Examining Heterogeneities in Public School Enrollment Trends During the Pandemic: Evidence from Four States

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Executive Summary

The decline in public school enrollment during the COVID-19 pandemic as many school districts switched to fully remote or hybrid instruction has been a major cause for concern in the United States. A recent analysis by the National Center for Education Statistics (NCES) reveals that total K–12 enrollment dropped by 3% nationwide in 2020–21 compared to the previous school year.[1] The primary objectives of this study are to better understand these enrollment trends in four states (California, Florida, Texas, and Washington), the extent to which the trends differ across different school settings, and the factors that are associated with these enrollment trends.

In particular, I examine the overall enrollment trends in these four states along with breakdowns by grade, race/ethnicity, and school characteristics. The analyses examine enrollment trends in two ways, first by comparing enrollment in 2020–21 to enrollment in the prior year and second by comparing enrollment in 2020–21 to a prediction based on the trend in prior years.

Several findings stand out:

All four states saw substantial declines in K–12 enrollment in 2020–21. In particular, compared to K–12 public school enrollment in 2019–20, total enrollment in 2020–21 was down by roughly 2% in California, Florida, and Texas, whereas this drop was nearly 4% in Washington. These declines were larger in Florida and Texas, yet smaller in the other two, when comparing the 2020–21 enrollment to the predicted enrollment numbers based on prior enrollment trends.

There is considerable variation in the patterns across grades, with kindergarten enrollment experiencing the largest drop in all four states. Specifically, kindergarten enrollment dropped by nearly 12% in California in 2020–21 (compared to 2019–20), 8% in Florida, 6% in Texas, and 14% in Washington. In contrast, enrollment in other elementary grades (1 through 5) declined by only 2% to 3% in all four states.

Enrollment declined in 2020–21 for White, Hispanic, and Black students, but the decline in enrollment for White students was larger than for Hispanic and Black students in three of the four states (California, Texas, and Washington). For example, White enrollment in 2020–21 declined by nearly 4% in Texas (compared to 2019–20), whereas Hispanic and Black enrollment declined by 2%.

[1] https://www.the74million.org/article/public-school-enrollment-down-3-percent-worst-century/, accessed on 9/28/2021.

In all states, within-district variation in school-level enrollment changes was larger than the between-district variation. This finding suggests that school-level factors played a larger role in explaining the enrollment changes rather than differences between districts such as school closings and instructional mode.

I observe significant heterogeneity in enrollment changes by the average socioeconomic status of the student body (SES) (as proxied by the share of students who are eligible for subsidized meals and the characteristics of the census tract in which the school is located). In Florida and Texas, enrollment declines were more pronounced in schools serving disadvantaged student populations, whereas the opposite is true in California. In Washington, I do not find any statistically significant relationship between enrollment changes and school-level SES.

There are significant differences in enrollment shifts between traditional public schools (TPS) and charter schools in Texas and Florida. Looking at discrepancies in enrollment trends across school sectors in states with significant charter school presence (California, Florida, and Texas), I find that TPS experienced much larger declines in enrollment during the pandemic compared to charter schools in Florida and Texas, and these differences remain virtually unchanged after controlling for differences in school poverty (as proxied by the share of students who are eligible for subsidized meals) or grades served. I do not find any significant differences in California.

The breakdown by school location reveals that the enrollment decline was not necessarily concentrated in urban areas. All four states saw significant enrollment declines in suburban/rural areas.

Introduction

The COVID-19 pandemic drastically altered public education in the United States beginning in March 2020, with many school districts nationwide switching to fully remote or hybrid instruction models throughout the 2020-21 school year. Education stakeholders have become worried about the decline in public school enrollment and whether enrollment numbers will rebound as public schools return to in-person instruction in the 2021-22 school year.

The National Center for Education Statistics (NCES) has released preliminary results that suggest that concerns about enrollment declines were not unfounded: K–12 enrollment in public schools declined by 3% nationwide in 2020–21 compared to the previous school year. There is also emerging literature that takes a closer look at these enrollment trends in different states. For example, Dee and Murphy (2021) examine enrollment patterns during the pandemic using district-level data from Massachusetts. They find significant heterogeneity across sectors with declines in traditional districts and increases in charter, virtual, and vocational districts. Musaddiq et al. (2021) address a similar question using student-level data from Michigan, and they find large declines (of roughly 10%) in kindergarten enrollment that were mainly concentrated among low-income and Black students.

This study complements the emerging literature on the effects of the pandemic on public education in the United States by taking a closer look at enrollment trends using school- and district-level enrollment records from California, Florida, Texas, and Washington. These states present interesting cases to examine in this context given the vast differences in their responses to the pandemic. In particular, I examine the heterogeneity in enrollment changes in public schools at a finer level and ask whether certain racial/ethnic student groups or schools that serve different student populations experienced larger enrollment shifts during the pandemic. These are vital questions that must be explored to better understand the uneven impact of the pandemic on public education and what it implies for educational gaps in outcomes and opportunities between different student groups.

Several findings are worth highlighting. First, similar to prior evidence, I find significant declines in K–12 enrollment in public schools in all four states, ranging between 2% and 6%, which are more pronounced in kindergarten. The results also suggest that these declines were larger among White students in California, Texas, and Washington, whereas enrollment among White and Hispanic students dropped more than Black students in Florida.

Second, the results suggest that aggregate analysis of enrollment trends masks important variation at the school level. For example, while the overall enrollment declined by 2% to 3% in

California, Florida, and Texas, and by 5% to 6% in Washington, a quarter of public schools in these states experienced enrollment declines larger than 8%, 12%, 10%, and 14%, respectively. The results also reveal that more than 70% of the variation in school-level enrollment changes is explained by within-district, across-school differences. This may imply that school-level factors played a larger role in explaining the enrollment changes than differences between districts, such as school closings and instructional mode policies, which were typically decided at the district level.

Third, the results reveal significant differences in enrollment changes by the socioeconomic status (SES) of the student body and charter status. For example, in California, schools serving higher-SES students experienced larger enrollment drops compared to other schools, whereas the opposite is true in Florida and Texas. Further, traditional public schools (TPS) experienced significantly larger enrollment declines than charter schools in Florida and Texas, and these differences remain virtually unchanged even after controlling for differences in student body and grades served between the two sectors. Finally, the breakdown by school urbanicity reveals that enrollment declines were not confined to urban areas: Schools in suburban and rural areas also experienced sizable enrollment drops in three out of four states.

Overall, this study highlights the need for more disaggregated analysis to better understand the implications of the pandemic on public school enrollment in different communities. Further, the findings imply that the external validity of the studies relying on data from a single state or district in this context will likely be limited given the significant variation observed across states and across different school settings within states.

Data and Methodology

In this analysis, I rely on publicly available enrollment data from state education agencies covering school years between 2016–17 and 2020–21 in California and Florida, between 2014–15 and 2020–21 in Texas, and between 2015–16 and 2020–21 in Washington. These data not only provide the overall enrollment numbers for each school, but they also contain enrollment numbers for student groups, including breakdowns by grade, race/ethnicity, and gender. I also supplement these enrollment records with (a) the percentage of students eligible for free-or-reduced-priced lunch (FRPL), charter status, and school urbanicity and (b) census-tract characteristics linked to individual schools (based on school address) such as educational attainment and median household income.[2] I use these school-level attributes to assess whether enrollment changes were more pronounced in certain school settings.

To assess the magnitude of the enrollment shifts in 2020–21, I rely on two measures: (a) percentage change in enrollment in 2020–21 compared to 2019–20 and (b) percentage change in enrollment in 2020–21 compared to the projected enrollment for 2020–21 calculated based on enrollment numbers in the prior three years, which account for preexisting enrollment trends. For the second measure, I predict what the enrollment in 2020-21 would have been in the absence of the pandemic using enrollment numbers from the previous three years and a linear trend, with more recent numbers playing a bigger role in the prediction. [3] The level at which I calculate these measures depends on the analysis. For example, when examining change by grade within a state, I use total enrollment by grade and state to calculate the measures. When examining change at the school level, I use enrollment numbers at the school level to calculate the two measures.

In the first part of the analysis, I present the public school enrollment numbers over time in each state (overall and broken down by student grade level and race/ethnicity) and the enrollment changes in 2020–21 using the two measures. I then examine the heterogeneity in enrollment changes across schools and how they relate to different school characteristics, including SES of the students served (as proxied by percentage of FRPL eligibility of enrolled students, median household income, and educational attainment of the census tract in which the school is located), charter status, and school urbanicity.

Results

Overall Trends

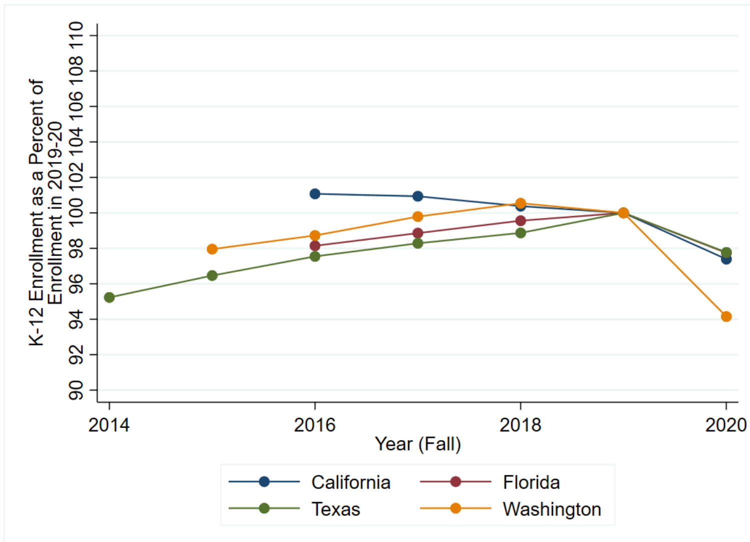
In Panel (A) of Exhibit 1, I present the changes in total K–12 enrollment in the four states using 2019–20 enrollment as the baseline. In other words, each number presented in the graph provides the total K–12 enrollment in the corresponding year as a percentage of the enrollment in 2019–20 school year. In Panel (B), I take a closer look at this decline: The first bar for each

[2] In California and Florida, FRPL eligibility data come from the state education database, whereas in Texas and Washington, I use the FRPL eligibility numbers provided by the National Center for Education Statistics' Common Core of Data (NCES-CCD). Charter status and school locale are obtained from NCES-CCD, whereas census tract-level characteristics come from the American Community Survey's five-year estimates in 2019. I use the share of adults over age 25 with a bachelor's degree or higher as the measure of educational attainment at the census-tract level.
[3] Formally, I use local linear smoothing with a triangle kernel function using enrollment numbers from 2017-18, 2018-19, and 2019-20 to predict the enrollment in 2020-21. The prediction is conducted separately at the unit of analysis for each state (overall, student grade, student race/ethnicity, and school).

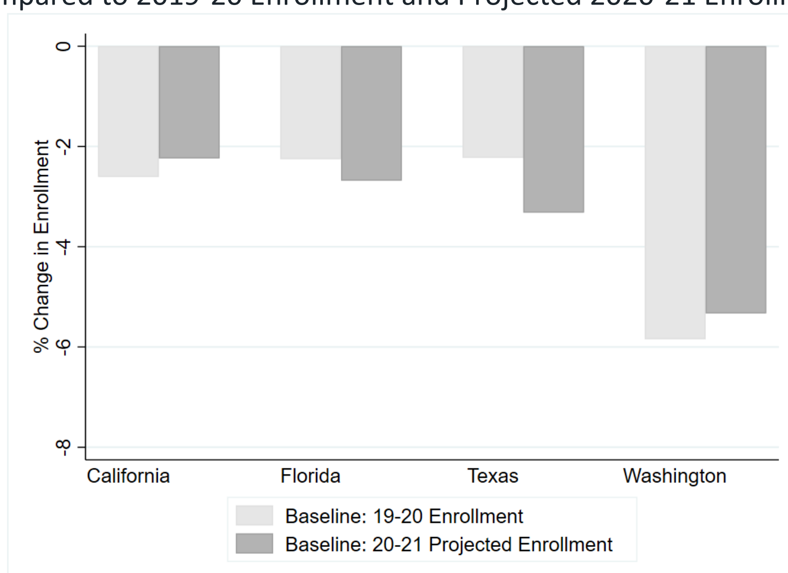
state presents the percentage decline in total K–12 enrollment in 2020–21 compared to 2019–20, whereas the second bar presents the decline in total K–12 enrollment in 2020–21 compared to the projected enrollment numbers in 2020–21.

Exhibit 1. K–12 Public School Enrollment Trends and Changes in Enrollment in 2020–21 School Year

(A) Enrollment Trends



(B) Change in Enrollment in 2020-21:
Compared to 2019-20 Enrollment and Projected 2020-21 Enrollment



Notes: Panel (A) presents the K–12 enrollment trends in public schools in California, Florida, Texas, and Washington using relative to 2019–20 enrollment (2019–20 enrollment = 100). Panel (B) presents the change in

K–12 enrollment in 2020–21 compared to (a) 2019–20 enrollment and (b) 2020–21 enrollment predicted using prior year enrollment numbers.

The results suggest sizable declines in all four states. Compared to the 2019–20 enrollment, 2020–21 enrollment declined by 2.4% in California, 2.2% in Florida, 2% in Texas, and nearly 6% in Washington. The changes in enrollment are larger when I compare enrollment in 2020–21 to the predicted numbers in Florida and Texas. Specifically, using this measure I find enrollment declines of roughly 2% in California, nearly 3% in Florida, 2.2% in Texas, and 7% in Washington.

Trends by Grade Level and Student Race/Ethnicity

Exhibit 2 repeats the same analysis as in Exhibit 1 Panels (A) and (B), respectively, and is broken down by grade range in Panel (A) and race/ethnicity in Panel (B).[4] The breakdown by grade range reveals significant variation in enrollment declines across grades in all four states. For example, kindergarten enrollment declined by nearly 12% in California, 8% in Florida, 4% to 6% in Texas, and 14% to 17% in Washington. In contrast, the decline in other elementary grades (1 through 5) was only 2% to 3% in all three states. There are similar patterns in middle and high school grades with much smaller enrollment declines compared to early elementary grades.

Enrollment declined among all three major racial/ethnic groups in 2020–21. That said, the enrollment drop among White students was larger, especially in California, Texas, and Washington. For example, enrollment among White students declined by 8% in 2020–21 in Washington, whereas Hispanic and Black student enrollment declined by roughly 3%.

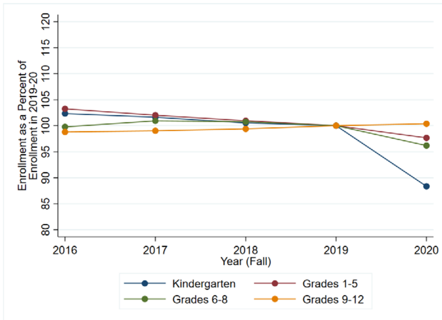
Exhibit 3 takes a closer look at the patterns in Exhibit 2 and presents the enrollment changes in 2020–21 compared to the projected enrollment numbers in 2020–21 by individual grades in Panel (A) and student race/ethnicity in Panel (B). Appendix Exhibit 1 repeats the same analysis using 2019–20 enrollment as the comparison. The findings are in line with the enrollment trends presented in Exhibit 2, with kindergarten enrollment in all states and enrollment among White students in three of the four states experiencing the largest declines.

[4] The predicted enrollment values are calculated at the state-by-grade and state-by-race/ethnicity levels.

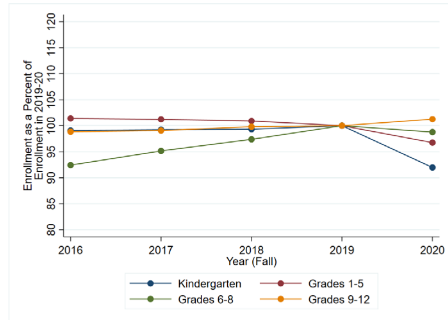
Exhibit 2. K–12 Public School Enrollment Trends by Grade and Race/Ethnicity

(A) By Grade

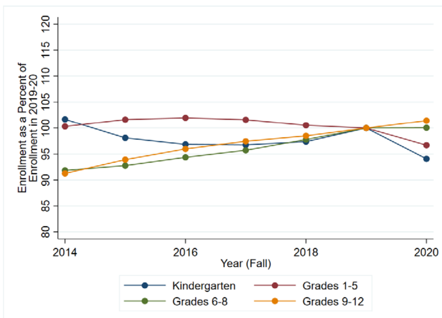
California



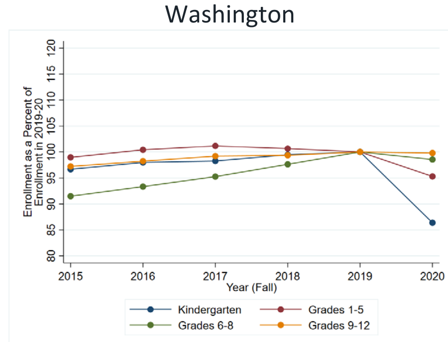
Florida



Texas

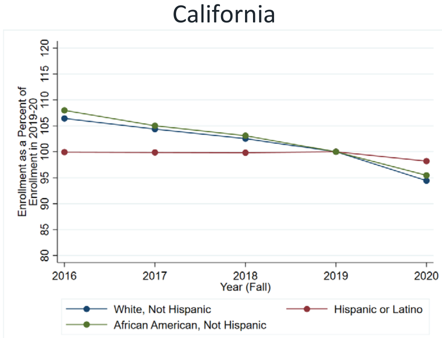


Washington

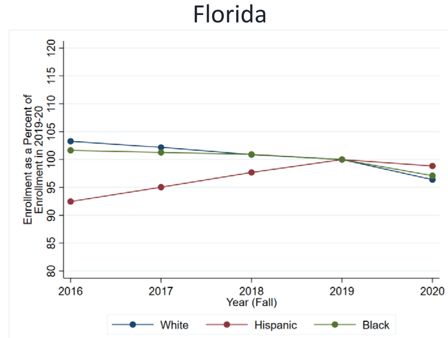


(B) Race/Ethnicity

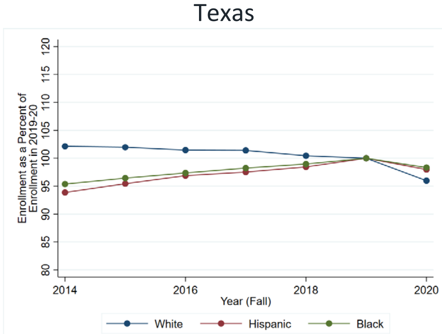
California



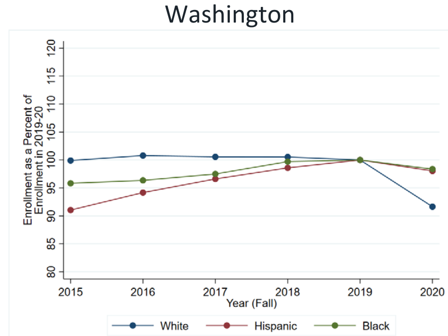
Florida



Texas

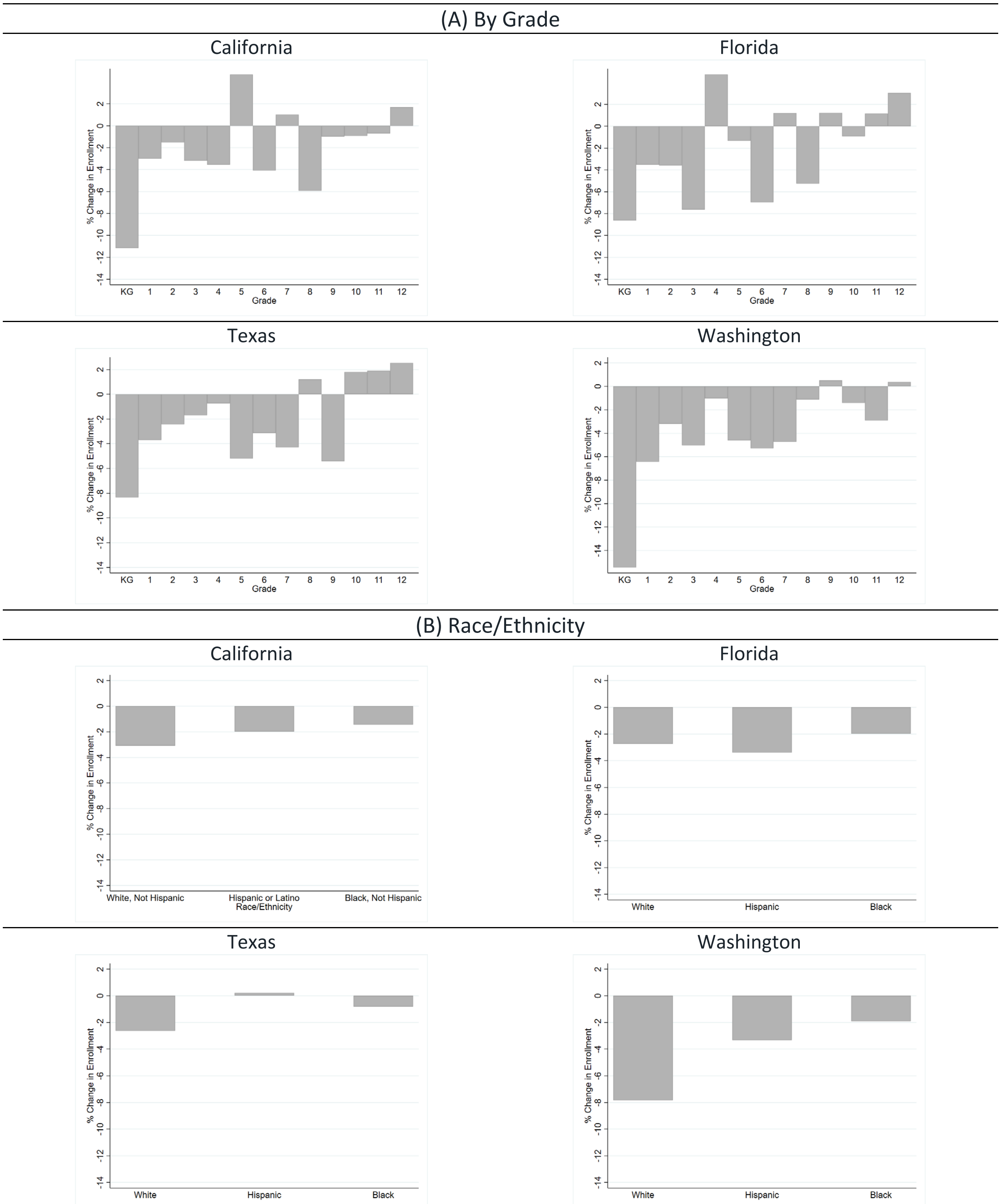


Washington



Notes: Panel (A) presents the K–12 enrollment trends in public schools in California, Florida, Texas, and Washington by grade relative to 2019–20 enrollment (2019-20 enrollment = 100), whereas Panel (B) presents the same by student race/ethnicity.

Exhibit 3. Changes in Public School Enrollment in 2020–21 by Grade and Race/Ethnicity Compared to Projected 2020–21 Enrollment



Notes: Panel (A) presents the change in K–12 enrollment in 2020–21 by grade compared to the projected 2020–21 enrollment. Panel (B) repeats the same analysis broken down by race/ethnicity.

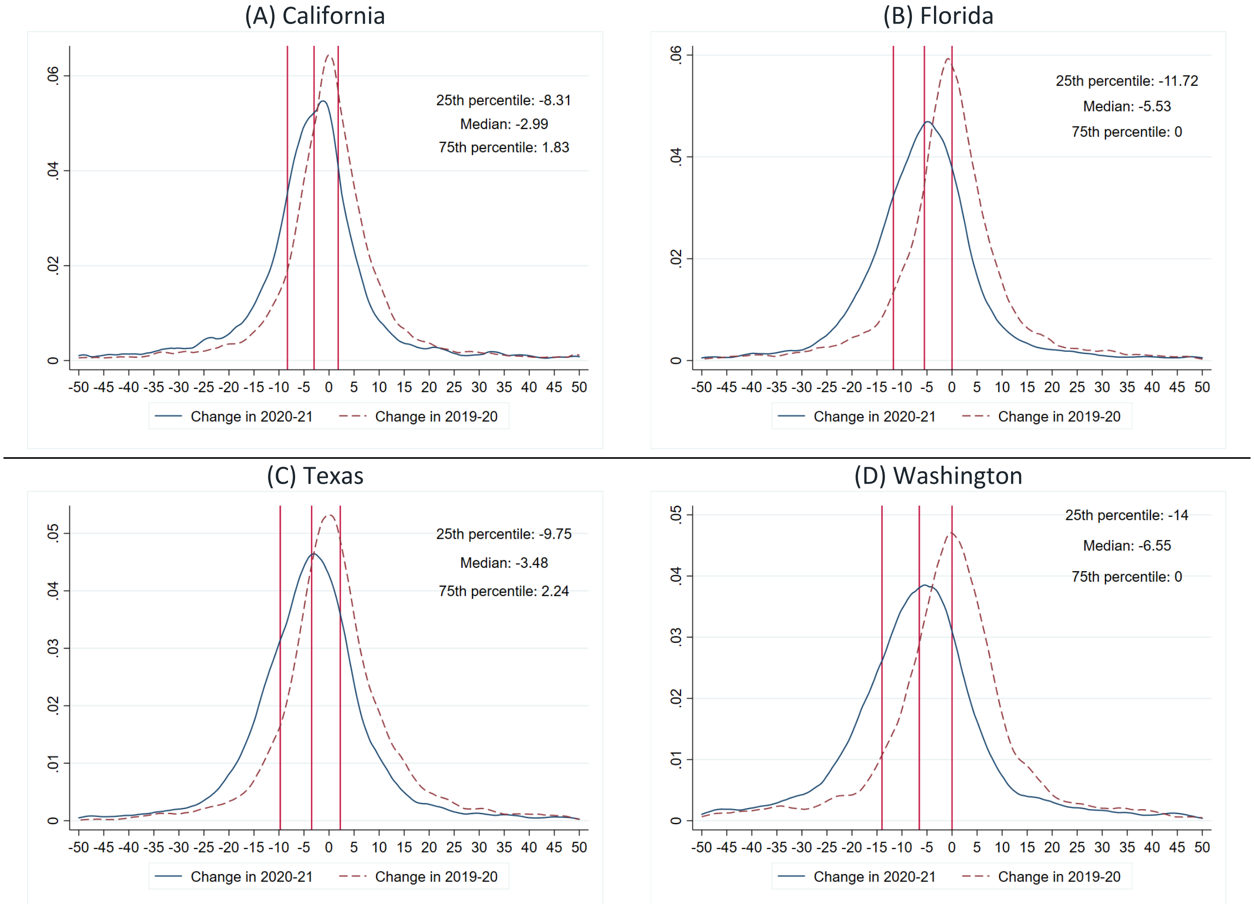
School-Level Changes in Public School Enrollment

While the aggregated analysis presented thus far is useful to understand general trends in enrollment, it could mask significant variation across different school settings within states. For example, schools serving students from more advantaged backgrounds could experience larger enrollment declines, as these students are more likely to be able to afford alternative schooling options (e.g., private schools, homeschooling) in response to public schools switching to hybrid/remote instruction. On the other hand, given the pandemic's much more severe impact on communities of color, schools serving students from disadvantaged backgrounds could have experienced larger enrollment declines.

To address this question, I first calculate school-level enrollment changes using the two measures described above.[5] Exhibit 4 presents the Kernel density plots of school-level changes in enrollment in the four states (solid lines), which were calculated using the projected 2020–21 enrollment numbers as the comparison. (Appendix Exhibit 2 presents the results using 2019–20 enrollment numbers as the comparison.) The dashed lines in each panel presents the distribution of school-level enrollment changes in 2019-20 compared to the projected enrollment in the same year. The findings suggest that district- or state-level numbers mask significant variation across schools within states. For example, while K–12 enrollment in California declined by 2.4% overall in 2020–21, 25% of public schools experienced enrollment declines larger than 8.3%. Similar patterns emerge in Florida, Texas, and Washington with half of the schools experiencing enrollment declines larger than 5.5%, 3.5%, and 6.5%, respectively. Further, the results imply that the enrollment changes in 2020-21 were considerably different than the previous year: The Wilcoxon rank-sum test rejects the equality of the two distributions (with p values < 0.001) in all states.

[5] In this exercise, the projected 2020-21 enrollment is calculated at the school-level. One empirical question in this exercise is how to treat new schools (with fewer than 3 years of prior enrollment data) when calculating the projected 2020–21 enrollment. For these schools, I use the enrollment number in 2019–20 as the projected enrollment number. That said, it is important to note that these new schools constitute less than 3 percent of all schools in each state. I also drop outlier schools that experienced enrollment swings (in either direction) of more than 50 percent, which are likely driven by factors (e.g., grade restructuring, school mergers) outside of the pandemic. These outlier schools roughly correspond to 5 percent of all schools in the four districts and roughly 1.6 percent of the total enrollment.

Exhibit 4. Distribution of School-Level Changes in Public School Enrollment Compared to Projected 2020–21 Enrollment



Notes: Each panel (solid line) presents the Kernel density plots of the school-level enrollment changes in 2020–21 compared to projected 2020–21 enrollment using Epanechnikov kernel and the given bandwidth. Dashed line in each panel presents the distribution of school-level enrollment changes in 2019-20 compared to the projected 2019-20 enrollment.

I then examine the extent to which the variation in school-level enrollment changes is associated with differences between school districts versus differences across schools within districts. This is important given that many policy decisions during the pandemic that could have affected parental enrollment decisions (e.g., school closures, instructional mode) were made at the school district level (possibly leading to large between-district differences in enrollment changes),[6] yet these policies could have different effects on different schools within school districts.

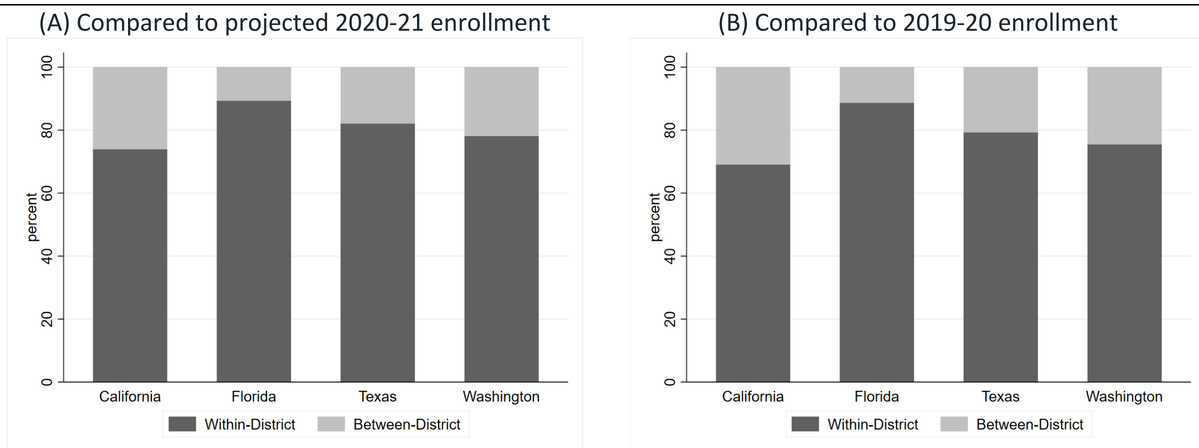
In this exercise, I regress the school-level enrollment changes on district indicators (using the 2019–20 school enrollment or the projected 2020–21 school enrollment as weights) to obtain

[6] For example, see https://www.cnn.com/interactive/2020/health/coronavirus-schools-reopening/.

how much these covariates explain this school-level variation (i.e., the between-district variation). Exhibit 5 presents the share of the variation in school-level changes in enrollment in 2020–21 that is driven by within-district versus between-district differences compared to 2019–20 enrollment in Panel (A) and compared to the projected 2020–21 enrollment in Panel (B).

The findings suggest that in all four states, more than 70% of the variation in school-level enrollment decline is within districts across schools. This finding suggests that school-level factors played a larger role in explaining the enrollment changes rather than differences between districts such as school closings and instructional mode policies.

Exhibit 5. The Share of School-Level Changes in Public School Enrollment in 2020–21 That Is Between- and Within-District Compared to 2019–20 Enrollment and Projected 2020–21 Enrollment



Notes: Panel (A) presents the change in school-level enrollment in 2020–21 (compared to 2019–20 enrollment) that is within- and between-district. Panel (B) repeats the same analysis compared to 2020–21 enrollment projected nonparametrically using prior year enrollment numbers.

Enrollment Changes and School Characteristics

Student Socioeconomic Status

What are some of the school-level factors associated with the enrollment declines? This is an important question given the evidence presented in Exhibit 4 suggesting that school-level factors seem to be playing a larger role in explaining differences in enrollment changes.

I first examine whether schools serving more disadvantaged student populations experienced larger enrollment declines during the pandemic compared to other schools in the four states. I use three measures as proxies for school-level student SES: (1) percentage of students eligible for FRPL, (2) median household income, and (3) educational attainment of the census tract in which the school is located. Each measure has important limitations. For example, using FRPL eligibility as a proxy for student-level poverty is likely problematic given the Community Eligibility Provision of the National School Lunch Program, which provides free school meals to all students in some high-poverty schools regardless of individual eligibility.[7] Similarly, census-tract level characteristics may not fully capture average student SES in each school as census tracts do not necessarily overlap with school catchment zones or because of school choice programs that weaken the link between student residential location and school location. That said, the correlations between the three measures are moderate to high in all states (ranging in magnitude between 0.7 and 0.75 in California, 0.45 and 0.76 in Florida, 0.65 and 0.80 in Texas, and 0.58 and 0.74 in Washington), and the combined evidence using all three measures could provide a more accurate picture about the relationship between student disadvantage and enrollment trends.

Exhibit 6 presents the scatter plots of the three measures of school-level student SES (percentage of FRPL eligible in panels A1-A4, % 25+ with a bachelor's degree or higher at the census-tract level in panels B, and median household income at the census-tract level in panels C) and enrollment changes calculated using the projected 2020–21 enrollment as a comparison for each state. Appendix Exhibit 3 repeats the same analysis using enrollment changes calculated with 2019–20 enrollment numbers. For ease of graphical presentation, I divide each SES measure into discrete bins with a width of 1 percentage point in panels A and B and a width of $10,000 in panels C. Each circle in these graphs represents the weighted average of the school-level enrollment change (using the projected 2020–21 enrollment for each school as weights) for a given bin, with circle size proportional to the total projected 2020–21 enrollment for all schools in that bin. The red lines provide the fitted values from a linear regression of school-level enrollment changes on the SES measure using the projected 2020-21 enrollment for each school as weights as well as the raw data (without the bins).

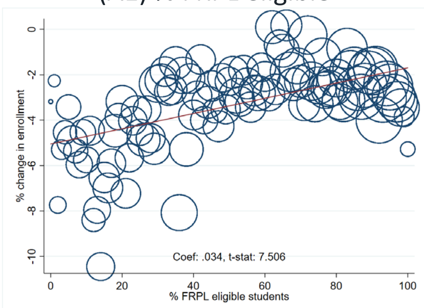
The results suggest significant differences across states. In California, schools serving lower-SES students experienced smaller declines in enrollment along all three measures. In Florida and Texas, the opposite is true, yet the relationship between enrollment changes and SES measures is weak for census tract-level SES measures, with estimated coefficients statistically insignificant at conventional levels. In Washington, I find no significant association between school-level SES measures and enrollment changes.

[7] That said, this is perhaps a lesser issue to identify school-level poverty at a broader scale (e.g., distinguishing between schools in different poverty quartiles) given that schools are required to present evidence that they are indeed serving large shares of economically disadvantaged students.

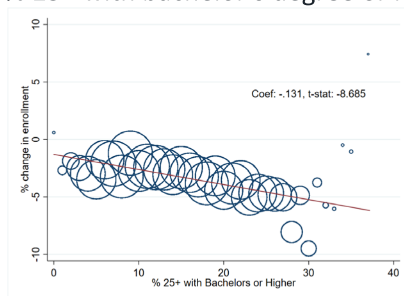
Exhibit 6. Measures of Student SES at the School Level and School-Level Changes in Public School Enrollment in 2020–21 Compared to Projected 2020–21 Enrollment

California

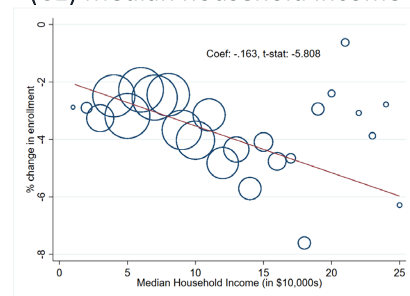
(A1) % FRPL eligible



(B1) % 25+ with bachelor's degree or higher

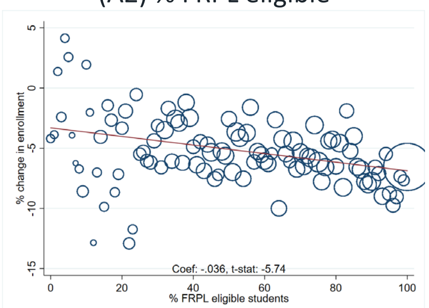


(C1) Median household income

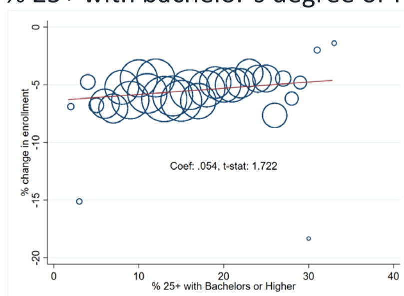


Florida

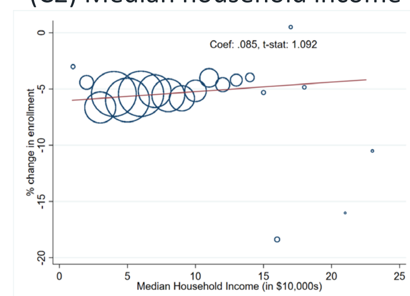
(A2) % FRPL eligible



(B2) % 25+ with bachelor's degree or higher

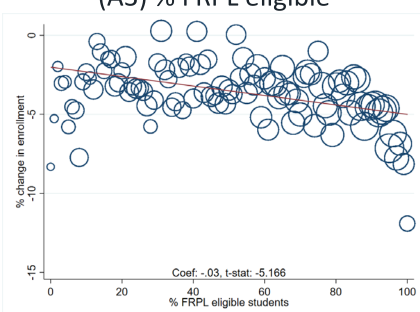


(C2) Median household income

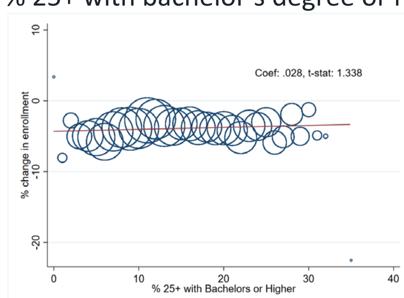


Texas

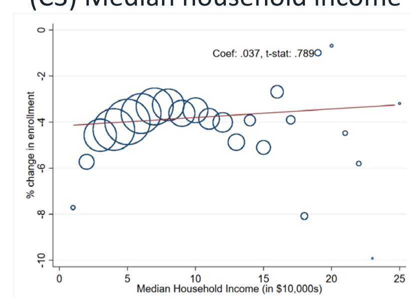
(A3) % FRPL eligible



(B3) % 25+ with bachelor's degree or higher

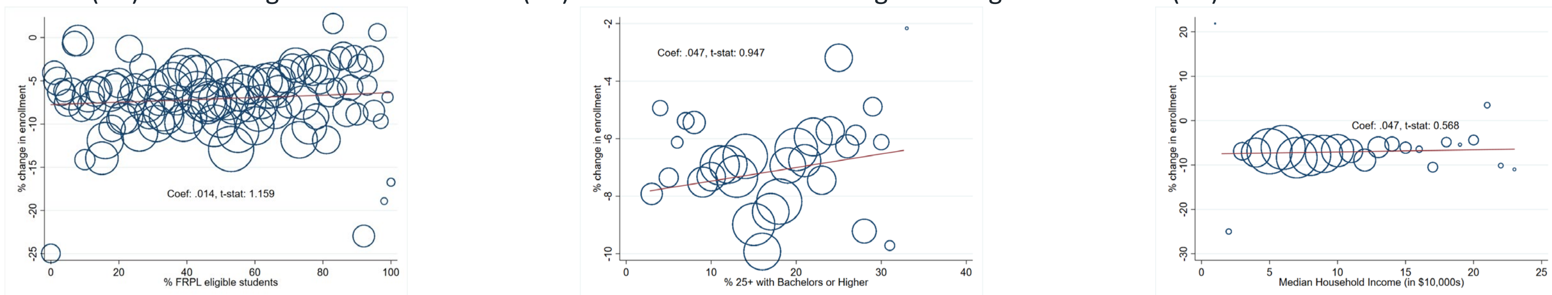


(C3) Median household income



Washington

(A4) % FRPL eligible | (B4) % 25+ with bachelor’s degree or higher | (C4) Median household income



Notes: Each panel presents the scatter plot of the corresponding SES measure and % change in school-level enrollment in 2020–21 compared to projected enrollment in 2020–21. In panels (A1)-(A4) and (B1)-(B4), the SES measures are divided into discrete bins with a width of 1 percentage point, whereas in panels (C1)-(C4), I use bin widths of $10,000 for the scatter plots. Each circle represents the weighted average of the school-level enrollment change (using the projected 2020–21 enrollment for each school as weights) for a given bin, with circle size proportional to the total projected 2020–21 enrollment for all schools in that bin. The red lines provide the fitted values from a linear regression of school-level enrollment changes on the SES measure using the projected 2020–21 enrollment for each school as weights as well as the raw data (without the bins).

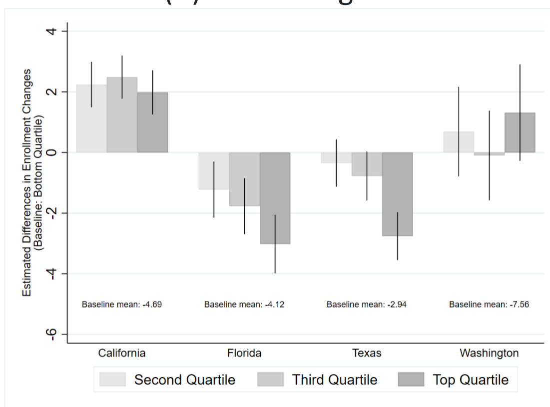
While these figures present a simple visual inspection of the relationship between school-level enrollment changes and SES, they may mask important nonlinearities. In Exhibit 7, I explore this possibility and present the differences in enrollment changes across schools in different SES quartiles. In particular, I create SES-quartile indicators (with the top quartile in the percentage of FRPL eligible representing the most disadvantaged schools, while the opposite is true for the other two measures) and regress school-level enrollment changes (compared to the 2020–21 projected enrollment) on these indicators separately for each state with the bottom quartile serving as the baseline. Each bar in Exhibit 7 presents the coefficients on these indicators with the spikes representing 95% confidence intervals. Appendix Exhibit 4 repeats the same analysis using enrollment changes calculated with 2019–20 enrollment numbers as the baseline.

The results reinforce the findings in Exhibit 6. In California, schools serving more advantaged students experienced the largest enrollment declines. For example, schools with the lowest shares of students eligible for FRPL (i.e., schools in the bottom quartile of the distribution) experienced an enrollment decline of 4.7%, while the schools in the top quartile saw an enrollment decline of 2.7%, and this difference is statistically significant at the 5% level. Similarly, the enrollment decline in schools that is located in high-income and/or high-education census tracts (i.e., schools in the top quartile of the distribution) was roughly 2% higher than the schools at the other end of the spectrum. In Washington, the coefficients follow a similar pattern as in California, yet the differences between schools in different quartiles are smaller and statistically insignificant at conventional levels in all cases.

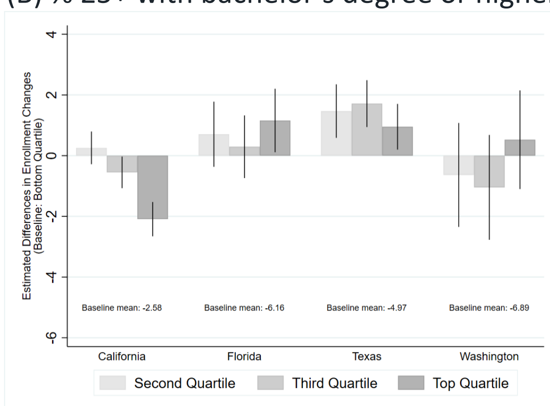
On the other hand, the opposite is true in Florida and Texas. In both states, schools serving the most economically disadvantaged students (i.e., schools in the top quartile of the percentage of FRPL eligible distribution) experienced declines of 7.1% and 6% in Florida and Texas, respectively, compared to declines of 4.1% and 2.9% in schools in the bottom quartile (the difference is statistically different than zero at 5% level). Similar patterns emerge when using the other two SES measures, yet the differences between schools in different categories are smaller and statistically insignificant in several cases.

Exhibit 7. School-Level SES Quartiles and Changes in Public School Enrollment in 2020–21 Compared to Projected 2020–21 Enrollment

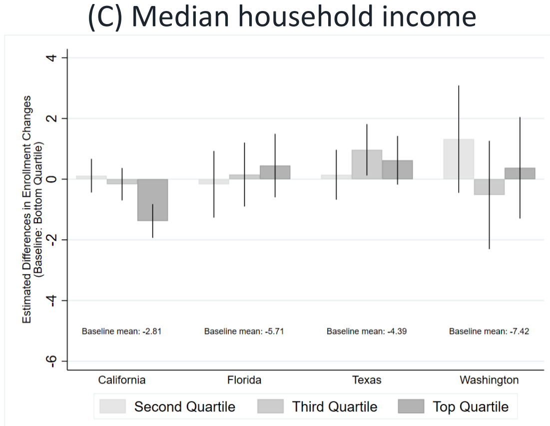
(A) % FRPL eligible



(B) % 25+ with bachelor's degree or higher



(C) Median household income



Notes: Each bar presents the difference in enrollment change in 2020–21 (compared to the projected enrollment) between the given SES quartile and the bottom quartile, estimated using the projected enrollment in 2020–21 as weights. The vertical lines/bars in each figure provide the 95% confidence interval for the corresponding estimate. The baseline means provided in each graph represent the means for the schools in the bottom quartile (the omitted category).

Traditional Public Schools Versus Charters

Another interesting breakdown in this context is by public school sector. In a recent study, Dee and Murphy (2021) find that while TPS districts in Massachusetts experienced significant enrollment declines, charter, virtual, and vocational districts increased enrollment during the pandemic. To assess whether similar patterns emerge in other states, panels (A) in Exhibit 8 present the Kernel density plots of enrollment changes in 2020–21 compared to projected enrollment by charter status. In this exercise, I focus on the three states with significant charter school presence in 2019–20: California, Florida, and Texas. Appendix Exhibit 5 repeats the same analysis using enrollment changes calculated with 2019–20 enrollment numbers.

The results reveal significant differences between TPS and charter schools in Florida and Texas. In these two states, TPS enrollment declined by 6% and 4.2%, respectively, whereas charter enrollment declined by only 2.6% in Florida and 0.8% in Texas. The Wilcoxon rank-sum test rejects the equality of the two distributions (with p-values<0.001) in both states. I do not find any significant differences between TPS and charter school enrollment changes in California.

These differences between TPS and charter schools could be driven by several factors. For example, in California and Florida, charter schools are more likely to be located in better-educated neighborhoods and serve lower shares of FRPL-eligible students, whereas the opposite is true in Texas.[8] Given the relationship between student SES and enrollment declines discussed above, this could drive the differences in enrollment changes. Further, differences in grades offered could help explain the discrepancies between TPS and charter schools. To examine the extent to which this may be the case, I first regress the school-level enrollment changes on indicators for school quartiles (based on percentage of FRPL-eligible students in each school) and school-type indicators (elementary, middle, high, mixed) to obtain the residuals. Panels (B) in Exhibit 8 present the Kernel density plots of these residuals. The results suggest that charter schools experienced smaller declines in enrollment compared to their TPS counterparts that serve similar grade levels and students from similar socioeconomic backgrounds. The Wilcoxon rank-sum test still rejects the equality of the two distributions (with p values < 0.001) in both states.[9]

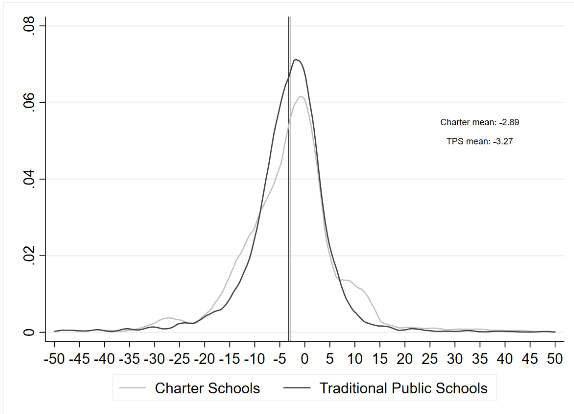
[8] For example, nearly 40% of charter schools in California fall into the bottom quartile of the FRPL-eligible share distribution in the state, and 30% are located in census tracts where the share of 25 and over with a bachelor's degree or higher falls into the top quartile.

[9] I also examine whether TPS located in neighborhoods where nearby charter options are available (within two or five miles) experienced larger declines in enrollment as students leave for charter schools in California, Florida, and Texas. The results, available upon request, suggest no significant differences between TPS based on availability of charter schools nearby.

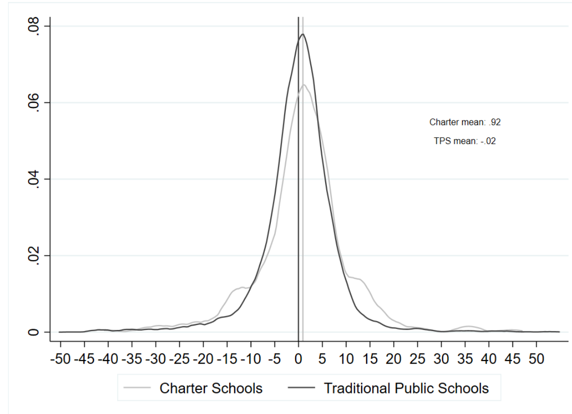
Exhibit 8. Distribution of School-Level Changes in Public School Enrollment Compared to Projected 2020–21 Enrollment by School Charter Status

California

(A1) Actual enrollment changes

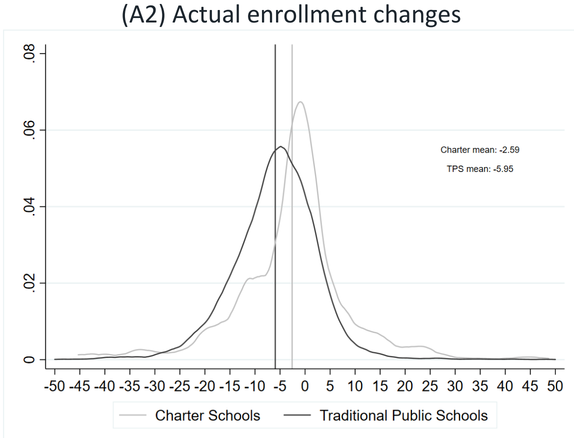


(B1) Residualized enrollment changes

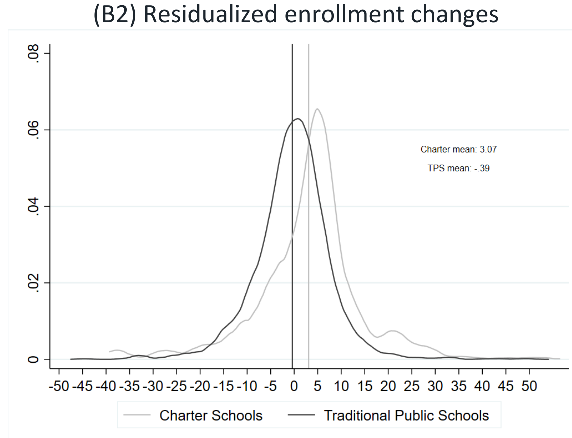


Florida

(A2) Actual enrollment changes

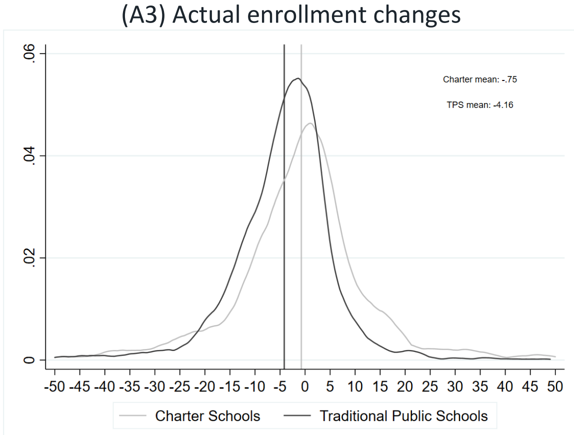


(B2) Residualized enrollment changes

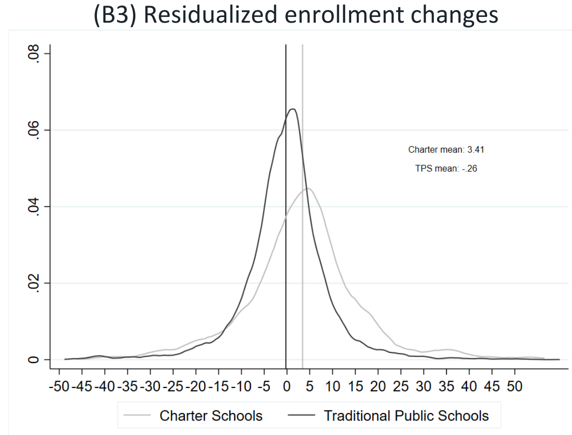


Texas

(A3) Actual enrollment changes



(B3) Residualized enrollment changes



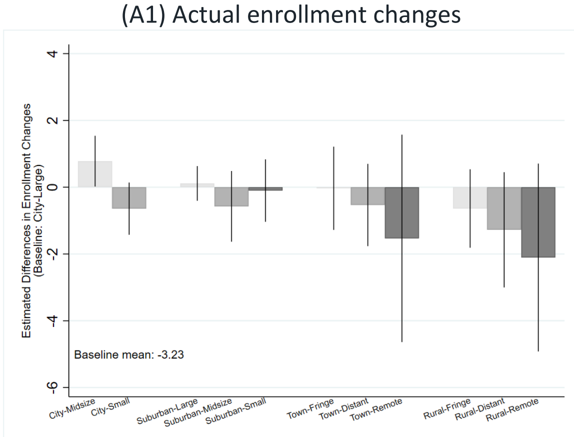
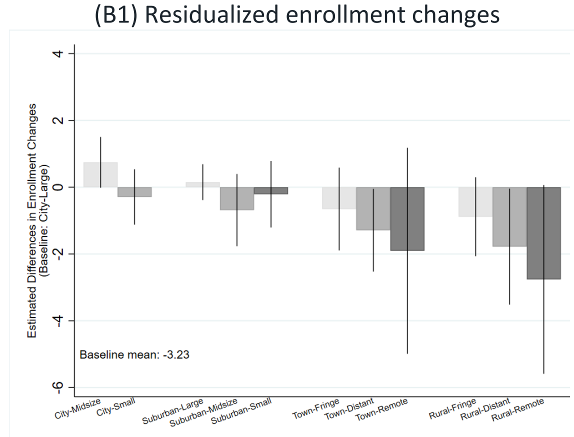
Notes: Panel A presents the Kernel density plots of the school-level enrollment changes in 2020–21 compared to projected 2020–21 enrollment by school charter status using Epanechnikov kernel. Panel B repeats the same analysis using enrollment changes (compared to projected 2020–21 enrollment) residualized using percentage of FRPL-eligible quartile indicators.

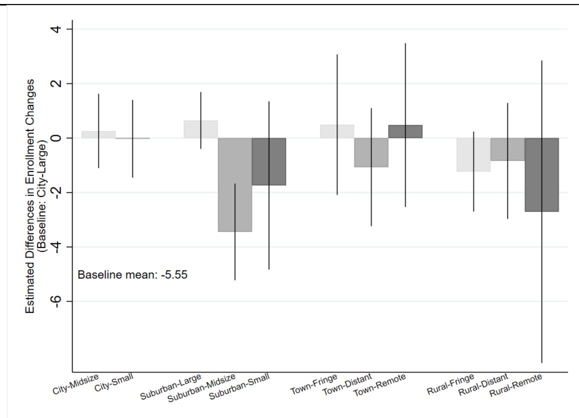
School Urbanicity

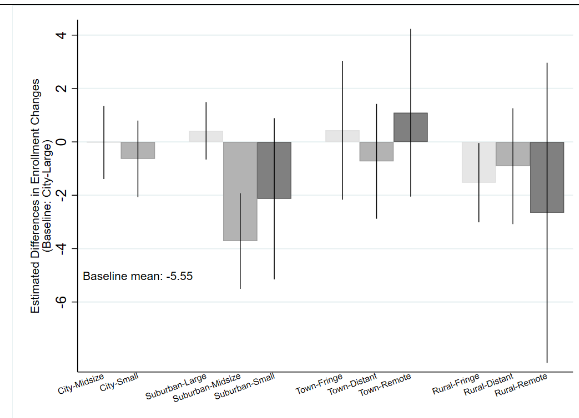
Finally, Exhibit 9 examines enrollment changes in 2020–21 by school urbanicity following NCES-CCD categorizations. In panels (A1) –(A4), similar to Exhibit 7, I present the estimated differences in school-level enrollment changes in 2020–21 (compared to projected enrollment) with the category “large city” serving as the baseline using the projected enrollment as weights in the regression. Panels (B1) –(B4) repeat the same analysis, controlling for the three SES measures mentioned above, and Appendix Exhibit 6 presents the results using enrollment changes calculated with 2019–20 enrollment numbers.

The findings once again reveal significant variation across states. The largest enrollment declines were observed in remote towns and rural areas in California; in midsize suburban areas (with a population less than 250,000 and greater than or equal to 100,000) in Florida; in large cities (with population of 250,000 or more) in Texas; and in midsize suburban areas and remote towns in Washington. These patterns remain unchanged when I control for the school-level SES measures.

Exhibit 9. Distribution of School-Level Changes in Public School Enrollment Compared to Projected 2020–21 Enrollment by School Urbanicity

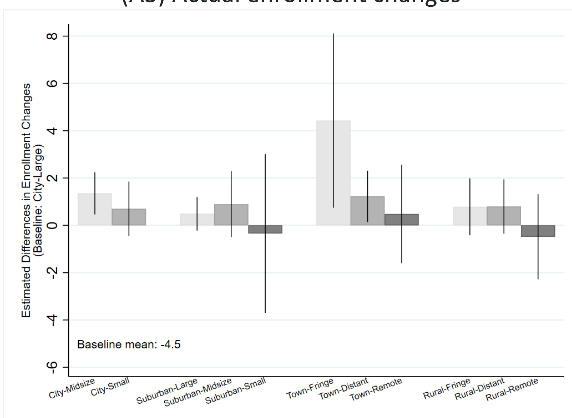
California	
(A1) Actual enrollment changes	(B1) Residualized enrollment changes
	
Florida	
(A2) Actual enrollment changes	(B2) Residualized enrollment changes



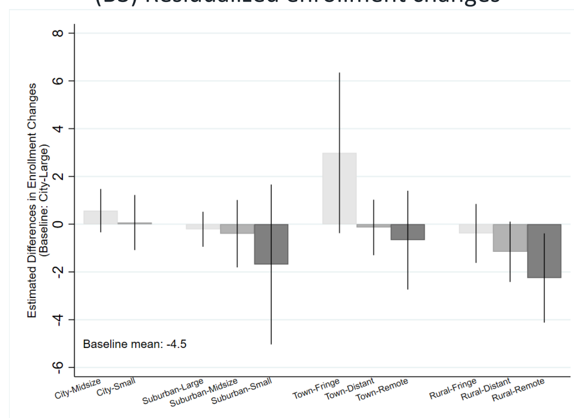


Texas

(A3) Actual enrollment changes

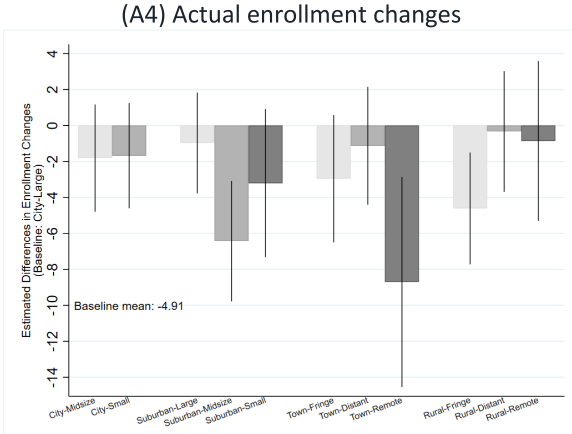


(B3) Residualized enrollment changes

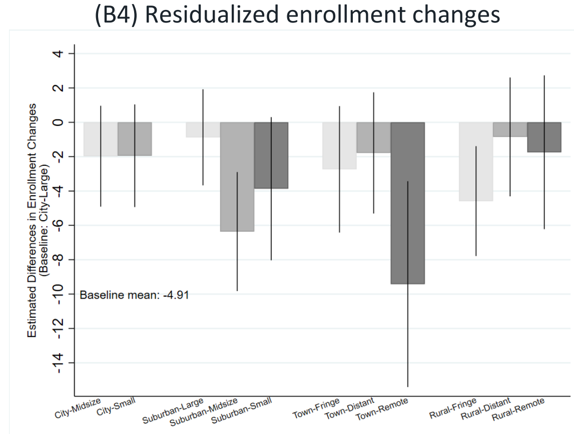


Washington

(A4) Actual enrollment changes



(B4) Residualized enrollment changes



Notes: Each bar in panels (A1)–(A4) presents the difference in enrollment change in 2020–21 (compared to the projected enrollment) between the given urbanicity category and schools in “large cities,” estimated using the projected enrollment in 2020–21 as weights. The spikes in each figure provide the 95% confidence interval for the corresponding estimate. Panels (B1)–(B4) repeat the same analysis using enrollment changes (compared to projected 2020–21 enrollment) residualized using the three school-level SES measures (% FRPL eligible, % of 25+ in the census tract with a bachelor’s degree or higher, and median household income). The baseline means provided in each graph represent the means for the schools in large cities (the omitted category).

Concluding Remarks

This study examines the enrollment trends in K–12 public schools in California, Florida, Texas, and Washington in the wake of the COVID-19 pandemic and explores some of the factors that are associated with these changes. Several findings are worth highlighting. First, enrollment declined considerably in all four states in the 2020-21 school year, especially in kindergarten, with Washington experiencing the largest declines. Second, this decline was larger among White students in three out of four states. Third, school-level differences within districts play a larger role in explaining school-level enrollment declines rather than between-district differences (e.g., differences in policies during the pandemic). Finally, there is mixed evidence regarding factors that might be associated with these enrollment changes. For example, in Florida and Texas, the results suggest that the declines were larger in schools serving more disadvantaged students, whereas in California I find the opposite. Overall, the findings reveal the need for more research in different settings to better understand the broader effects of the pandemic on public school enrollment, the mechanisms behind these effects, and whether they will persist beyond the 2020–21 school year.

References

Dee, T. S. & Murphy, M. (2021). Patterns in the pandemic decline of public school enrollment. *Educational Researcher*. https://doi.org/10.3102/0013189X211034481.

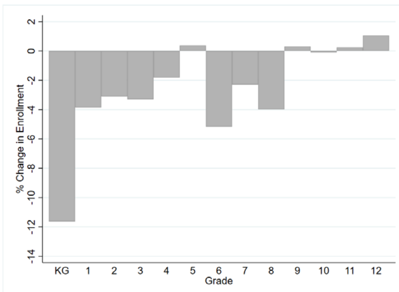
Musaddiq, T., Stange, K. M., Bacher-Hicks, A., & Goodman, J. (2021). The pandemic's effect on demand for public schools, homeschooling, and private schools. National Bureau of Economic Research Working Paper No. 29262.

Appendix

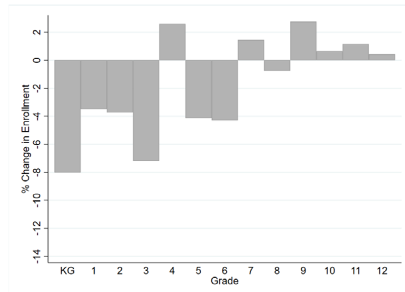
Appendix Exhibit 1. Changes in Public School Enrollment in 2020–21 by Grade and Race/Ethnicity Compared to 2019–20 Enrollment

(A) By Grade

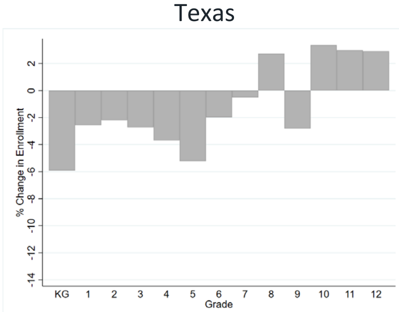
California



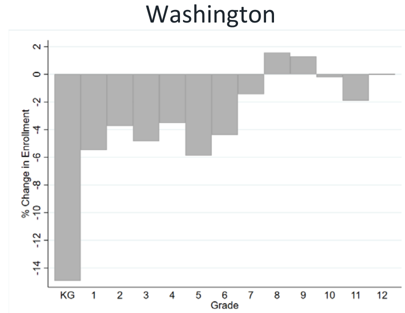
Florida



Texas

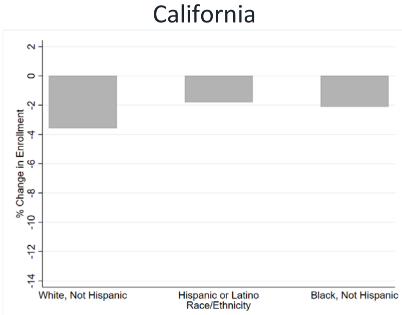


Washington

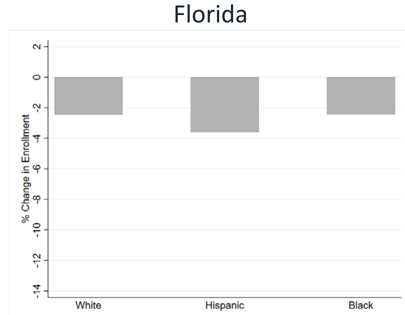


(B) Race/Ethnicity

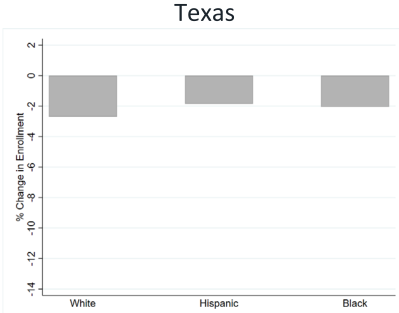
California



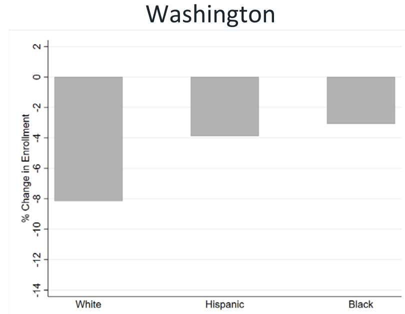
Florida



Texas

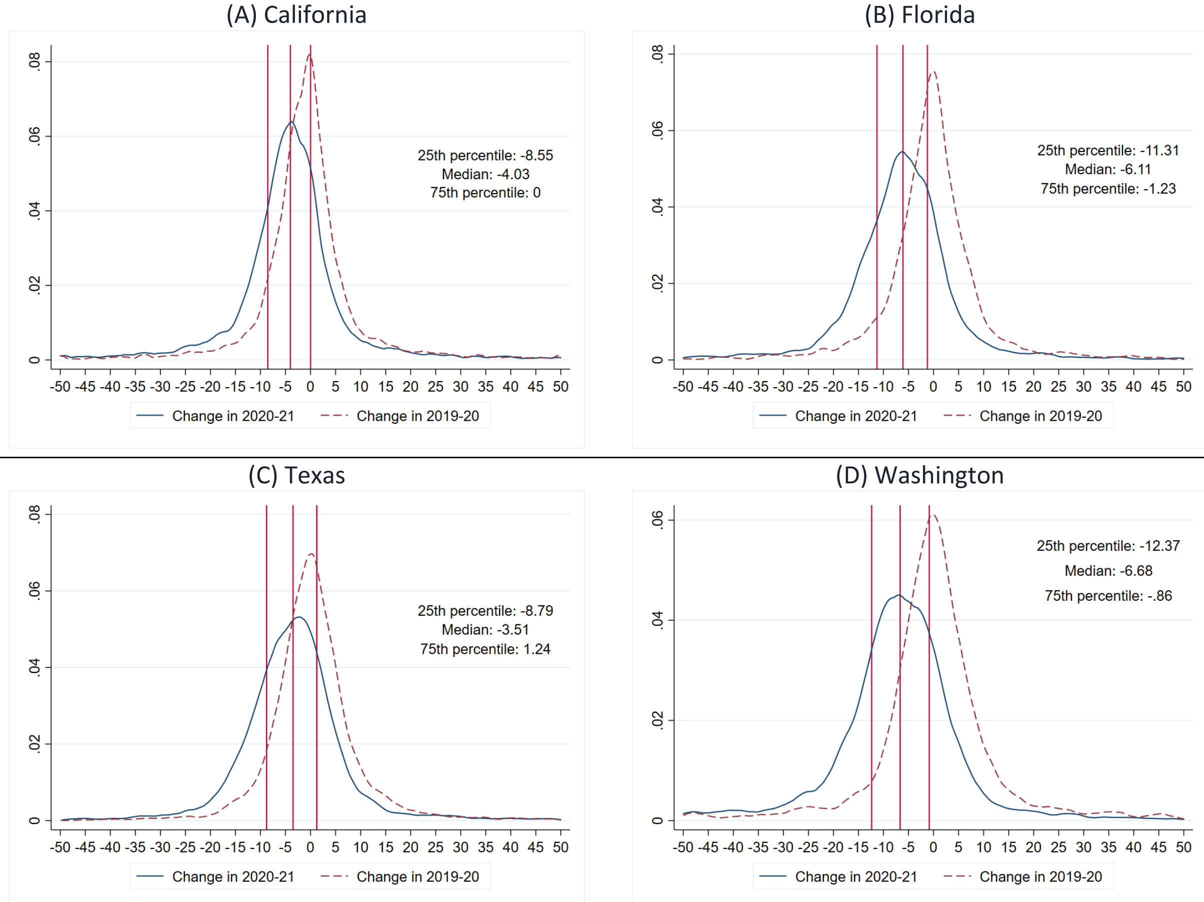


Washington



Notes: Panel (A) presents the change in K–12 enrollment in 2020–21 by grade compared to enrollment in 2019–20 for each grade level. Panel (B) repeats the same analysis broken down by race/ethnicity.

Appendix Exhibit 2. Distribution of School-Level Changes in Public School Enrollment Compared to 2019–20 Enrollment

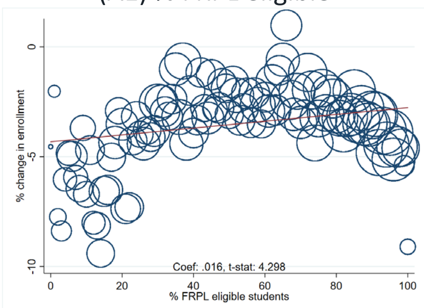


Notes: Each panel presents the Kernel density plots of the school-level enrollment changes in 2020–21 compared to 2019–20 enrollment using Epanechnikov kernel and the given bandwidth. Dashed line in each panel presents the distribution of school-level enrollment changes in 2019–20 compared to the 2018–19 enrollment.

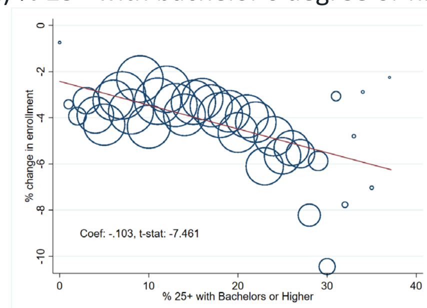
Appendix Exhibit 3. Measures of Student SES at the School Level and School-Level Changes in Public School Enrollment in 2020–21 Compared to Enrollment in 2019–20

California

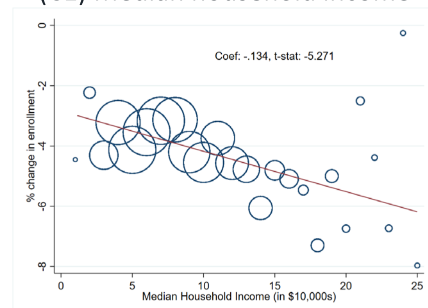
(A1) % FRPL eligible



(B1) % 25+ with bachelor's degree or higher

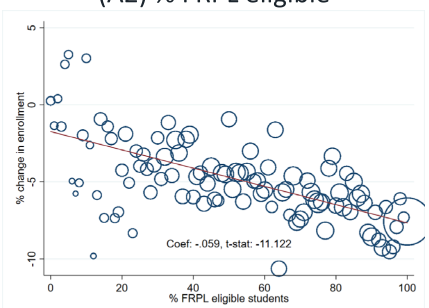


(C1) Median household income

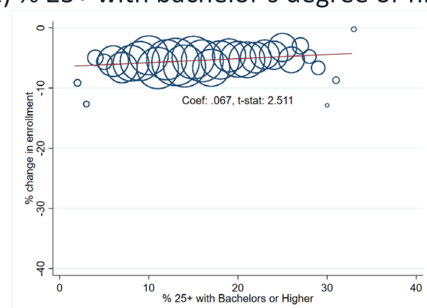


Florida

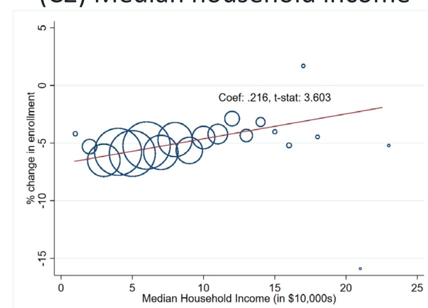
(A2) % FRPL eligible



(B2) % 25+ with bachelor's degree or higher

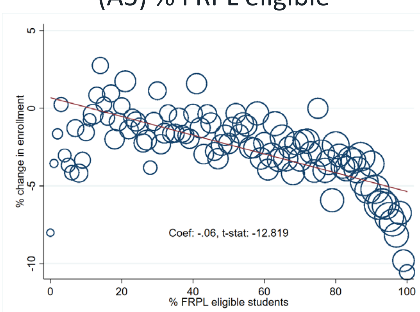


(C2) Median household income

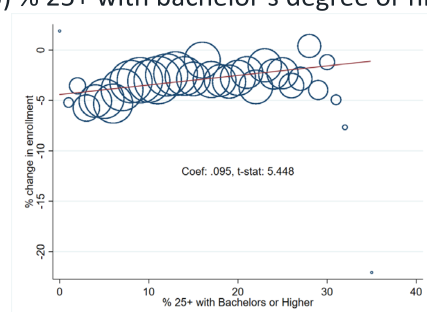


Texas

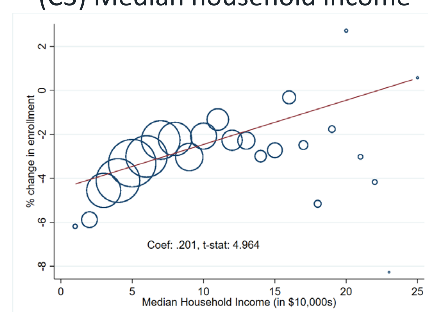
(A3) % FRPL eligible



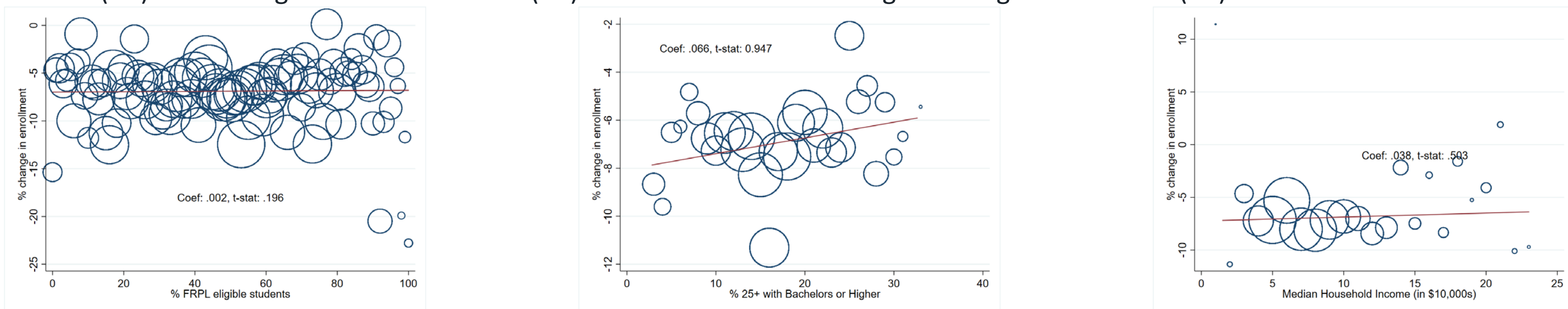
(B3) % 25+ with bachelor's degree or higher



(C3) Median household income



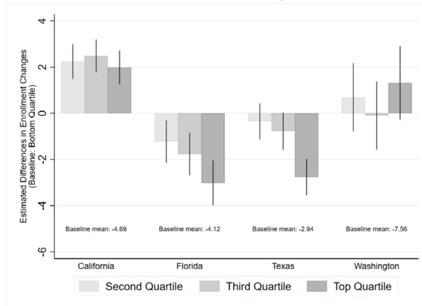
Washington		
(A4) % FRPL eligible	(B4) % 25+ with bachelor's degree or higher	(C4) Median household income



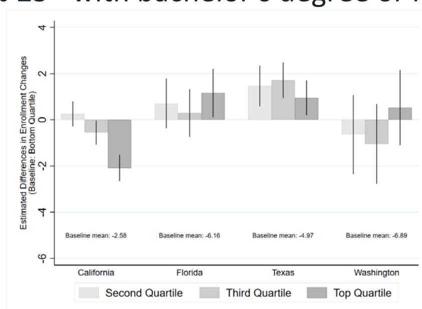
Notes: Each panel presents the scatter plot of the corresponding SES measure and % change in school-level enrollment compared to 2019–20 enrollment. In panels (A1)–(A4) and (B1)–(B4), the SES measures are divided into discrete bins with a width of 1 percentage point whereas in panels (C1)–(C4), I use bin widths of $10,000 for the scatter plots. Each circle represents the weighted average of the school-level enrollment change (using the 2019–20 enrollment for each school as weights) for a given bin with circle size proportional to 2019-20 enrollment for all schools in that bin. Red lines provide the fitted values from a linear regression of school-level enrollment changes on the SES measure using the 2019-20 enrollment for each school as weights and the raw data (without the bins).

Appendix Exhibit 4. School-Level SES Quartiles and Changes in Public School Enrollment in 2020–21 Compared to 2019–20 Enrollment

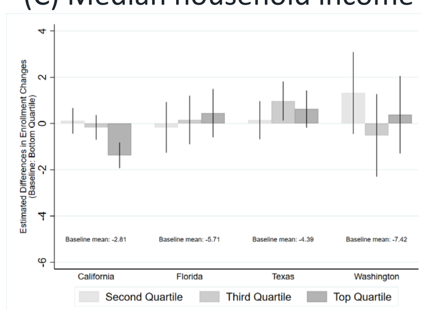
(A) % FRPL eligible



(B) % 25+ with bachelor’s degree or higher



(C) Median household income

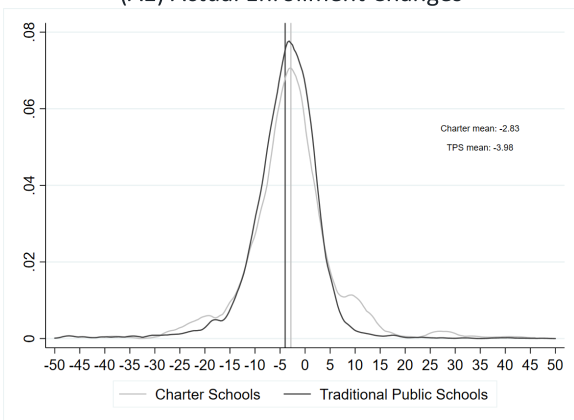


Notes: Each bar presents the difference in enrollment change in 2020–21 (compared to the 2019–20 enrollment) between the given SES quartile and the bottom quartile, estimated using the 2019-20 enrollment as weights. Spikes in each figure provide the 95% confidence interval for the corresponding estimate.

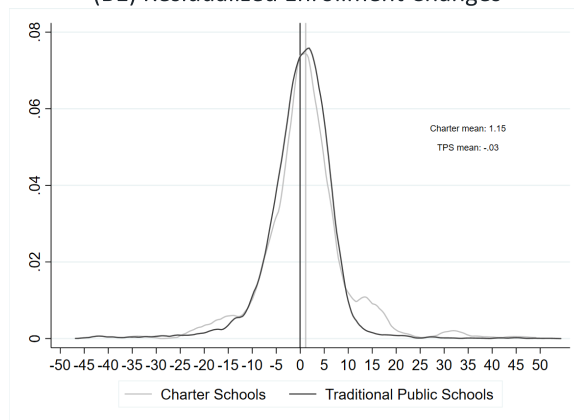
Appendix Exhibit 5. Distribution of School-Level Changes in Public School Enrollment Compared to 2019–20 Enrollment by School Charter Status

California

(A1) Actual Enrollment Changes

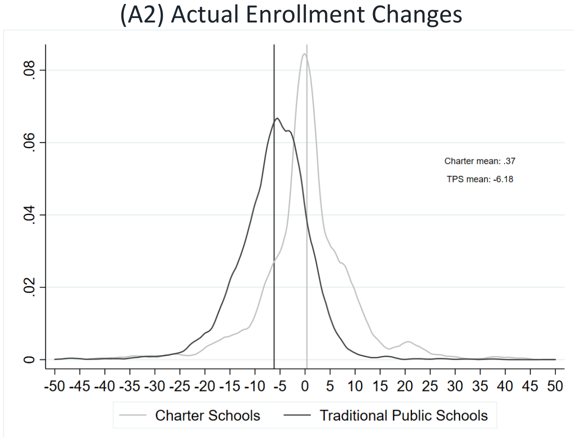


(B1) Residualized Enrollment Changes

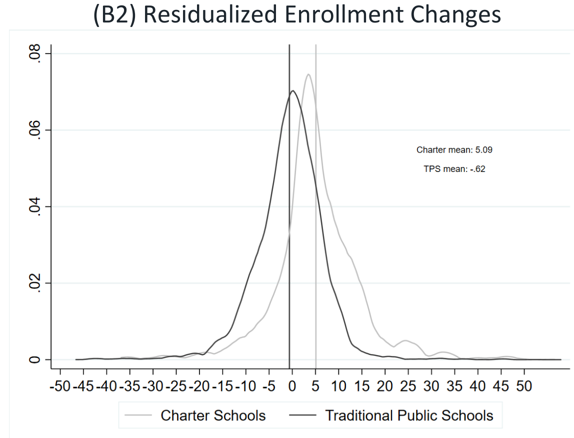


Florida

(A2) Actual Enrollment Changes

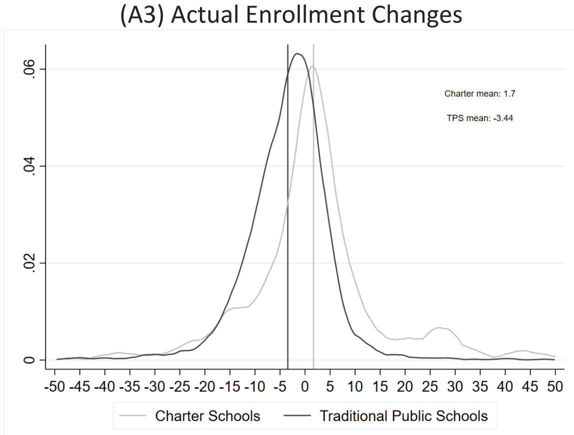


(B2) Residualized Enrollment Changes

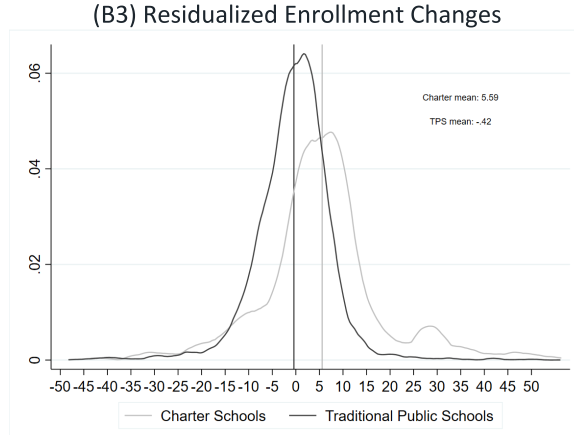


Texas

(A3) Actual Enrollment Changes



(B3) Residualized Enrollment Changes

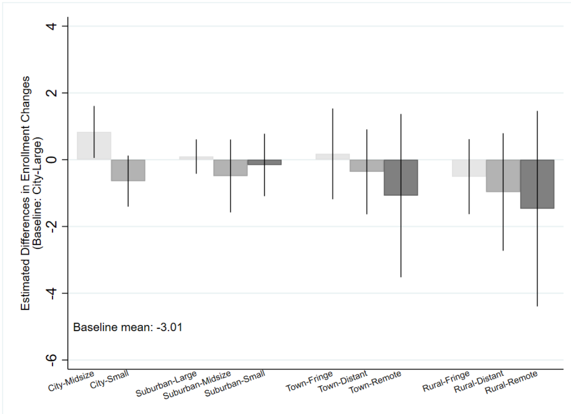


Notes: Panel A presents the Kernel density plots of the school-level enrollment changes in 2020–21 compared to 2019–20 enrollment by school charter status using Epanechnikov kernel. Panel B repeats the same analysis using enrollment changes (compared to 2019–20 enrollment) residualized using percentage of FRPL-eligible quartile indicators.

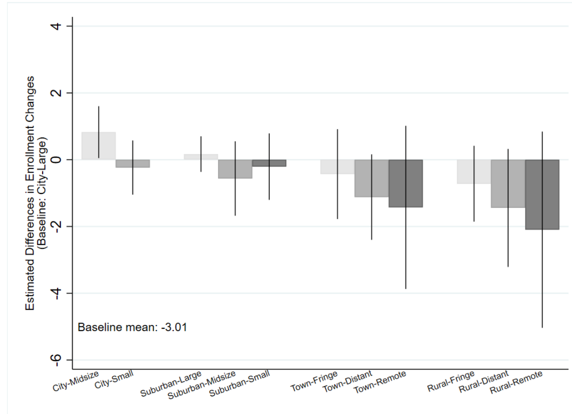
Appendix Exhibit 6. Distribution of School-Level Changes in Public School Enrollment Compared to 2019–20 Enrollment by School Urbanicity

California

(A1) Actual Enrollment Changes

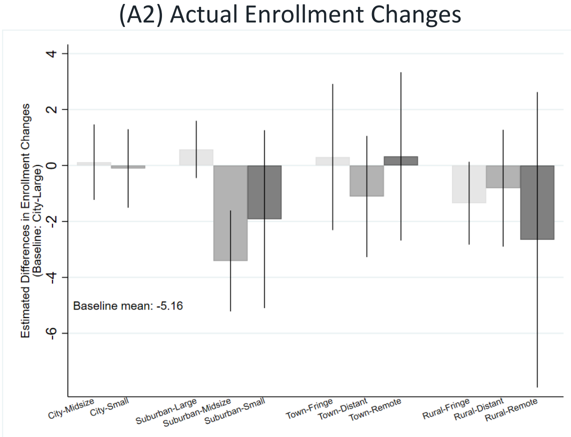


(B1) Residualized Enrollment Changes

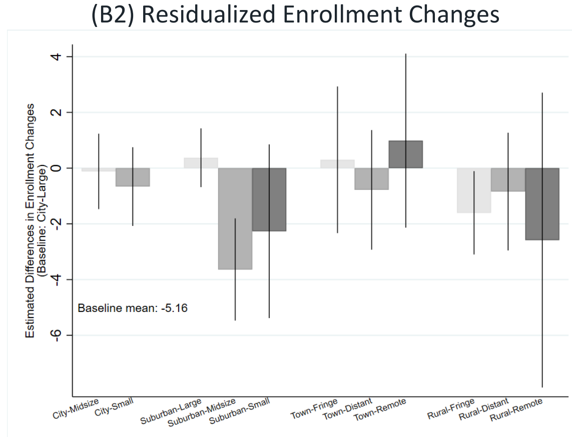


Florida

(A2) Actual Enrollment Changes

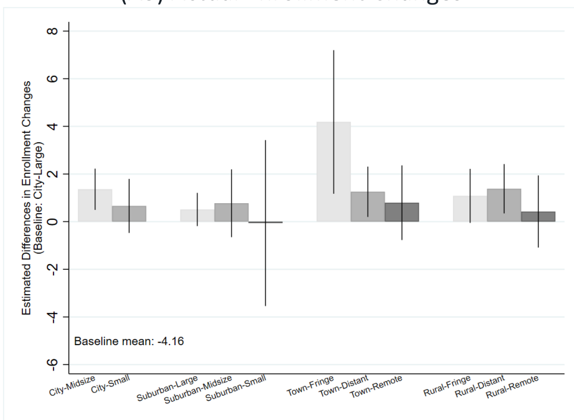


(B2) Residualized Enrollment Changes

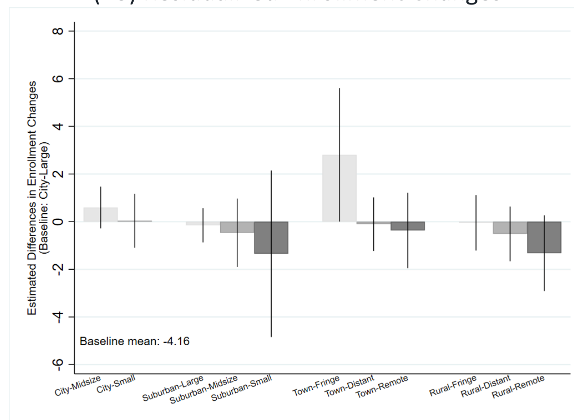


Texas

(A3) Actual Enrollment Changes

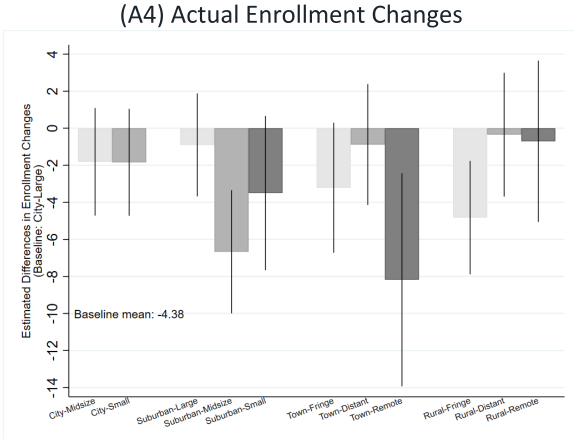


(B3) Residualized Enrollment Changes

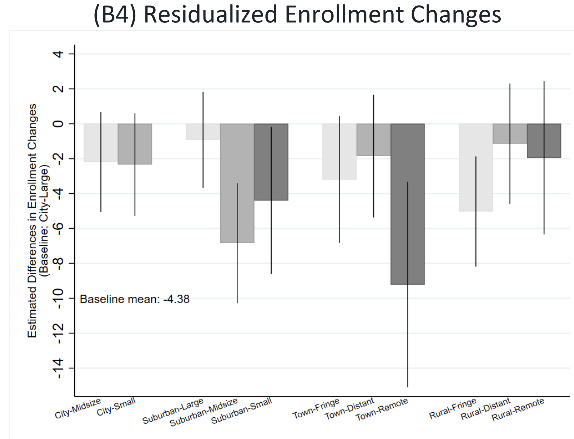


Washington

(A4) Actual Enrollment Changes



(B4) Residualized Enrollment Changes



Notes: Each bar in panels (A1)–(A4) presents the difference in enrollment change in 2020–21 (compared to 2019–20 enrollment) between the given urbanicity category and schools in "large cities", estimated using the projected enrollment in 2019–20 as weights. Spikes in each figure provide the 95% confidence interval for the corresponding estimate. Panels (B1)–(B4) repeat the same analysis using enrollment changes (compared to 2019–20 enrollment) residualized using the three school-level SES measures (% FRPL eligible, % of 25+ in the census tract with a bachelor's degree or higher, and median household income).

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