.0%)	0 (0.0%)
AL	2	0 (0.0%)	1 (50.0%)	1 (50.0%)
AR	38	1 (2.6%)	9 (23.7%)	16 (42.1%)
AZ	111	0 (0.0%)	48 (43.2%)	65 (58.6%)
CA	538	86 (16.0%)	429 (79.7%)	470 (87.4%)
CO	114	13 (11.4%)	28 (24.6%)	72 (63.2%)
CT	7	0 (0.0%)	0 (0.0%)	0 (0.0%)
DC	31	1 (3.2%)	8 (25.8%)	8 (25.8%)
DE	9	0 (0.0%)	2 (22.2%)	3 (33.3%)
FL	338	101 (29.9%)	206 (61.0%)	286 (84.6%)
GA	46	2 (4.4%)	8 (17.4%)	17 (37.0%)
HI	4	2 (50.0%)	2 (50.0%)	2 (50.0%)
ID	24	0 (0.0%)	2 (8.3%)	4 (16.7%)
IL	40	3 (7.5%)	6 (15.0%)	7 (17.5%)
IN	71	0 (0.0%)	27 (38.0%)	32 (45.1%)
KS	17	0 (0.0%)	5 (29.4%)	7 (41.2%)
LA	46	3 (6.5%)	18 (39.1%)	23 (50.0%)
MA	40	0 (0.0%)	1 (2.5%)	1 (2.5%)
MD	28	3 (10.7%)	3 (10.7%)	5 (17.9%)
ME	4	0 (0.0%)	0 (0.0%)	1 (25.0%)
MI	110	2 (1.8%)	63 (57.3%)	89 (80.9%)
MN	49	0 (0.0%)	25 (51.0%)	35 (71.4%)
MO	29	1 (3.5%)	22 (75.9%)	23 (79.3%)
MS	5	0 (0.0%)	1 (20.0%)	1 (20.0%)
NC	30	0 (0.0%)	9 (30.0%)	10 (33.3%)
NH	26	0 (0.0%)	0 (0.0%)	0 (0.0%)
NJ	58	0 (0.0%)	6 (10.3%)	14 (24.1%)
NM	49	4 (8.2%)	8 (16.3%)	13 (26.5%)
NV	12	9 (75.0%)	6 (50.0%)	9 (75.0%)
NY	250	0 (0.0%)	72 (28.8%)	75 (30.0%)
OH	120	0 (0.0%)	68 (56.7%)	75 (62.5%)
OK	10	1 (10.0%)	4 (40.0%)	4 (40.0%)
OR	32	0 (0.0%)	3 (9.4%)	5 (15.6%)
PA	58	0 (0.0%)	25 (43.1%)	29 (50.0%)

Appendix I: Objective, Scope, and Methodology

State	Population	State-grade-year-district exact match	State-grade-year-locale exact match	State-grade-year exact match
PR	1	0 (0.0%)	0 (0.0%)	0 (0.0%)
RI	23	0 (0.0%)	1 (4.4%)	4 (17.4%)
SC	61	3 (4.9%)	5 (8.2%)	10 (16.4%)
TN	77	8 (10.4%)	25 (32.5%)	31 (40.3%)
TX	214	36 (16.8%)	203 (94.9%)	211 (98.6%)
UT	23	0 (0.0%)	4 (17.4%)	5 (21.7%)
WA	6	0 (0.0%)	0 (0.0%)	0 (0.0%)
WI	112	5 (4.5%)	29 (25.9%)	53 (47.3%)
Total	2864	284 (9.9%)	1382 (48.3%)	1716 (59.9%)

Source: GAO matched comparison analysis of the Department of Education’s CSP awards data and school-level characteristics from the Common Core of Data. | GAO-23-106268

Note: Entries are counts of charter schools with row percentages in parentheses. We examined data for the CSP State Educational Agencies/State Entities, CSP Charter Management Organizations, and CSP Non-State Educational Agencies/Developers grants. We analyzed Education’s CSP awards data as of May 2022.

For each CSP grant-recipient charter school, we selected the non-recipient school that was most similar on several continuous covariates:

- **Number of students.**
- **Student racial and ethnic demographics.** The percentage of Asian, Black, Hawaiian/Pacific Islander, Hispanic, Native American, Non-Hispanic White, and multiracial students.
- **Free or reduced-price lunch eligibility rate.**

We matched charter schools on these continuous covariates within the groups formed by cross-classifying the exact covariates, such as state by grade level. We identified the closest non-CSP school on the continuous covariates using the Mahalanobis distance metric, without requiring a maximum distance, and we reused non-CSP schools as needed to achieve the best match. In the statistics literature, this method is known as one-to-one Mahalanobis distance matching with replacement.⁶

Although we were able to perform a combination of exact and distance-based matching on key characteristics, we could not measure some characteristics that may have varied between the two groups and that may have been associated with enrollment growth. For example, CSP

⁶For more information on the Mahalanobis method, see Guido W. Imbens and Donald B. Rubin, *Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction* (New York, NY: Cambridge University Press, 2015), Chapter 15, “Matching to Improve Balance in Covariate Distributions.”

grant-recipient charter schools may have been more likely to have the necessary administrative skills or resources to seek and receive CSP awards. These same characteristics could allow CSP grant-recipient charter schools to attain greater enrollment growth. Because our matched comparison could not ensure that both groups of charter schools were similar on all relevant characteristics, differences in enrollment growth should not be attributed only to award receipt.

Scope of Analysis

We defined CSP grant-recipient schools as those receiving any type of CSP grant: CSP State Educational Agencies/State Entities, CSP Non-State Educational Agencies/Developers, or CSP Charter Management Organizations grants.⁷ We did not have adequate sample sizes to compare enrollment change separately by grant type. We defined cohorts of CSP grant-recipient charter schools using only the first grant awarded within our time frame. Grant-recipient charter schools may have received additional CSP grants during the follow-up period when we measured enrollment change.

Our analysis only applied to a selected subpopulation of CSP grant-recipient charter schools, as shown in table 4. Of the 4,494 charter schools in the CCD receiving grants from school years 2006 through 2020, 3,643 had students and were not run by the Bureau of Indian Education (see table 4). We defined this group as our target population of interest. We further limited this group to the 2,596 schools that: (1) opened; (2) could be observed in the CCD as “new” in the year prior to receiving its first grant; or (3) had complete data on all covariates. Charter schools that satisfied all three screens made up about 71 percent of the original target population. Among charter schools that met the first two screens, 85 percent had operating status reported in the CCD for only one year prior to receiving grants, and 86 percent of these charter schools were “new” in that year. Our matched analysis focused on new charter schools and not on existing charter schools that received CSP grants to expand enrollment. Charter schools that received CSP grants to

⁷The CSP State Entities program is authorized under the Elementary and Secondary Education Act of 1965 (ESEA), as amended by the Every Student Succeeds Act (ESSA). Pub. L. No. 89-10, 79 Stat. 27 (1965), as amended by Pub. L. No. 114-95, 129 Stat. 1802 (2015) (codified as amended at 20 U.S.C. §§ 7221-7221j). Prior to the enactment of ESSA, this program was called the CSP State Educational Agencies program. Education was authorized to make awards to state educational agencies to enable them to conduct charter school subgrant programs in their states. The CSP State Entities program under ESSA has broadened which state entities can apply for the grant, including state educational agencies, state charter school boards, state governors, and charter school support organizations. It also has different authorized activities, priorities, definitions, application requirements, and selection criteria.

expand were a relatively small share of charter schools. The smaller number of charter schools that were open for more than 1 year before receiving grants would have had varying histories, and the small sample would have constrained our ability to find comparison schools with comparable histories. It should be noted that although we looked at data over a 14-year period from 2006 through 2020, the maximum period of time we could assess enrollment change was 12 years. This is because we (1) required schools in the matched comparison analysis to be new in the year prior to receiving a grant, and (2) designated schools' first year of operation as the year following receipt of a grant.

Table 4: Scoping Decisions to Arrive at Final Population for Multivariate Matching Analysis for Charter Schools Program (CSP) Grants, Based on Data for 2006–2020

Number of schools	Description
4,494	All charter schools in the Common Core of Data (CCD), receiving one or more grants
3,643	Only K-12 charter schools with students, not run by the Bureau of Indian Education
3,349	Only charter schools that opened (first CCD status new or open)
2,868	Only charter schools that were first observed in new status in the year prior to receiving grant
2,596	Only charter schools with complete covariate data

Source: GAO matched comparison analysis of the Department of Education's CSP awards data and school-level characteristics from the Common Core of Data. | GAO-23-106268

Note: We examined data for the CSP State Educational Agencies/State Entities, CSP Charter Management Organizations, and CSP Non-State Educational Agencies/Developers grants. We analyzed Education's CSP awards data as of May 2022.

Our matched samples achieved coverage rates of 9–60 percent of the target population, depending on the exact covariates used, as shown previously in table 3. Coverage rates exceeded 90 percent for California, Florida, and Texas, and exceeded 50 percent for several additional states.

Data Reliability

We took steps to assess the reliability of the CSP awards and CCD datasets. Specifically, we:

- compared Education's restricted data file to the public-use file, which includes additional context for variables, and verified that our results using the public-use file were similar;
- conducted our own electronic data testing to assess the accuracy and completeness of the data used in our analyses;
- reviewed technical documentation, including data collection forms, on the data elements included in the CSP awards dataset; and

- interviewed federal and state officials knowledgeable about the CSP awards data and CCD, and consulted these officials periodically throughout the course of our study.

Matching Results

Table 5 shows various quantiles of the unmatched sample and for the sample matched exactly by state, opening year, grade level, and locale. Generally, the quantiles were similar between CSP grant-recipient and non-CSP charter schools.

Table 5: Unmatched Sample and Comparison Group Matched Exactly on State, Year, Grade, and Locale for Charter Schools Program (CSP), Based on Data for 2006–2020

Covariate	Treatment	Unmatched percentile					Matched percentile					
		10	25	50	75	95	10	25	50	75	95	
Location: latitude by longitude	CSP grant-recipient charter schools	-4397.39	-3989.37	-3352.09	-2986.51	-2140.33	-4550.94	-4022.62	-3434.74	-2901.59	-	2102.80
Location: latitude by longitude	Non-CSP charter schools	-4603.91	-4053.87	-3498.95	-3003.16	-2179.31	-4593.04	-4025.03	-3477.80	-2895.05	-	2093.45
Location: latitude	CSP grant-recipient charter schools	28.51	33.13	37.36	40.73	44.07	27.78	30.30	34.14	39.74	42.88	
Location: latitude	Non-CSP charter schools	28.81	32.76	36.15	40.65	44.94	26.70	30.26	34.23	39.75	42.95	
Location: longitude	CSP grant-recipient charter schools	-118.45	-111.80	-88.42	-80.52	-73.88	-121.29	-117.67	-95.53	-82.65	-74.22	
Location: longitude	Non-CSP charter schools	-120.86	-112.11	-95.37	-83.00	-76.54	-121.11	-117.74	-95.51	-82.12	-75.10	
Number of students	CSP grant-recipient charter schools	44.00	79.00	121.00	210.00	511.60	51.00	81.00	127.00	221.75	533.85	
Number of students	Non-CSP charter schools	25.00	53.00	115.00	236.00	605.80	37.00	74.25	140.00	232.00	486.95	

Appendix I: Objective, Scope, and Methodology

Covariate	Treatment	Unmatched percentile					Matched percentile				
		10	25	50	75	95	10	25	50	75	95
Percent of students on free or reduced-price lunch	CSP grant-recipient charter schools	0.07	0.31	0.65	0.84	0.97	0.08	0.35	0.68	0.86	0.97
Percent of students on free or reduced-price lunch	Non-CSP charter schools	0.00	0.10	0.46	0.78	0.96	0.05	0.36	0.67	0.85	0.97
Race: percent Native American	CSP grant-recipient charter schools	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.03
Race: percent Native American	Non-CSP charter schools	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.02
Race: percent Asian	CSP grant-recipient charter schools	0.00	0.00	0.01	0.03	0.12	0.00	0.00	0.01	0.03	0.14
Race: percent Asian	Non-CSP charter schools	0.00	0.00	0.00	0.02	0.11	0.00	0.00	0.01	0.03	0.09
Race: percent Black	CSP grant-recipient charter schools	0.00	0.03	0.18	0.62	0.98	0.00	0.03	0.15	0.55	0.97
Race: percent Black	Non-CSP charter schools	0.00	0.02	0.11	0.48	0.98	0.00	0.04	0.16	0.52	0.98
Race: percent Hawaiian/Pacific Islander	CSP grant-recipient charter schools	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01
Race: percent Hawaiian/Pacific Islander	Non-CSP charter schools	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01
Race: percent Hispanic	CSP grant-recipient charter schools	0.00	0.04	0.17	0.51	0.92	0.01	0.07	0.27	0.65	0.95

Appendix I: Objective, Scope, and Methodology

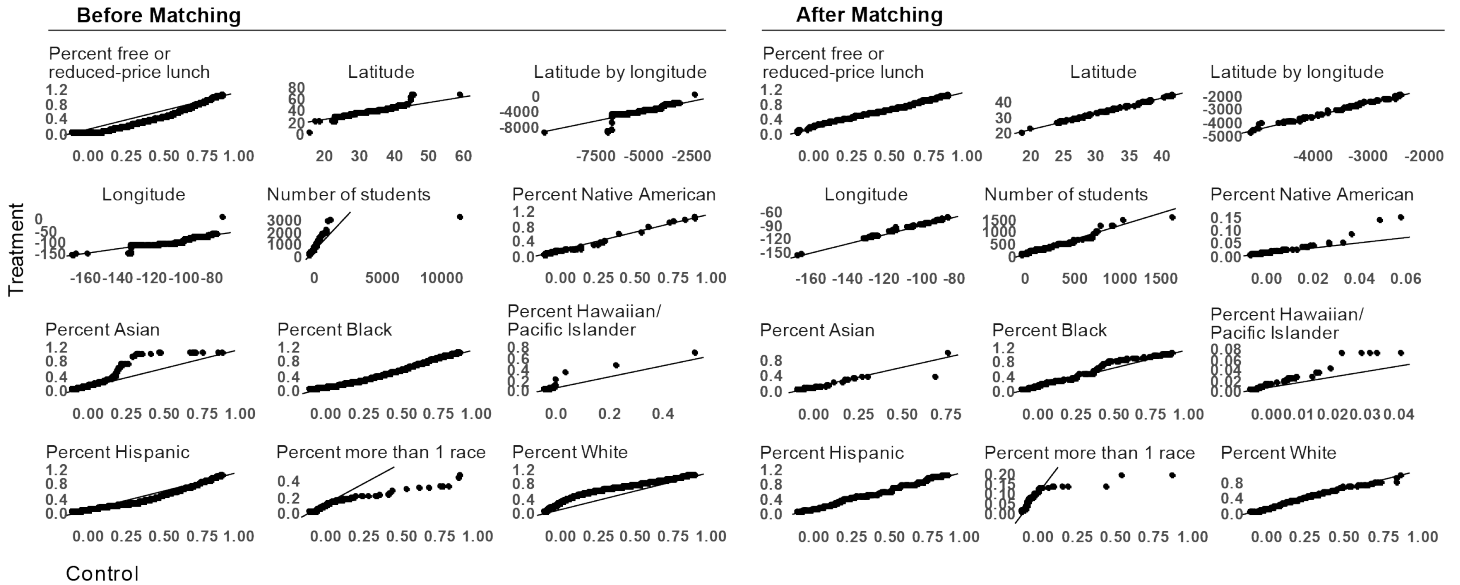
Covariate	Treatment	Unmatched percentile					Matched percentile				
		10	25	50	75	95	10	25	50	75	95
Race: percent Hispanic	Non-CSP charter schools	0.00	0.02	0.11	0.33	0.90	0.01	0.07	0.29	0.66	0.95
Race: percent non-Hispanic White	CSP grant-recipient charter schools	0.00	0.02	0.15	0.56	0.91	0.00	0.02	0.11	0.42	0.83
Race: percent non-Hispanic White	Non-CSP charter schools	0.00	0.04	0.33	0.72	0.95	0.00	0.02	0.13	0.47	0.81
Race: percent multiracial	CSP grant-recipient charter schools	0.00	0.00	0.01	0.04	0.11	0.00	0.00	0.01	0.04	0.12
Race: Percent multiracial	Non-CSP charter schools	0.00	0.00	0.00	0.01	0.08	0.00	0.00	0.01	0.04	0.12

Source: GAO matched comparison analysis of the Department of Education's CSP awards data and school-level characteristics from the Common Core of Data. | GAO-23-106268

Note: We examined data for the CSP State Educational Agencies/State Entities, CSP Charter Management Organizations, and CSP Non-State Educational Agencies/Developers grants. We analyzed Education's CSP awards data as of May 2022. Figures 4 through 6 show the distributions of covariates in grant-recipient charter schools and non-CSP charter schools, before and after matching. In a completely balanced design, each point in each plot would sit directly on the diagonal line, representing that the quantiles of each sample's distribution are the same. As seen below, matching generally improved the similarity of the covariate distributions, but imbalances remained for school size in some of the matched samples and for some race and ethnic groups (e.g., Native American, Asian, Hawaiian/Pacific Islander, and multiracial).

Appendix I: Objective, Scope, and Methodology

Figure 4: Covariate Distributions among Charter Schools Programs (CSP) and Comparison Charter Schools, Matched Exactly on State, Grade, Year, and District, Based on Data for 2006–2020

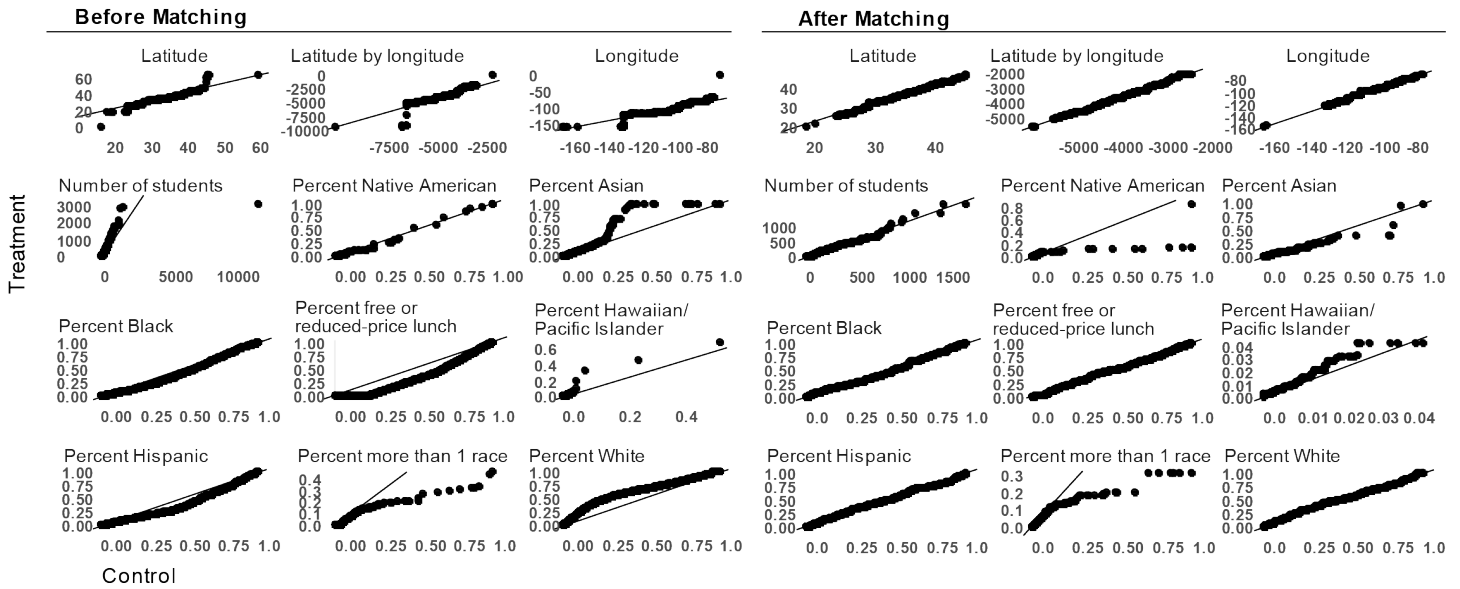


Source: GAO matched comparison analysis of the Department of Education's CSP awards data and school-level characteristics from the Common Core of Data. | GAO-23-106268

Note: Points are quantiles of the sample distributions, overlaid with a 45-degree line (empirical quantile-quantile plots). The sample distributions are identical if the quantiles fall on the line. We examined data for the CSP State Educational Agencies/State Entities, CSP Charter Management Organizations, and CSP Non-State Educational Agencies/Developers grants. We analyzed Education's CSP awards data as of May 2022.

Appendix I: Objective, Scope, and Methodology

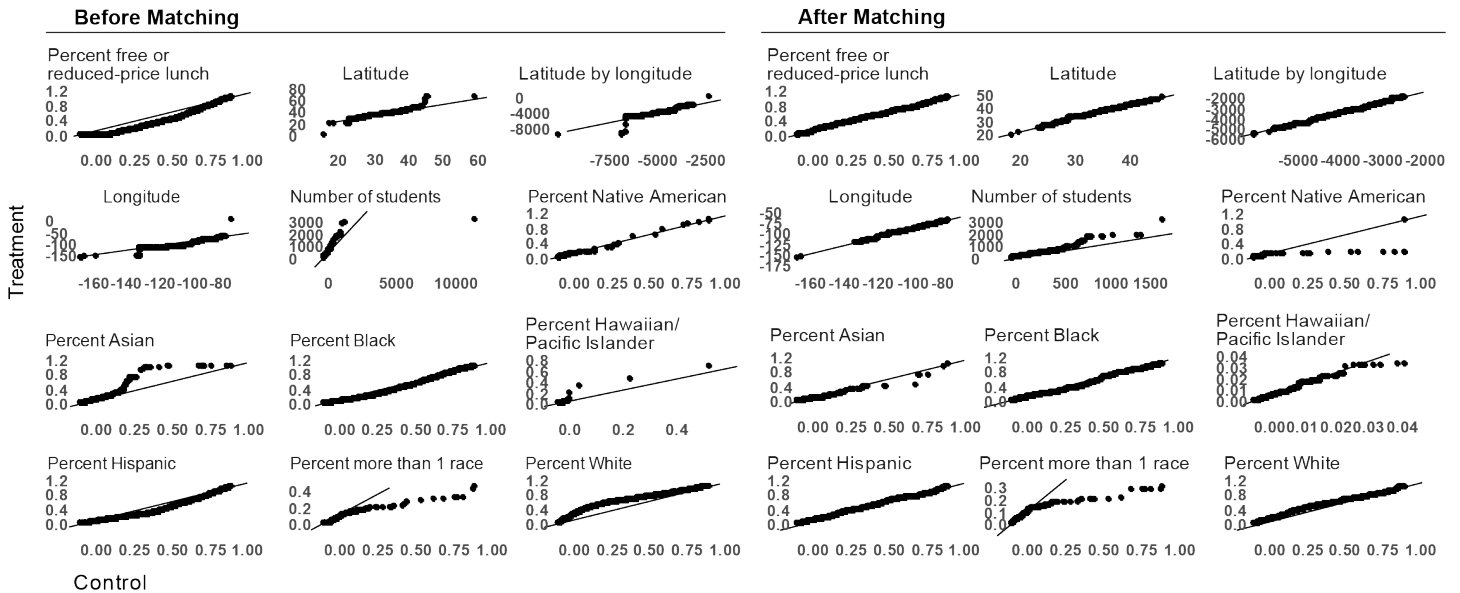
Figure 5: Covariate Distributions among Charter Schools Programs (CSP) and Comparison Charter Schools Matched Exactly on State, Grade, Year, and Locale, Based on Data for 2006–2020



Source: GAO matched comparison analysis of the Department of Education’s CSP awards data and school-level characteristics from the Common Core of Data. | GAO-23-106268

Note: Points are quantiles of the sample distributions, overlaid with a 45-degree line (empirical quantile-quantile plots). The sample distributions are identical if the quantiles fall on the line. We examined data for the CSP State Educational Agencies/State Entities, CSP Charter Management Organizations, and CSP Non-State Educational Agencies/Developers grants. We analyzed Education’s CSP awards data as of May 2022.

Figure 6: Covariate Distributions among Charter Schools Programs (CSP) and Comparison Charter Schools Matched Exactly on State, Grade, and Year, Based on Data for 2006–2020



Source: GAO matched comparison analysis of the Department of Education’s CSP awards data and school-level characteristics from the Common Core of Data. | GAO-23-106268

Note: Points are quantiles of the sample distributions, overlaid with a 45-degree line (empirical quantile-quantile plots). The sample distributions are identical if the quantiles fall on the line. We examined data for the CSP State Educational Agencies/State Entities, CSP Charter Management Organizations, and CSP Non-State Educational Agencies/Developers grants. We analyzed Education’s CSP awards data as of May 2022.

Table 6 shows the mean difference on each covariate between grantees and nongrantees, divided by the standard deviation of the grantee observations and multiplied by 100. Generally, matching reduced these differences to less than 10 (0.1 standard deviations).

Appendix I: Objective, Scope, and Methodology

Table 6: Standardized Mean Difference Before and After Matching for Multivariate Matching Analysis for Charter Schools Program (CSP), Based on Data for 2006–2020

Variable	State-grade-year-district exact match		State-grade-year-locales exact match		State-grade-year exact match	
	Standardized difference before	Standardized difference after	Standardized difference before	Standardized difference after	Standardized difference before	Standardized difference after
Location: latitude	8.96	0.34	8.96	-1.84	8.96	-2.31
Location: longitude	25.13	-0.47	25.13	-0.40	25.13	-0.25
Race: percent Asian	-2.62	6.70	-2.62	8.96	-2.62	7.76
Race: percent Hispanic	18.5	-0.30	18.50	-1.27	18.50	2.08
Race: percent Black	10.37	-5.78	10.37	1.07	10.37	-0.82
Race: percent non-Hispanic White	-27.55	1.84	-27.55	-5.34	-27.55	-6.80
Race: percent Native American	5.97	-16.63	5.97	6.15	5.97	6.43
Percent of students on free or reduced-price lunch	34.91	-5.78	34.91	1.64	34.91	2.11
Race: percent Hawaiian/Pacific Islander	0.32	-21.61	0.32	-9.70	0.32	3.09
Race: percent multiracial	24.49	7.16	24.49	9.39	24.49	8.13
Number students	-3.37	8.92	-3.37	1.11	-3.37	-10.80
Location: latitude by longitude	14.33	-0.61	14.33	1.30	14.33	1.86

Source: GAO matched comparison analysis of the Department of Education’s CSP awards data and school-level characteristics from the Common Core of Data. | GAO-23-106268

Note: Entries are the mean differences on each covariate between grantees and nongrantees, divided by the standard deviation of the grantee observations and multiplied by 100. We examined data for the CSP State Educational Agencies/State Entities, CSP Charter Management Organizations, and CSP Non-State Educational Agencies/Developers grants. We analyzed Education’s CSP awards data as of May 2022.

Finally, table 7 shows the results of Kolmogorov-Smirnov tests before and after matching. Kolmogorov-Smirnov tests assess the probability that two samples are drawn from the same distribution. Tests generally showed p-values that exceeded .05. This implies we generally could not reject the hypothesis that the covariate samples were drawn from the same distribution.

Table 7: Kolmogorov-Smirnov p-Values Before and After Matching for Charter Schools Program (CSP) Multivariate Comparison Analysis, Based on Data for 2006–2020

Variable	State-grade-year-district exact match		State-grade-year-locale exact match		State-grade-year exact match	
	Before matching	After matching	Before matching	After matching	Before matching	After matching
Location: latitude	0.000	0.758	0.000	0.428	0.000	0.158
Location: longitude	0.000	0.983	0.000	0.375	0.000	0.281
Race: percent Asian	0.000	0.009	0.000	0.014	0.000	0.018
Race: percent Hispanic	0.000	0.823	0.000	0.135	0.000	0.115
Race: percent Black	0.000	0.549	0.000	0.047	0.000	0.007
Race: percent non-Hispanic White	0.000	0.103	0.000	0.038	0.000	0.027
Race: percent Native American	0.000	0.758	0.000	0.767	0.000	0.845
Percent of students on free or reduced-price lunch	0.000	0.823	0.000	0.124	0.000	0.053
Race: percent Hawaiian/Pacific Islander	0.001	0.927	0.001	0.853	0.001	0.956
Race: percent multiracial	0.000	0.482	0.000	0.428	0.000	0.513
Number of students	0.000	0.419	0.000	0.011	0.000	0.002
Location: latitude by longitude	0.000	0.758	0.000	0.103	0.000	0.053

Source: GAO matched comparison analysis of the Department of Education’s CSP awards data and school-level characteristics from the Common Core of Data. | GAO-23-106268

Note: We examined data for the CSP State Educational Agencies/State Entities, CSP Charter Management Organizations, and CSP Non-State Educational Agencies/Developers grants. We analyzed Education’s CSP awards data as of May 2022.

Figures 4 through 6 and tables 6 and 7 show that matching improved covariate balance (similarity of distributions) between the CSP grant-recipient charter school and non-CSP charter school groups. However, less restrictive comparison groups have worse balance than more restrictive comparison groups. Moreover, balance between CSP grant-recipient charter school and non-CSP charter school was generally worse for some racial and ethnic groups than for other covariates.

Outcome Analysis Methods

We used a regression model to estimate proportional change in enrollment from the matching baseline year up to 12 follow-up years, separately for the CSP grant-recipient and non-CSP charter schools. The length of the follow-up period varied across the cohorts of grantee schools and their matched comparison schools, depending on when they received grants within our dataset’s overall observation period from 2006-

07 through 2020-21. The analysis was limited to schools that remained open in all possible follow-up years in the matching period, because closed schools had zero enrollment by definition. Our previous work ([GAO-23-105616](#)) accounted for differences in closure rates between CSP grant-recipient and non-CSP charter schools.⁸

Exploratory data analysis revealed extreme positive skew and outliers in the distribution of proportional enrollment change. We applied robust variance estimation methods, clustered by school, to adjust for the heteroscedasticity this outcome distribution causes. However, the skew and outliers also might have had strong leverage over the estimated coefficients and predicted enrollment change, conditional on treatment status and subpopulation covariates.

As a result, we viewed post-treatment raw enrollment as count data, generated proportional to baseline enrollment at matching as an exposure variable. Generalized linear regression models for count data, using the Poisson or negative binomial distributions, use exposure variables to represent a linear association between the outcome and a measure of opportunity to experience counts. In our exploratory analysis, we observed that raw post-treatment enrollment was proportional to baseline enrollment, and that outliers and positive skew also were strongly associated with baseline enrollment. This suggested that baseline enrollment served as an exposure variable, which influenced the stability and variance of enrollment growth among the smallest schools at baseline.

We use the following model to estimate how the original outcome of interest, proportional change from baseline, varied by treatment status and covariates:

⁸See [GAO-23-105616](#) *K-12 Education: Charter Schools That Received Federal Funding to Open or Expand Were Generally Less Likely to Close Than Other Similar Charter Schools*, [GAO-23-105616](#) (Washington, D.C.: Oct. 11, 2022).

$$\begin{aligned} \log(\text{Enroll}_1) &= \log(\text{Enroll}_0) + x\beta + e, e \sim N(0, \sigma^2) \\ \log\left(\frac{\text{Enroll}_1}{\text{Enroll}_0}\right) &= x\beta + e \\ \left(\frac{\text{Enroll}_1}{\text{Enroll}_0}\right) - 1 &= \exp(x\beta + e) - 1 \\ 100 * \left(\frac{\text{Enroll}_1 - \text{Enroll}_0}{\text{Enroll}_0}\right) &= 100(\exp(x\beta + e) - 1) \\ E(\text{PctChange}|x, \beta) &= 100(\exp(x\beta) - 1) \end{aligned}$$

Enroll1 and Enroll0 measure enrollment in a follow-up period and at baseline, respectively, and x is a vector of indicators for grant-receipt, follow-up years, quartiles of enrollment, percent of enrollment by race and ethnicity, and percent of enrollment receiving free or reduced-price lunch in one of the matched samples. We estimated the parameters using the original “log-log” version of the model, and then applied the transformation above to calculate the predicted enrollment growth rate for grant recipients and matched non-recipients at each follow-up time and demographic quartile. We weighted the estimation by the inverse of the number of times that the matching method re-used each comparison charter school. Finally, we calculated 95 percent confidence intervals for these quantities by drawing 10,000 values of the parameters from their estimated multivariate normal distribution, calculating the quantity for each simulate, and using the 2.5th and 97.5th quantiles as lower and upper bounds, respectively. We estimated the variance-covariance matrix using robust methods clustered by school.

Results

We found that CSP grant-recipient charter schools generally had higher estimated enrollment growth than similar non-CSP charter schools, regardless of which matched comparison group we used (see table 8). When we compared student enrollment growth among various subpopulations of schools, we found that CSP grant-recipient charter schools generally had higher enrollment growth in the 12 years after receiving an award than similar non-grant charter schools (see table 9). Table 9 shows results from our state-grade-year exact match.

Appendix I: Objective, Scope, and Methodology

Table 8: Estimated Average Percentage Growth in Enrollment, by Follow-Up Time and Matched Comparison Group for Multivariate Matching Analysis for Charter Schools Program (CSP), Based on Data for 2006–2020

Years open	State-grade-year-district exact match		State-grade-year-locale exact match		State-grade-year exact match	
	Non-CSP charter schools	CSP grant-recipient charter schools	Non-CSP charter schools	CSP grant-recipient charter schools	Non-CSP charter schools	CSP grant-recipient charter schools
1	33.0 (23.8–42.5)	55.5 (48.2–62.8)	37.0 (32.1–42.1)	60.5 (56.9–64.1)	41.4 (36.1–46.8)	59.5 (56.2–62.7)
2	46.1 (31.1–62.3)	84.9 (73.1–97.5)	59.5 (52.0–67.6)	96.5 (90.3–102.8)	64.1 (56.2–72.0)	94.6 (89.0–100.3)
3	73.3 (52.9–95.4)	104.5 (88.7–121.6)	77.2 (67.4–87.7)	120.7 (112.3–129.1)	80.2 (69.4–91.0)	115.7 (108.5–123.1)
4	81.4 (59.0–105.8)	112.4 (93.6–133.2)	87.9 (76.3–100.3)	131.0 (121.2–141.0)	91.1 (78.3–104.4)	125.4 (116.6–134.2)
5	120.9 (86.5–159.5)	120.3 (97.6–145.5)	106.0 (91.4–121.3)	143.0 (131.7–154.7)	113.3 (95.9–131.7)	137.4 (127.4–147.8)
6	136.5 (96.0–182.6)	131.9 (106.6–160.4)	115.8 (99.7–133.2)	148.1 (135.4–161.5)	121.8 (102.1–142.8)	142.8 (131.3–154.7)
7	150.8 (104.8–202.9)	151.1 (119.8–186.5)	117.2 (99.2–136.7)	158.1 (142.5–174.4)	129.2 (107.2–153.1)	154.7 (141.1–169.0)
8	173.5 (110.9–247.7)	145.7 (111.4–184.4)	123.1 (101.5–146.3)	160.7 (142.2–180.1)	124.0 (102.3–148.0)	154.1 (138.2–170.8)
9	156.8 (78.4–255.8)	143.1 (107.4–183.5)	125.0 (99.2–153.2)	160.1 (139.0–182.4)	123.3 (97.9–151.6)	155.4 (137.2–174.5)
10	160.9 (65.7–289.6)	131.1 (88.2–182.1)	133.7 (105.6–164.3)	167.7 (140.9–196.9)	128.3 (100.5–158.7)	162.4 (139.8–186.8)
11	155.4 (106.5–211.8)	134.4 (81.9–196.1)	134.9 (103.3–170.5)	170.0 (137.4–206.1)	134.4 (101.4–171.8)	167.9 (138.6–199.1)
12	138.1 (86.4–200.2)	130.1 (74.5–198.1)	132.9 (97.0–174.0)	176.1 (138.1–219.8)	126.4 (94.4–163.1)	178.4 (144.8–214.9)

Source: GAO matched comparison analysis of the Department of Education’s CSP awards data and school-level characteristics from the Common Core of Data. | GAO-23-106268

Note: Entries are the estimated mean percentage growth in enrollment from the matched baseline year to each follow-up year, with 95 percent confidence intervals in parentheses. We examined data for the CSP State Educational Agencies/State Entities, CSP Charter Management Organizations, and CSP Non-State Educational Agencies/Developers grants. We analyzed Education’s CSP awards data as of May 2022.

Appendix I: Objective, Scope, and Methodology

Table 9: Estimated Average Percentage Growth in Enrollment, by Sub-Population, Follow-Up Time, and Matched Comparison Group for Multivariate Matching Analysis for Charter Schools Program (CSP), Based on Data for 2006–2020

Years open	Subpopulation	Non-CSP charter schools	CSP charter schools
1	Grade level – high school	42.78 (26.65–60.17)	66.21 (55.99–76.74)
2	Grade level – high school	68.93 (47.90–91.31)	101.95 (85.50–119.51)
3	Grade level – high school	76.73 (48.59–107.90)	116.67 (97.60–137.04)
4	Grade level – high school	94.47 (63.76–129.09)	114.17 (92.96–136.90)
5	Grade level – high school	118.40 (77.66–164.90)	128.14 (102.63–156.22)
6	Grade level – high school	127.61 (87.39–173.61)	130.10 (101.46–161.87)
7	Grade level – high school	127.13 (84.68–176.53)	133.44 (101.57–169.18)
8	Grade level – high school	128.87 (77.17–192.22)	118.00 (83.95–154.81)
9	Grade level – high school	124.48 (64.48–198.94)	112.06 (74.04–155.72)
10	Grade level – high school	80.23 (41.36–126.66)	95.38 (51.61–148.40)
11	Grade level – high school	71.56 (32.09–119.76)	75.29 (31.26–129.87)
12	Grade level – high school	53.15 (14.89–99.80)	95.53 (43.28–162.69)
1	Grade level – middle school	41.56 (28.99–54.68)	76.25 (66.91–86.38)
2	Grade level – middle school	65.17 (44.49–86.62)	127.96 (112.48–144.63)
3	Grade level – middle school	91.14 (64.32–120.33)	164.96 (141.59–189.76)
4	Grade level – middle school	100.29 (68.00–135.97)	177.27 (150.78–205.87)
5	Grade level – middle school	116.71 (77.97–160.80)	205.92 (176.82–236.25)
6	Grade level – middle school	120.87 (77.59–171.33)	213.20 (179.44–248.53)
7	Grade level – middle school	132.78 (82.35–193.27)	219.09 (179.61–261.55)
8	Grade level – middle school	176.93 (101.24–268.52)	207.16 (159.47–258.69)
9	Grade level – middle school	147.13 (68.40–246.65)	202.50 (137.71–276.47)
10	Grade level – middle school	251.40 (128.87–419.12)	215.36 (137.23–313.23)
11	Grade level – middle school	321.60 (154.62–565.09)	254.72 (156.61–378.99)
12	Grade level – middle school	425.44 (216.78–724.96)	292.19 (152.44–487.42)
1	Grade level – elementary school	33.60 (28.28–39.10)	49.08 (45.03–53.26)
2	Grade level – elementary school	53.01 (44.54–61.74)	78.16 (72.04–84.54)
3	Grade level – elementary school	65.48 (54.87–76.65)	97.62 (90.02–105.53)
4	Grade level – elementary school	78.50 (65.34–92.54)	110.16 (100.52–120.19)
5	Grade level – elementary school	89.56 (73.55–106.66)	117.36 (106.86–128.59)
6	Grade level – elementary school	97.58 (78.11–118.37)	124.00 (112.09–136.78)
7	Grade level – elementary school	113.93 (91.12–138.19)	137.87 (122.93–153.91)
8	Grade level – elementary school	118.02 (92.62–145.53)	146.70 (129.00–164.90)
9	Grade level – elementary school	132.25 (100.44–167.71)	156.65 (135.66–178.89)
10	Grade level – elementary school	137.76 (102.53–177.90)	170.61 (144.28–199.42)
11	Grade level – elementary school	149.81 (112.53–191.75)	190.10 (154.83–229.18)

Appendix I: Objective, Scope, and Methodology

Years open	Subpopulation	Non-CSP charter schools	CSP charter schools
12	Grade level – elementary school	145.71 (103.99–192.89)	178.32 (141.92–218.75)
1	Locale – rural	51.94 (32.85–72.63)	52.31 (42.19–62.84)
2	Locale – rural	67.42 (43.31–93.66)	71.17 (56.11–87.15)
3	Locale – rural	88.46 (54.04–128.12)	90.63 (70.58–112.06)
4	Locale – rural	106.21 (61.47–160.16)	102.10 (78.92–127.48)
5	Locale – rural	154.02 (93.22–228.68)	115.84 (86.50–147.87)
6	Locale – rural	141.23 (82.15–213.70)	127.89 (93.88–166.32)
7	Locale – rural	127.84 (67.77–200.76)	140.14 (98.37–189.33)
8	Locale – rural	100.42 (60.73–146.86)	131.36 (88.67–181.80)
9	Locale – rural	100.77 (57.04–152.47)	112.27 (78.65–149.93)
10	Locale – rural	129.17 (75.40–193.66)	121.51 (75.76–174.20)
11	Locale – rural	149.06 (77.86–236.67)	84.19 (36.51–144.81)
12	Locale – rural	121.45 (72.12–179.79)	124.85 (78.16–179.07)
1	Locale – suburban	39.63 (32.67–46.89)	57.69 (51.95–63.65)
2	Locale – suburban	54.74 (43.87–66.24)	90.37 (80.48–100.53)
3	Locale – suburban	67.43 (51.06–85.09)	106.19 (92.08–121.15)
4	Locale – suburban	87.19 (68.87–107.45)	117.51 (101.55–134.37)
5	Locale – suburban	104.58 (79.00–133.44)	116.88 (99.14–135.60)
6	Locale – suburban	125.44 (93.74–161.96)	125.63 (105.93–146.38)
7	Locale – suburban	147.52 (106.75–194.85)	138.24 (114.76–162.84)
8	Locale – suburban	133.30 (91.44–182.07)	144.90 (118.06–173.57)
9	Locale – suburban	131.66 (82.84–190.05)	168.37 (133.32–208.30)
10	Locale – suburban	115.85 (69.13–170.79)	187.28 (138.41–242.11)
11	Locale – suburban	120.69 (71.39–180.71)	202.52 (141.31–275.33)
12	Locale – suburban	118.14 (66.32–180.54)	207.52 (136.43–292.60)
1	Locale – urban	38.86 (32.13–45.90)	62.75 (58.64–66.98)
2	Locale – urban	69.99 (58.84–81.73)	103.59 (96.12–111.26)
3	Locale – urban	87.69 (73.52–102.51)	127.17 (117.73–136.70)
4	Locale – urban	88.28 (72.07–105.28)	135.80 (123.89–148.08)
5	Locale – urban	102.80 (80.86–125.69)	152.89 (139.46–166.70)
6	Locale – urban	110.82 (83.95–139.66)	154.73 (139.48–170.62)
7	Locale – urban	114.72 (86.67–144.61)	165.24 (146.71–184.91)
8	Locale – urban	124.32 (92.42–159.70)	162.84 (140.26–187.26)
9	Locale – urban	124.38 (86.49–168.01)	160.85 (135.96–188.39)
10	Locale – urban	123.96 (83.53–171.50)	164.65 (134.66–197.42)
11	Locale – urban	131.54 (76.97–197.77)	178.46 (138.10–223.53)
12	Locale – urban	134.55 (74.70–207.63)	176.45 (128.37–230.63)

Appendix I: Objective, Scope, and Methodology

Years open	Subpopulation	Non-CSP charter schools	CSP charter schools
1	Free or reduced-price lunch – less than 25 percent	53.60 (37.37–71.65)	56.31 (47.03–66.08)
2	Free or reduced-price lunch – less than 25 percent	81.06 (57.56–107.58)	82.71 (67.80–99.35)
3	Free or reduced-price lunch – less than 25 percent	106.54 (75.69–141.22)	99.11 (81.83–117.91)
4	Free or reduced-price lunch – less than 25 percent	126.30 (89.86–167.57)	119.00 (97.68–141.81)
5	Free or reduced-price lunch – less than 25 percent	147.32 (98.39–205.22)	132.66 (109.07–157.67)
6	Free or reduced-price lunch – less than 25 percent	157.22 (104.88–219.77)	151.73 (124.00–182.05)
7	Free or reduced-price lunch – less than 25 percent	185.49 (123.96–261.05)	159.52 (128.15–193.07)
8	Free or reduced-price lunch – less than 25 percent	138.88 (100.32–183.34)	159.28 (122.72–199.17)
9	Free or reduced-price lunch – less than 25 percent	137.91 (92.07–190.50)	151.61 (117.57–189.83)
10	Free or reduced-price lunch – less than 25 percent	148.97 (99.11–205.87)	154.38 (113.57–201.25)
11	Free or reduced-price lunch – less than 25 percent	142.89 (90.05–204.66)	151.69 (106.27–203.44)
12	Free or reduced-price lunch – less than 25 percent	128.98 (85.18–180.16)	150.59 (104.00–204.06)
1	Free or reduced-price lunch – more than 25 percent and less than 50 percent	34.32 (26.25–42.87)	54.11 (47.97–60.34)
2	Free or reduced-price lunch – more than 25 percent and less than 50 percent	56.38 (44.22–69.22)	86.55 (76.28–97.21)
3	Free or reduced-price lunch – more than 25 percent and less than 50 percent	61.08 (45.98–77.52)	105.19 (92.21–118.72)
4	Free or reduced-price lunch – more than 25 percent and less than 50 percent	75.61 (54.02–98.63)	110.22 (95.69–125.22)
5	Free or reduced-price lunch – more than 25 percent and less than 50 percent	101.72 (73.27–132.99)	112.17 (95.11–130.11)
6	Free or reduced-price lunch – more than 25 percent and less than 50 percent	122.89 (88.62–161.79)	115.79 (95.88–136.92)
7	Free or reduced-price lunch – more than 25 percent and less than 50 percent	109.36 (74.28–150.57)	134.13 (109.19–161.07)
8	Free or reduced-price lunch – more than 25 percent and less than 50 percent	113.80 (70.06–165.75)	141.48 (114.64–170.75)

Appendix I: Objective, Scope, and Methodology

Years open	Subpopulation	Non-CSP charter schools	CSP charter schools
9	Free or reduced-price lunch – more than 25 percent and less than 50 percent	104.45 (55.39–165.22)	161.18 (127.23–198.70)
10	Free or reduced-price lunch – more than 25 percent and less than 50 percent	90.10 (48.39–139.89)	180.97 (135.55–230.85)
11	Free or reduced-price lunch – more than 25 percent and less than 50 percent	104.79 (54.16–168.32)	183.84 (131.47–243.80)
12	Free or reduced-price lunch – more than 25 percent and less than 50 percent	103.98 (49.46–172.21)	176.84 (117.18–248.20)
1	Free or reduced-price lunch – more than 50 percent and less than 75 percent	38.38 (27.84–49.38)	57.48 (52.26–62.95)
2	Free or reduced-price lunch – more than 50 percent and less than 75 percent	57.52 (44.04–71.84)	89.29 (79.19–99.70)
3	Free or reduced-price lunch – more than 50 percent and less than 75 percent	80.21 (58.55–103.17)	115.13 (103.09–127.77)
4	Free or reduced-price lunch – more than 50 percent and less than 75 percent	85.71 (63.99–109.51)	120.69 (104.83–137.22)
5	Free or reduced-price lunch – more than 50 percent and less than 75 percent	114.18 (83.51–147.76)	142.59 (123.04–163.24)
6	Free or reduced-price lunch – more than 50 percent and less than 75 percent	120.32 (85.34–159.83)	143.10 (121.19–166.40)
7	Free or reduced-price lunch – more than 50 percent and less than 75 percent	125.52 (88.72–167.47)	153.95 (128.63–181.23)
8	Free or reduced-price lunch – more than 50 percent and less than 75 percent	138.39 (94.58–188.19)	155.13 (124.11–189.26)
9	Free or reduced-price lunch – more than 50 percent and less than 75 percent	137.40 (85.65–197.27)	162.65 (127.81–199.46)
10	Free or reduced-price lunch – more than 50 percent and less than 75 percent	133.33 (76.13–203.99)	171.77 (126.67–222.29)
11	Free or reduced-price lunch – more than 50 percent and less than 75 percent	139.18 (68.20–229.45)	194.37 (127.70–271.86)
12	Free or reduced-price lunch – more than 50 percent and less than 75 percent	126.97 (55.30–219.24)	253.41 (156.43–373.26)
1	Free or reduced-price lunch – more than 75 percent	43.06 (35.08–51.32)	67.79 (62.28–73.44)
2	Free or reduced-price lunch – more than 75 percent	66.49 (52.90–81.41)	114.44 (105.08–123.93)
3	Free or reduced-price lunch – more than 75 percent	80.97 (63.75–99.34)	136.74 (121.76–152.01)
4	Free or reduced-price lunch – more than 75 percent	84.08 (63.84–105.57)	148.45 (131.20–166.17)
5	Free or reduced-price lunch – more than 75 percent	95.54 (72.23–120.63)	161.47 (142.21–181.38)
6	Free or reduced-price lunch – more than 75 percent	87.28 (61.31–116.11)	163.77 (142.84–186.10)

Appendix I: Objective, Scope, and Methodology

Years open	Subpopulation	Non-CSP charter schools	CSP charter schools
7	Free or reduced-price lunch – more than 75 percent	98.29 (66.93–132.84)	173.89 (147.06–203.15)
8	Free or reduced-price lunch – more than 75 percent	100.51 (60.05–147.39)	164.30 (132.94–199.16)
9	Free or reduced-price lunch – more than 75 percent	115.53 (68.38–170.15)	146.74 (108.15–190.13)
10	Free or reduced-price lunch – more than 75 percent	152.65 (84.17–238.20)	148.57 (104.32–198.05)
11	Free or reduced-price lunch – more than 75 percent	189.27 (93.94–312.47)	153.28 (91.95–225.26)
12	Free or reduced-price lunch – more than 75 percent	236.78 (110.15–412.51)	188.78 (116.61–279.58)
1	Percent White – less than 25 percent	51.29 (38.65–64.66)	71.19 (64.77–77.68)
2	Percent White – less than 25 percent	77.18 (60.75–94.85)	115.49 (103.34–128.01)
3	Percent White – less than 25 percent	100.27 (78.72–123.92)	145.01 (130.20–160.41)
4	Percent White – less than 25 percent	106.38 (80.86–133.86)	161.99 (143.51–181.20)
5	Percent White – less than 25 percent	127.39 (95.11–163.52)	181.23 (158.31–205.38)
6	Percent White – less than 25 percent	133.00 (98.09–171.55)	197.60 (170.40–226.19)
7	Percent White – less than 25 percent	156.25 (109.90–209.07)	208.21 (177.06–240.80)
8	Percent White – less than 25 percent	167.19 (117.42–224.72)	211.98 (174.49–251.18)
9	Percent White – less than 25 percent	210.39 (146.76–284.89)	206.87 (162.88–254.51)
10	Percent White – less than 25 percent	202.17 (133.36–285.90)	230.22 (173.60–293.88)
11	Percent White – less than 25 percent	229.78 (149.89–329.93)	248.44 (173.58–336.57)
12	Percent White – less than 25 percent	208.66 (109.71–339.89)	260.69 (175.80–360.61)
1	Percent White – More than 25 percent less than 50 percent	35.78 (28.25–43.49)	59.92 (54.52–65.35)
2	Percent White – More than 25 percent less than 50 percent	58.17 (45.25–71.98)	98.00 (89.30–106.89)
3	Percent White – More than 25 percent less than 50 percent	69.89 (53.36–87.80)	116.29 (103.51–129.67)
4	Percent White – More than 25 percent less than 50 percent	80.58 (61.35–101.41)	117.30 (101.54–134.04)
5	Percent White – More than 25 percent less than 50 percent	99.94 (72.63–129.66)	127.57 (110.02–145.85)
6	Percent White – More than 25 percent less than 50 percent	105.73 (73.97–141.50)	126.89 (106.82–147.97)
7	Percent White – More than 25 percent less than 50 percent	117.73 (82.63–157.99)	138.47 (114.56–164.65)
8	Percent White – More than 25 percent less than 50 percent	125.02 (83.41–173.53)	132.34 (104.59–162.84)
9	Percent White – More than 25 percent less than 50 percent	126.34 (76.79–186.46)	129.77 (97.02–166.51)

Appendix I: Objective, Scope, and Methodology

Years open	Subpopulation	Non-CSP charter schools	CSP charter schools
10	Percent White – More than 25 percent less than 50 percent	139.29 (76.58–220.00)	126.84 (92.04–167.09)
11	Percent White – More than 25 percent less than 50 percent	156.40 (66.20–275.00)	162.62 (109.04–226.10)
12	Percent White – More than 25 percent less than 50 percent	165.44 (74.03–291.45)	189.08 (120.26–271.15)
1	Percent White – More than 50 percent less than 75 percent	38.59 (29.47–48.11)	58.55 (51.77–65.49)
2	Percent White – More than 50 percent less than 75 percent	59.17 (46.09–72.82)	94.68 (82.24–107.80)
3	Percent White – More than 50 percent less than 75 percent	76.61 (56.21–99.25)	113.28 (98.13–129.07)
4	Percent White – More than 50 percent less than 75 percent	90.90 (67.50–116.79)	128.50 (111.69–146.41)
5	Percent White – More than 50 percent less than 75 percent	107.74 (77.60–141.84)	141.31 (122.23–161.54)
6	Percent White – More than 50 percent less than 75 percent	114.78 (80.05–154.09)	140.79 (121.15–162.11)
7	Percent White – More than 50 percent less than 75 percent	110.30 (73.70–152.77)	146.06 (122.15–172.41)
8	Percent White – More than 50 percent less than 75 percent	99.94 (56.78–150.88)	142.55 (115.61–172.48)
9	Percent White – More than 50 percent less than 75 percent	65.29 (26.94–110.76)	156.22 (120.71–195.69)
10	Percent White – More than 50 percent less than 75 percent	83.82 (33.44–147.84)	165.98 (119.13–219.39)
11	Percent White – More than 50 percent less than 75 percent	71.32 (21.71–133.25)	164.87 (110.17–230.27)
12	Percent White – More than 50 percent less than 75 percent	71.64 (18.76–139.11)	166.22 (102.15–244.92)
1	Percent White – More than 75 percent	41.35 (28.93–54.76)	42.97 (36.06–50.20)
2	Percent White – More than 75 percent	64.39 (46.14–84.65)	60.91 (51.30–70.89)
3	Percent White – More than 75 percent	78.37 (55.23–104.83)	80.90 (67.33–95.43)
4	Percent White – More than 75 percent	90.47 (61.85–122.52)	90.45 (74.79–107.36)
5	Percent White – More than 75 percent	119.94 (81.04–164.26)	101.58 (83.27–121.75)
6	Percent White – More than 75 percent	134.80 (91.18–186.96)	111.62 (90.10–134.92)
7	Percent White – More than 75 percent	136.77 (87.73–194.63)	129.04 (101.71–159.37)
8	Percent White – More than 75 percent	110.45 (75.43–151.21)	136.86 (104.81–172.87)
9	Percent White – More than 75 percent	110.66 (70.87–156.93)	140.00 (109.78–173.43)
10	Percent White – More than 75 percent	111.17 (74.25–153.45)	146.57 (107.49–190.06)
11	Percent White – More than 75 percent	118.79 (75.83–169.03)	120.49 (79.01–168.23)
12	Percent White – More than 75 percent	110.27 (77.63–147.29)	138.82 (91.06–192.83)

Appendix I: Objective, Scope, and Methodology

Years open	Subpopulation	Non-CSP charter schools	CSP charter schools
1	States with higher than 50 percent matching coverage	42.83 (36.55–49.44)	62.42 (58.58–66.30)
2	States with higher than 50 percent matching coverage	65.82 (56.41–75.81)	98.57 (92.08–105.16)
3	States with higher than 50 percent matching coverage	83.03 (70.48–96.25)	117.77 (109.11–126.77)
4	States with higher than 50 percent matching coverage	88.44 (74.40–103.22)	127.70 (117.37–138.37)
5	States with higher than 50 percent matching coverage	107.88 (89.03–128.07)	139.35 (127.33–151.61)
6	States with higher than 50 percent matching coverage	113.98 (92.28–137.26)	144.68 (131.18–158.75)
7	States with higher than 50 percent matching coverage	121.29 (96.57–148.00)	154.67 (138.91–171.32)
8	States with higher than 50 percent matching coverage	116.55 (91.11–144.84)	154.02 (135.83–173.82)
9	States with higher than 50 percent matching coverage	112.66 (82.45–145.66)	145.25 (124.92–167.56)
10	States with higher than 50 percent matching coverage	110.55 (77.26–148.27)	144.05 (118.73–171.15)
11	States with higher than 50 percent matching coverage	117.78 (74.95–167.50)	141.92 (112.00–175.39)
12	States with higher than 50 percent matching coverage	105.59 (63.56–155.72)	147.38 (109.78–190.54)
1	California	47.25 (32.21–63.84)	72.30 (64.61–80.43)
2	California	73.87 (54.27–95.52)	117.74 (104.66–131.55)
3	California	104.88 (73.30–140.37)	144.69 (124.28–166.20)
4	California	108.32 (75.20–146.45)	163.90 (140.69–188.90)
5	California	138.60 (95.53–187.24)	190.54 (160.70–222.32)
6	California	145.90 (96.38–202.91)	195.06 (162.11–231.31)
7	California	158.17 (101.65–225.84)	221.96 (181.56–266.23)
8	California	105.57 (76.55–137.90)	235.52 (179.58–297.63)
9	California	95.17 (60.44–135.32)	239.44 (175.73–311.65)
10	California	124.75 (79.91–176.29)	237.28 (149.46–346.26)
11	California	150.39 (90.43–224.08)	237.66 (144.29–354.63)
12	California	136.96 (73.70–217.35)	285.48 (172.77–432.46)
1	Florida	35.77 (25.96–45.98)	59.32 (51.41–67.47)
2	Florida	47.56 (29.66–67.31)	89.92 (76.13–104.47)
3	Florida	53.17 (35.45–72.99)	104.52 (89.00–120.70)
4	Florida	80.41 (55.48–108.61)	112.53 (94.50–131.36)
5	Florida	131.10 (87.32–183.48)	109.47 (89.58–130.24)

Appendix I: Objective, Scope, and Methodology

Years open	Subpopulation	Non-CSP charter schools	CSP charter schools
6	Florida	159.34 (104.37–225.84)	114.35 (91.43–138.81)
7	Florida	154.74 (96.72–224.08)	128.25 (100.68–158.71)
8	Florida	160.29 (92.77–243.92)	134.40 (102.25–170.66)
9	Florida	138.37 (57.50–242.33)	137.76 (98.53–182.24)
10	Florida	101.60 (43.82–173.41)	156.52 (105.16–217.70)
11	Florida	107.55 (70.63–150.62)	162.74 (73.73–278.23)
12	Florida	102.99 (59.93–153.90)	99.38 (27.95–196.99)
1	Texas	51.01 (39.43–63.22)	58.94 (52.16–65.93)
2	Texas	82.58 (61.47–105.49)	100.41 (87.16–114.25)
3	Texas	94.03 (66.16–125.61)	124.68 (104.56–146.70)
4	Texas	99.67 (68.30–135.74)	134.14 (109.22–160.84)
5	Texas	118.34 (74.05–169.61)	165.60 (135.87–198.89)
6	Texas	116.77 (68.62–174.77)	194.94 (157.71–236.34)
7	Texas	126.29 (69.91–195.79)	197.74 (157.62–242.71)
8	Texas	133.73 (62.77–224.97)	210.12 (161.02–265.96)
9	Texas	127.61 (41.14–248.05)	183.41 (129.87–246.07)
10	Texas	122.39 (23.92–265.25)	175.52 (115.12–246.43)
11	Texas	228.50 (3.05–703.71)	212.15 (131.17–316.39)
12	Texas	81.33 (-29.32–284.77)	190.66 (95.52–314.23)

Source: GAO matched comparison analysis of the Department of Education’s CSP awards data and school-level characteristics from the Common Core of Data. | GAO-23-106268

Note: Entries are the estimated mean percentage growth in enrollment from the matched baseline year to each follow-up year, with 95 percent confidence intervals in parentheses. These results are from our state-grade-year exact match. We examined data for the CSP State Educational Agencies/State Entities, CSP Charter Management Organizations, and CSP Non-State Educational Agencies/Developers grants. We analyzed Education’s CSP awards data as of May 2022.

Analysis of How Demographic Characteristics Varied among CSP Grant-Recipient Charter, Non-CSP Charter, and Traditional Public Schools

We performed multinomial logistic regression analyses to examine how demographic characteristics varied among traditional schools, CSP grant-recipient charter schools, and non-CSP charter schools. The analysis used variables from the CSP, CCD, and CRDC databases for 2011-2015, the most recently available data that could be matched.⁹

The CRDC is a mandatory biennial survey of public schools and school districts conducted in all 50 states plus D.C. and Puerto Rico. We used CRDC school-level data on certain demographics such as race and ethnicity, gender, IDEA, Section 504, English learners, and teacher full-

⁹Our regression analysis used school data and student enrollment data from the CCD and CRDC, which use school years. In contrast, Education’s CSP awards data, which identified CSP grant recipient charter schools, is organized by fiscal years.

time equivalent to examine how demographic characteristics varied across schools. We combined the CRDC data with merged CSP–CCD data using the school identification number.

We removed schools with zero or negative students, Bureau of Indian Education schools, schools with zero full-time equivalent teachers, traditional public schools with grants, and magnet schools with grants from the analysis. We classified magnet schools as traditional schools, and we excluded missing data pairwise to maximize the total number of cases remaining for analysis in each model. After applying these scoping rules, we had about 263,000 complete observations with about 251,000 observations among IDEA students.¹⁰ The original data contained about 372,000 observations.

We examined the extent to which the percent of students by race and ethnicity and by IDEA, Section 504, and English learner status predicted school types—traditional schools, CSP grant-recipient charter schools, and non-CSP charter schools, using multinomial logistic regression models of these school statuses. In the models analyzing IDEA, Section 504, and English learners, the covariates included Title I status, number of students (quartile indicators), percent of free or reduced-price lunch recipients (quartile indicators), U.S. Census defined regions (Northeast, Midwest, South, West), locale (urban, suburban, or rural), school grade level (pre-kindergarten/kindergarten, elementary/middle school, or high school), teacher full-time equivalent (quartile indicators), and virtual status. In the models analyzing race and ethnicity, the covariates also included the percent of IDEA, Section 504, and English learners.

We obtained the predicted probabilities using the `marginalEffects` package for R. The marginal effect is a unit-level measure of association between changes in a covariate and changes in the outcome. We set the regression-adjusted contrasts for the nominal variables, and the package calculated the average of all the observation-specific marginal effects.

We conducted this performance audit from September 2022 to February 2023 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe

¹⁰Because we included multiple years in the analysis, these observation counts include the total number of separate school observations in separate years.

**Appendix I: Objective, Scope, and
Methodology**

that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: GAO Contacts and Staff Acknowledgments

Contacts

Jacqueline M. Nowicki, Director, (617) 788-0580 or nowickij@gao.gov

Staff Acknowledgments

In addition to the contact named above, Sherri Doughty (Assistant Director), Manuel Valverde (Analyst in Charge), Michael Alleyne, Elizabeth Calderon, Gretel Clarke, Denise Cook, Jennifer Cook, Holly Dye, Jean McSween, John Mingus, Mimi Nguyen, Samuel Portnow, Almeta Spencer, and Jeff Tessin made key contributions to this report.

GAO's Mission

The Government Accountability Office, the audit, evaluation, and investigative arm of Congress, exists to support Congress in meeting its constitutional responsibilities and to help improve the performance and accountability of the federal government for the American people. GAO examines the use of public funds; evaluates federal programs and policies; and provides analyses, recommendations, and other assistance to help Congress make informed oversight, policy, and funding decisions. GAO's commitment to good government is reflected in its core values of accountability, integrity, and reliability.

Obtaining Copies of GAO Reports and Testimony

The fastest and easiest way to obtain copies of GAO documents at no cost is through our website. Each weekday afternoon, GAO posts on its [website](#) newly released reports, testimony, and correspondence. You can also [subscribe](#) to GAO's email updates to receive notification of newly posted products.

Order by Phone

The price of each GAO publication reflects GAO's actual cost of production and distribution and depends on the number of pages in the publication and whether the publication is printed in color or black and white. Pricing and ordering information is posted on GAO's website, <https://www.gao.gov/ordering.htm>.

Place orders by calling (202) 512-6000, toll free (866) 801-7077, or TDD (202) 512-2537.

Orders may be paid for using American Express, Discover Card, MasterCard, Visa, check, or money order. Call for additional information.

Connect with GAO

Connect with GAO on [Facebook](#), [Flickr](#), [Twitter](#), and [YouTube](#).
Subscribe to our [RSS Feeds](#) or [Email Updates](#). Listen to our [Podcasts](#).
Visit GAO on the web at <https://www.gao.gov>.

To Report Fraud, Waste, and Abuse in Federal Programs

Contact FraudNet:

Website: <https://www.gao.gov/about/what-gao-does/fraudnet>

Automated answering system: (800) 424-5454 or (202) 512-7700

Congressional Relations

A. Nicole Clowers, Managing Director, ClowersA@gao.gov, (202) 512-4400, U.S. Government Accountability Office, 441 G Street NW, Room 7125, Washington, DC 20548

Public Affairs

Chuck Young, Managing Director, youngc1@gao.gov, (202) 512-4800
U.S. Government Accountability Office, 441 G Street NW, Room 7149
Washington, DC 20548

Strategic Planning and External Liaison

Stephen J. Sanford, Managing Director, spel@gao.gov, (202) 512-4707
U.S. Government Accountability Office, 441 G Street NW, Room 7814,
Washington, DC 20548

