

COVID-19 and the Squeeze on State Education Budgets

Equity Implications for New York State

MAY 2020

Drew Atchison

MAKING RESEARCH RELEVANT

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Introduction

With the economic halt precipitated by the COVID-19 virus, states are starting to prepare for and beginning to address the budgetary squeeze that is sure to come absent of massive federal stimulus dollars. Given that more than 90% of K–12 education revenue nationally is from state and local sources (National Center for Education Statistics, 2020) and approximately 20% of state and local government expenditures are for K–12 education (Urban Institute, 2020), when states feel the pinch, so does K–12 education. According to the Center on Budget and Policy Priorities, states face potentially record levels of budget shortfalls (McNichol, Leachman, & Marshall, 2020). Preliminary estimates suggest state revenue will drop by 10% to 20% (Griffith, 2020).

Several studies have shown that high poverty school districts were disproportionately negatively impacted during education cuts made during the great recession (Baker, 2014; Goldhaber, Strunk, Brown, & Knight, 2016; Knight, 2017). In addition, I conducted a longitudinal analysis of New York education finance following the *Campaign for Fiscal Equity v. State of New York* court cases to understand whether equity of education funding improved. As a result of the litigation, New York State passed education finance reform in the form of a new foundation formula in 2007. However, my analysis showed that the formula was never fully enacted due to freezes and cuts to state education revenue at the time of the Great Recession, and these freezes and cuts were most detrimental to high poverty school districts (Atchison, 2019).

Much remains to be seen regarding how the economic fallout resulting from the COVID-19 crisis will impact education budgets around the country. Hopefully, states can learn from the experiences of the Great Recession. Although budget reductions are almost certain to come, states still have the opportunity to be thoughtful about the cuts they make and should try to preserve educational services to the extent possible for the most disadvantaged youth (Baker & Di Carlo, 2020).

At the end of March, New York State was the first state to come out with a post–COVID-19 state budget (the Legislative Budget). In early April, Governor Cuomo signed the Legislative Budget into law to make it the Enacted Budget. Because of the early release of the budget, I used New York's Enacted Budget as one example of how states are cutting education budgets as a result of COVID-19. In January, New York State released its Executive Budget prior to any understanding of how devastating COVID-19 would be. I compared district-by-district estimates of state aid per pupil under the Executive and Enacted Budgets to understand the impacts of COVID-19 across districts in relation to the level of economic disadvantage of students served and the racial composition of students in districts. This makes the assumption that districts would have received state aid in the amounts specified by the Executive Budget in a COVID-19–

free world. In actuality, districts probably would have received more in state aid than indicated in the Executive Budget. In each of the last two years (fiscal year [FY] 2019 and FY 2020) state aid for education (and Foundation Aid, in particular) was substantially higher in the Enacted Budgets compared to the Executive Budget. This indicates that the Executive Budget is likely a conservative estimate of what districts would have received in the absence of COVID; and therefore the calculated difference between Enacted and Executive budgets is a likely lower-bound estimate of the impact of COVID-19 on budget cuts.

Next, I conducted longitudinal analysis looking at education revenue per pupil over time in New York State by district poverty rates to understand what might occur during the current budgetary crisis if the state enacts cuts similarly to those that occurred during the Great Recession. For the presentation of results in the main text, I focus on how cuts or revenues were distributed in relation to the proportion of students who are economically disadvantaged. I also examined the distribution of cuts by race/ethnicity for the budget analysis. Additional figures of the budgetary analysis by race/ethnicity can be found in Appendix A, as can several longitudinal figures examining components of local revenue (property valuation and local effort). Additionally, in Appendix A, I present several figures comparing Foundation Aid under the Enacted Budget to Foundation Aid goals as specified by the foundation formula. A description of the data sources and methods used in the analyses is found in Appendix B.

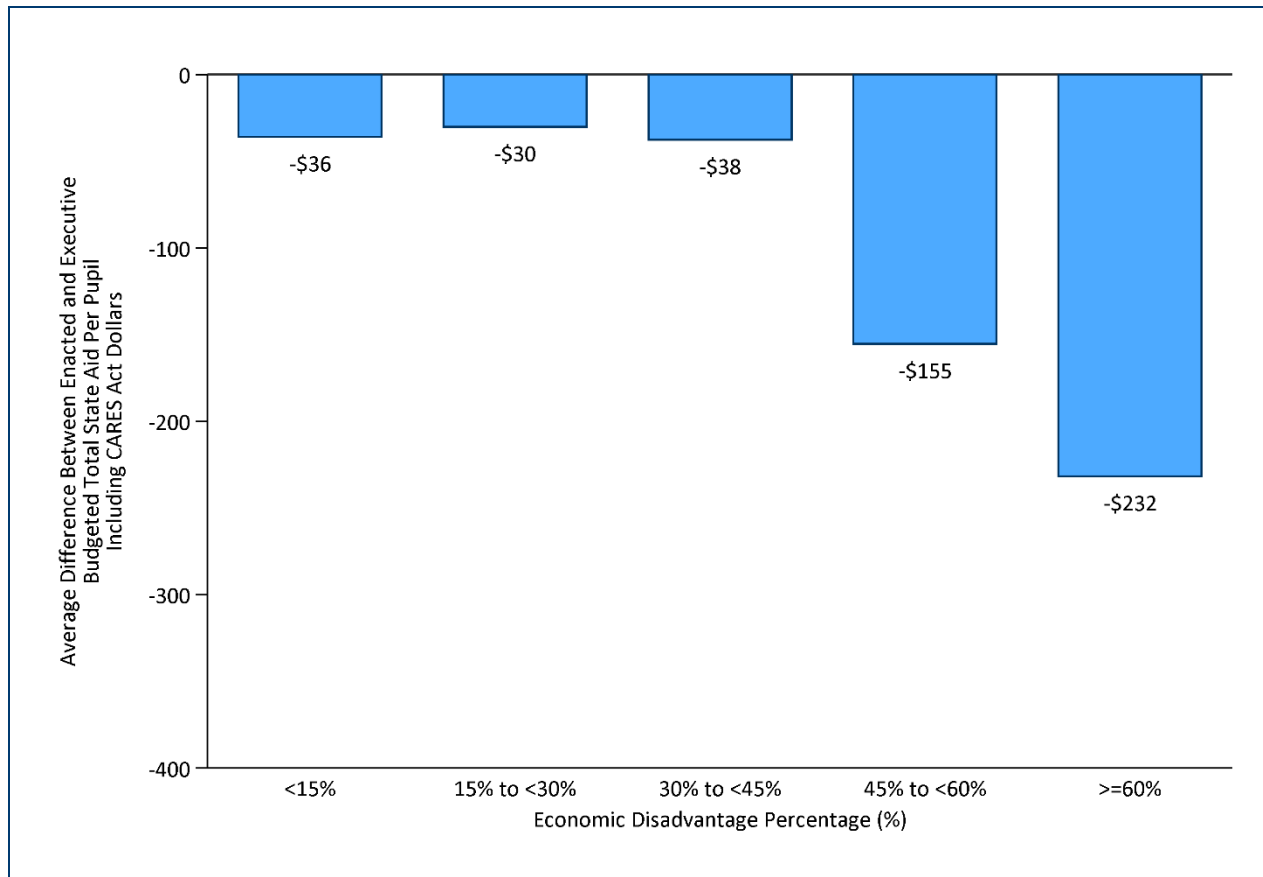
Comparison of Enacted Education Budget With Executive Budget Proposal

New York's Enacted Education Budget from the end of March included what they called "pandemic cuts" and also included federal dollars under the CARES act. The Education Law Center highlighted some concerns with the method in which New York imposed its pandemic cuts (McKillip & Sciarra, 2020), which was done on a dollar-for-dollar basis in line with the CARES Act funding; any district receiving CARES Act funding also had a cut in state aid equivalent in magnitude to the amount of CARES Act funding it was awarded. I made comparisons between the executive and enacted budgeted state aid both including and excluding CARES Act funding. In addition, I compared the amount of Foundation Aid between the two budgets. New York's approach to Foundation Aid in the Enacted Budget was to simply freeze it at levels observed in the prior year. Therefore, another way of thinking about the comparison between the two budgets is as the additional amount districts might have received in the absences of COVID-19.

State Aid Inclusive of Federal CARES Act Funding

The first analysis shows the average difference in funding between the Enacted and Executive Budgets experienced by districts with various levels of student poverty (as proxied by incidence of students who are economically disadvantaged). Compared with the Executive Budget, the highest poverty school districts (those with at least 60% of students who are economically disadvantaged) are budgeted to receive an average of approximately \$230 less per student in the Enacted Budget after taking into account the federal CARES Act stimulus dollar (Exhibit 1). Districts with fewer than 45% of students who are economically disadvantaged will receive approximately \$30 to \$40 less per student on average. Although the difference of \$200 per student between high- and low-poverty districts may not seem substantial, this amounts to a difference of \$1 million for a district of 5,000 students.

Exhibit 1. Average Difference in Total State Aid Per Pupil Including Federal CARES Act Dollars Between the Two Budgets by Economic Disadvantage

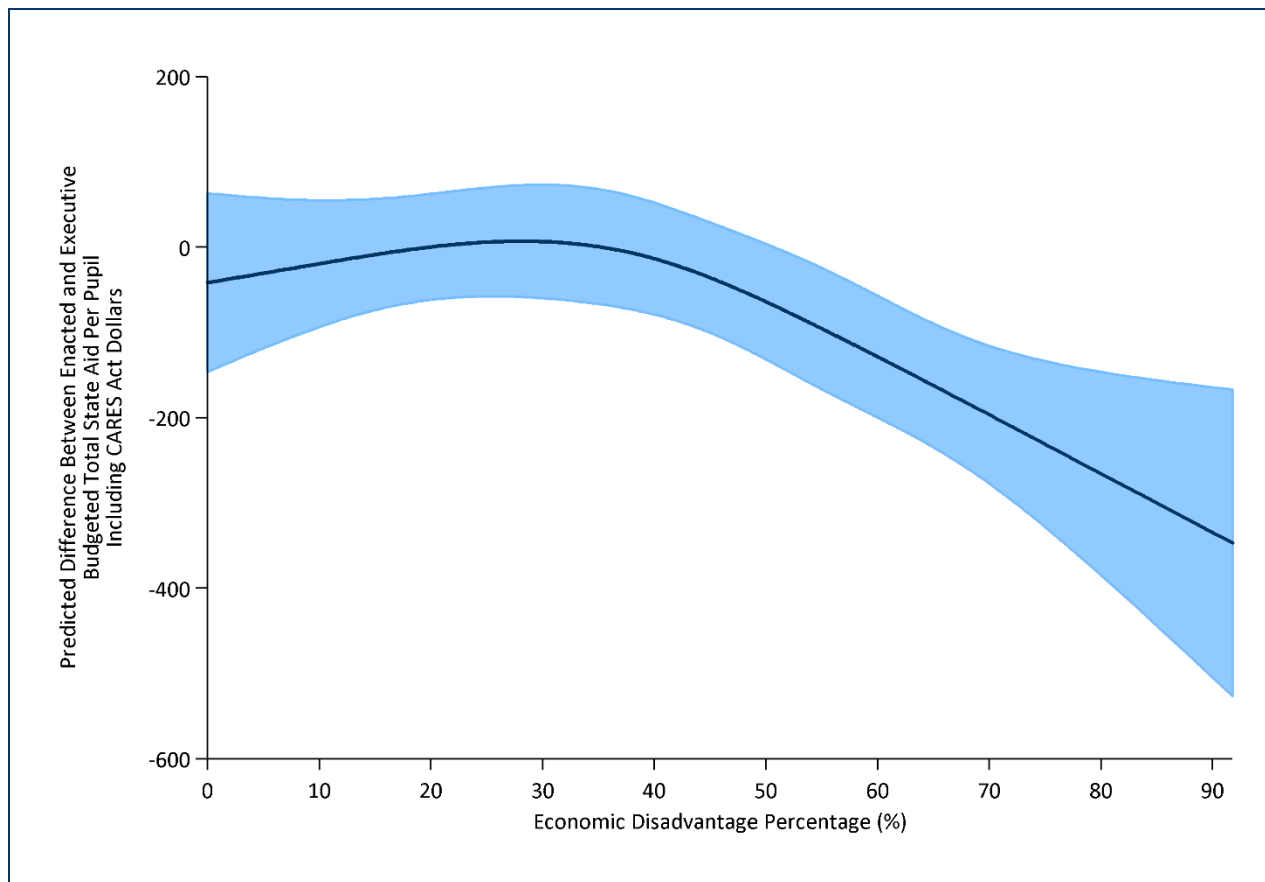


Note. Dollars are adjusted for regional cost variation. Averages are weighted by the square root of enrollment.

In Exhibit 2, I use regression analysis to examine the conditional relationship between the Enacted and Executive Budget difference and district student economic disadvantage while

controlling for other district characteristics that could explain differences in the budgets. The shaded area around the solid line represents the 95% confidence interval around the prediction. As shown, until an economic disadvantage percentage of just above 50%, the difference between the Executive and Enacted Budgets is not statistically significant from 0. Above an economic disadvantage percentage of 50%, districts face statistically significant cuts. In other words, after accounting for differences across districts in size, population density, and other student characteristics, the reductions in budget between the Executive and Enacted Budgets are most strongly incurred by districts with more than 50% of students who are economically disadvantaged.

Exhibit 2. Predicted Difference in Total State Aid Per Pupil Including Federal CARES Act Dollars Between the Two Budgets by Economic Disadvantage



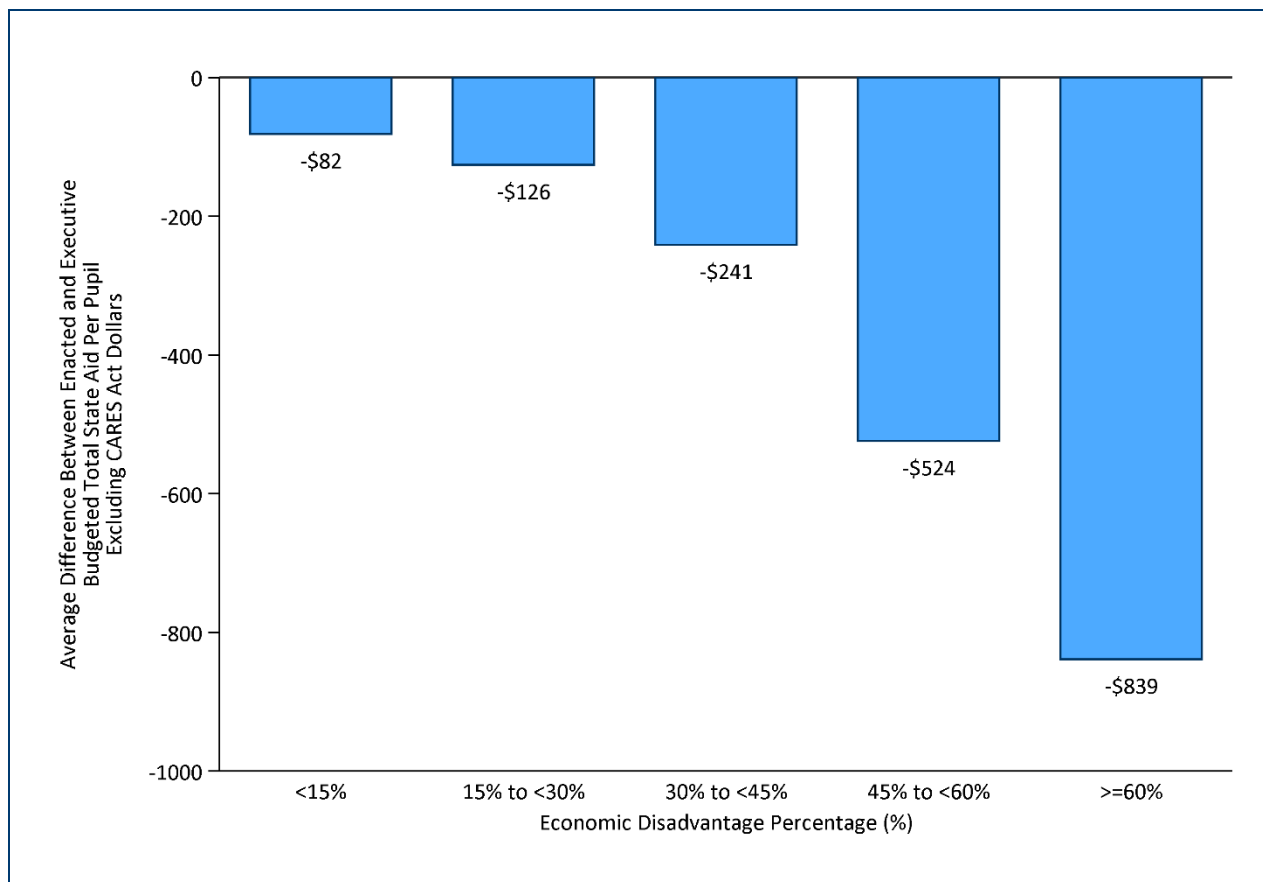
Note. Dollars are adjusted for regional cost variation. The model controls for the size of districts, population density of the location of the district, percentage of English learners, and percentage of students with disabilities. Estimated using spline regression with four knots. Regression is not weighted.

State Aid Excluding Federal CARES Act Funding

The majority of CARES Act dollars flow to districts according to the same formula as federal Title I dollars (McKillip & Sciarra, 2020; Reber & Gordon, 2020). Therefore, higher-poverty districts are scheduled to receive more CARES Act dollars than lower-poverty districts. The cuts in state aid, labeled as the “pandemic cuts,” will fall disproportionately on higher-poverty districts. When I calculate the difference in state aid between the Executive and Enacted Budgets exclusive of CARES Act dollars, a far more regressive picture emerges.

As shown in Exhibit 3, districts with at least 60% of students who are economically disadvantaged had state aid decreased by approximately \$840 per pupil, on average. In contrast, districts with less than 15% of students who are economically disadvantaged had state aid decreased by only \$82 per pupil, on average.

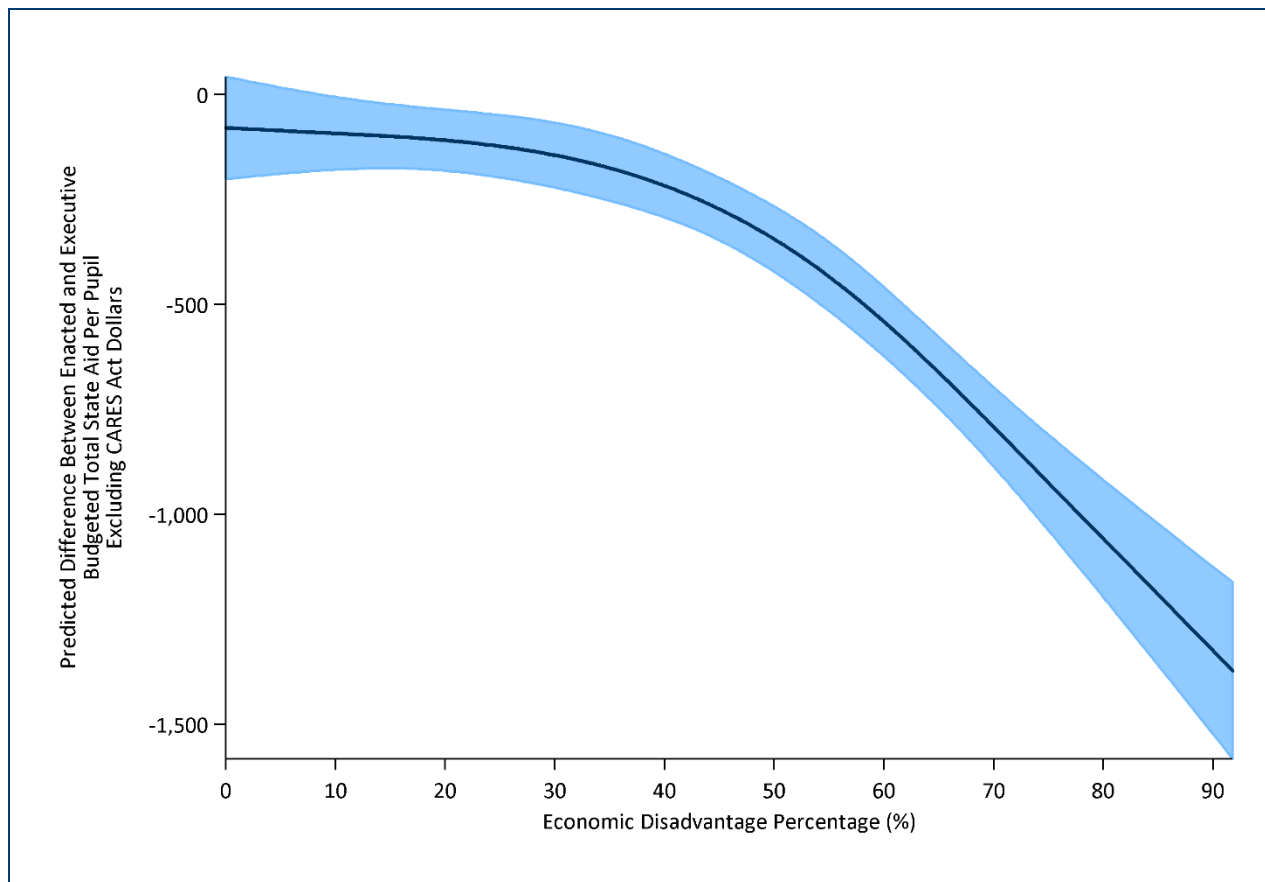
Exhibit 3. Average Difference in Total State Aid Per Pupil Excluding Federal CARES Act Dollars Between the Two Budgets by Economic Disadvantage



Note. Dollars are adjusted for regional cost variation. Averages are weighted by the square root of enrollment.

The regression-predicted difference in budgets per pupil by economic disadvantage, after controlling for other district characteristics, shows an even stronger negative relationship between budget differences and student economic disadvantage (Exhibit 4). The lowest poverty districts (below 10% economic disadvantage) had projected cuts that were not statistically distinguishable from 0 from the Executive to the Enacted Budget. From this point up to approximately 30% economic disadvantage, there were only slight increases in the magnitude of the expected funding cuts. After approximately 40% economic disadvantage, the magnitude of the expected cuts increased drastically. The highest poverty districts face cuts of almost \$1,400 per pupil.

Exhibit 4. Predicted Difference in Total State Aid Per Pupil Excluding Federal CARES Act Dollars Between the Two Budgets by Economic Disadvantage



Note. Dollars are adjusted for regional cost variation. The model controls for the size of districts, population density of the location of the district, percentage of English learners, and percentage of students with disabilities. Estimated using spline regression with four knots. Regression is not weighted.

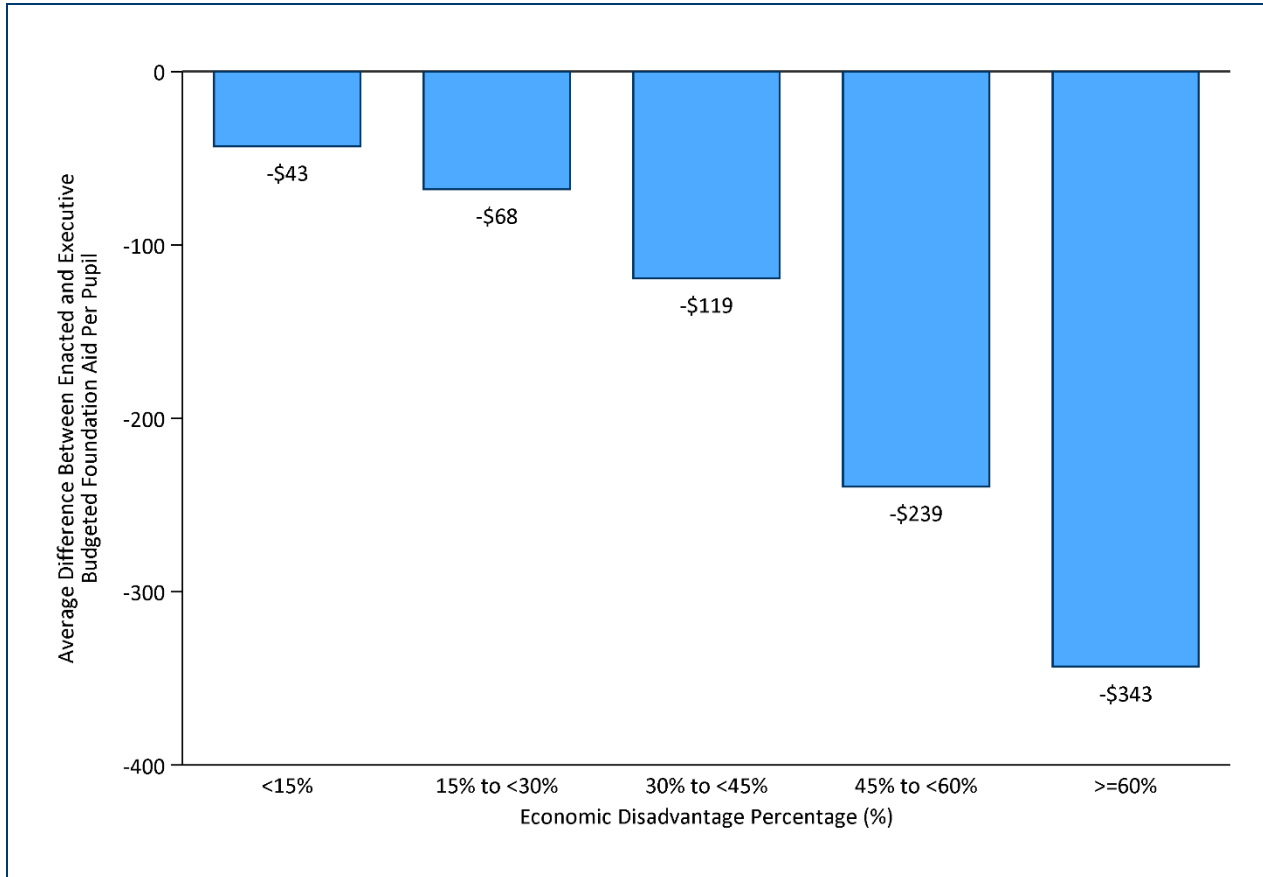
Foundation Aid Funding

In addition to examining total state aid, I also examined Foundation Aid specifically. Foundation Aid is the largest category of state aid that flows to districts as unrestricted dollars (they are not earmarked for any specific purpose, giving districts flexibility over how to use them).

Foundation Aid is the portion of the state education formula that is intended to address student needs by distributing more dollars to districts with higher percentages of economically disadvantaged students. Furthermore, Foundation Aid offsets differences in ability across districts to raise local revenue by providing more funding to districts with less capacity to raise local revenue. Because the CARES Act dollars and the pandemic cuts were included as separate line items in the budget, the Foundation Aid dollars presented here were not affected by CARES Act or pandemic cuts.

As shown in Exhibit 5, the highest poverty school districts showed the largest difference in Foundation Aid between the Executive and Enacted Budgets. For the highest poverty districts (with at least 60% economically disadvantaged students), the Enacted Foundation Aid was approximately \$340 less than the amount of Foundation Aid in the Executive Budget. For the lowest poverty districts, the difference between the two budgets was less than \$50.

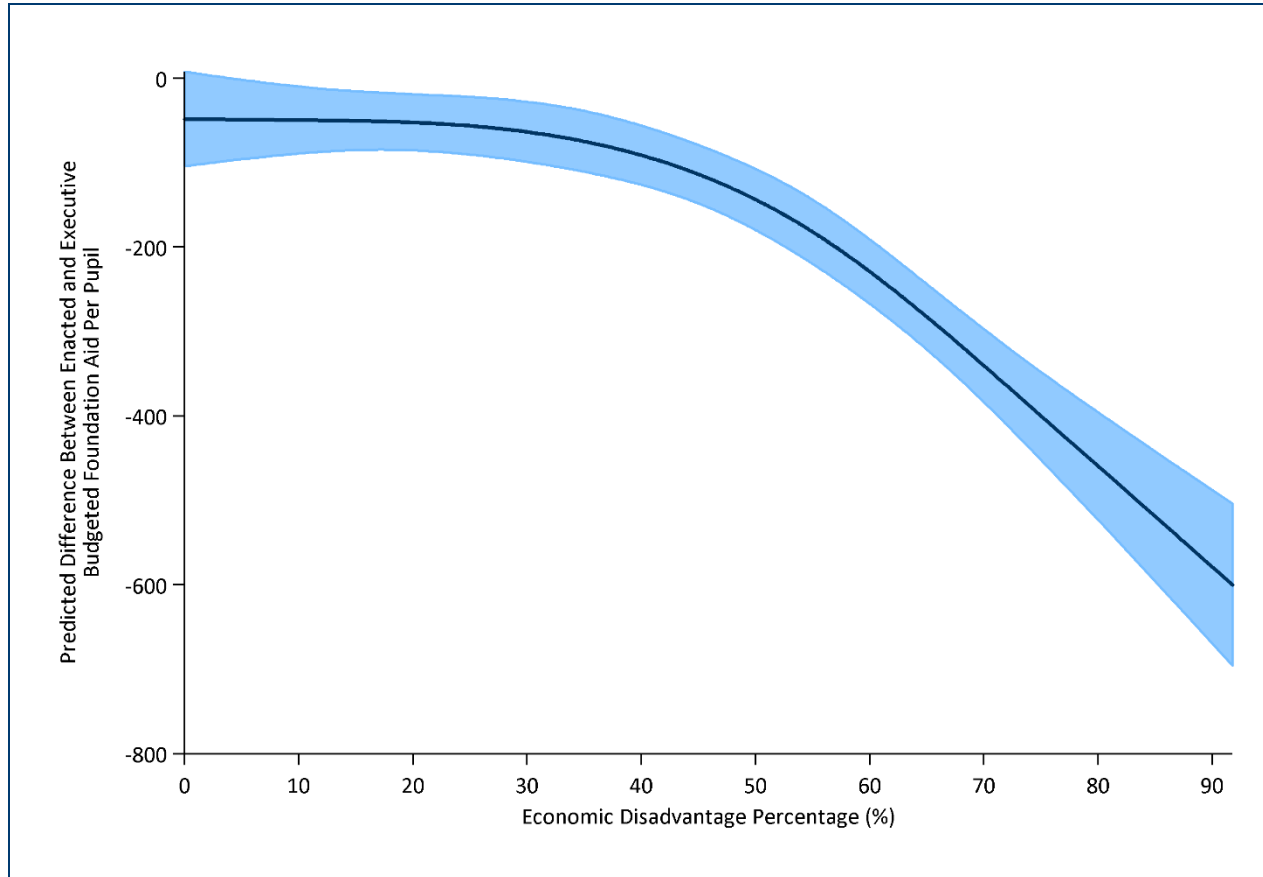
Exhibit 5. Average Difference in Foundation Aid Between the Two Budgets by Economic Disadvantage



Note. Dollars are adjusted for regional cost variation. Averages are weighted by the square root of enrollment. Foundation Aid in the Executive Budget is inclusive of funding for Board of Cooperative Education Services (BOCES); high tax aid; special services; charter school transitional; hardware and technology; software, library, and textbooks; supplemental public excess cost; and academic enhancement funding. Therefore, these categories are included with Foundation Aid for the purpose of this analysis.

The regression analysis (Exhibit 6) shows that the difference between the two budgets escalates when districts' economic disadvantage percentage exceeds 40%. The decision to freeze Foundation Aid at FY 2020 levels disproportionately impacted higher-poverty districts.

Exhibit 6. Predicted Difference in Foundation Aid Between the Two Budgets by Economic Disadvantage



Note. Dollars are adjusted for regional cost variation. The model controls for the size of districts, population density of the location of the district, percentage of English learners, and percentage of students with disabilities. Estimated using spline regression with four knots. Regression is not weighted. Foundation Aid in the Executive Budget is inclusive of funding for BOCES; high tax aid; special services; charter school transitional; hardware and technology; software, library, and textbooks; supplemental public excess cost; and academic enhancement funding. Therefore, these categories are included with Foundation Aid for the purpose of this analysis.

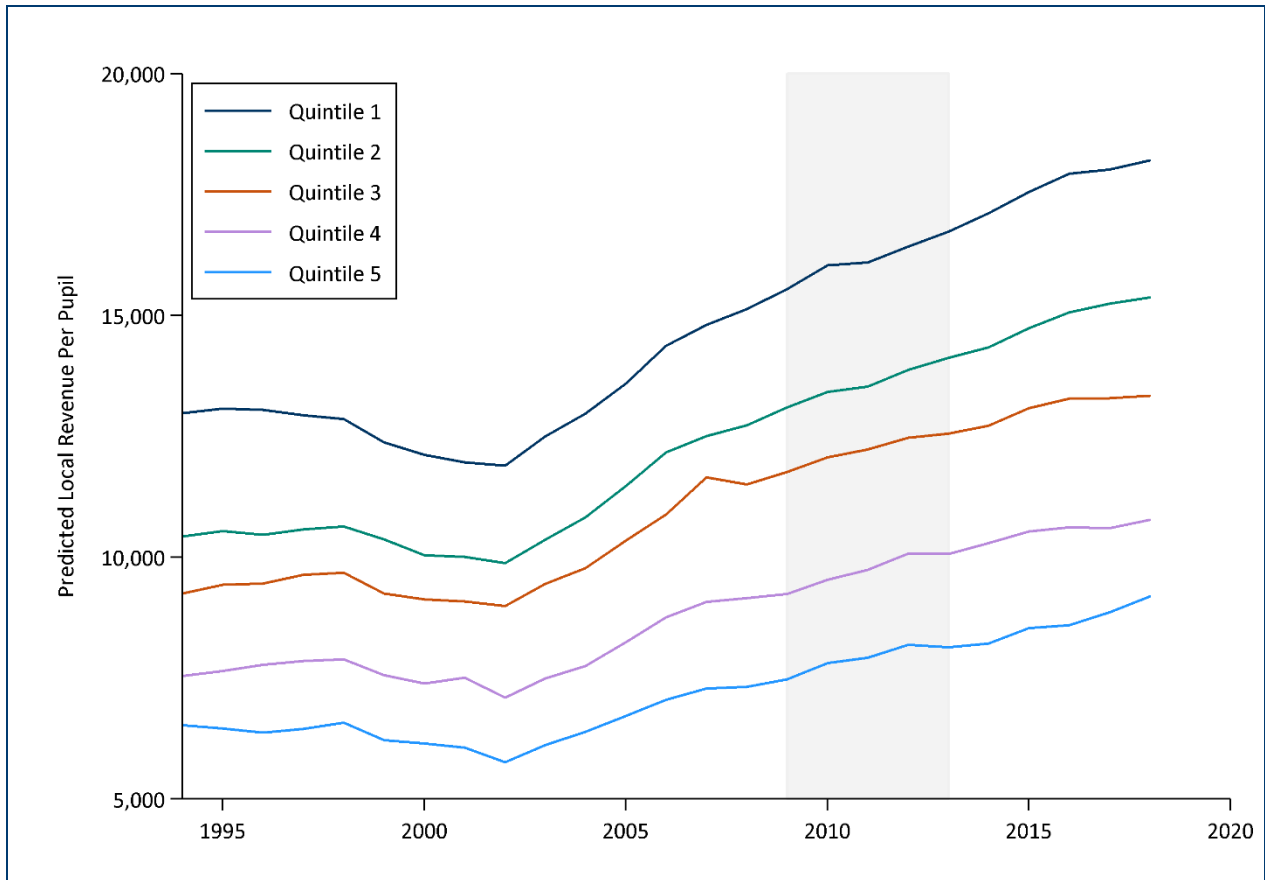
Longitudinal Analysis of Trends in New York State

The previous analyses show only part of the story. In New York, funding for education is split fairly evenly between state and local revenue. The prior analyses only show the portion of education revenue coming from state aid. The budgetary responses to COVID-19 by New York with respect to state aid disproportionately affect the highest poverty districts. Arguably, this might be justified if the lowest poverty (most affluent) districts will be more severely impacted on the local revenue side. Unfortunately, in contrast to the availability of state revenue budgets for districts, district-by-district projections of local revenue budgets are not available. However,

I can look back and see how local and state revenue were impacted over the course of the Great Recession.

As shown in Exhibit 7, trends in local revenue did not appear to be substantially affected during the course of the Great Recession. Between 2009 and 2013, districts increased local revenue per pupil, on average, regardless of poverty level. However, more affluent districts (especially Quintile 1) were able to increase local per-pupil revenue faster during the course of the Great Depression than higher-poverty districts. From 2009 to 2013, districts in the lowest poverty quintile increased local revenue from approximately \$15,500 per student to approximately \$16,700 per pupil, an increase of approximately \$1,200 per student. In contrast, districts in the highest poverty quintile increased local revenue from \$7,500 per student to \$8,100 per student, a \$600 increase. Over the years of the Great Recession, districts across the five poverty quintiles increased their rates of local taxation. Property values continued to rise during the initial half of the Great Recession, but then stalled in the latter half. The higher rates of current local taxation along with stagnant property valuation in recent years suggest that districts may be less willing or able to increase local revenues as they did during the Great Recession. However, there is no evidence that lower-poverty districts will face steeper cuts to local revenue than higher-poverty districts. Exhibits A17 and A18 in the Appendix show how local effort (tax rates) and property valuation changed over time across districts by poverty quintile.

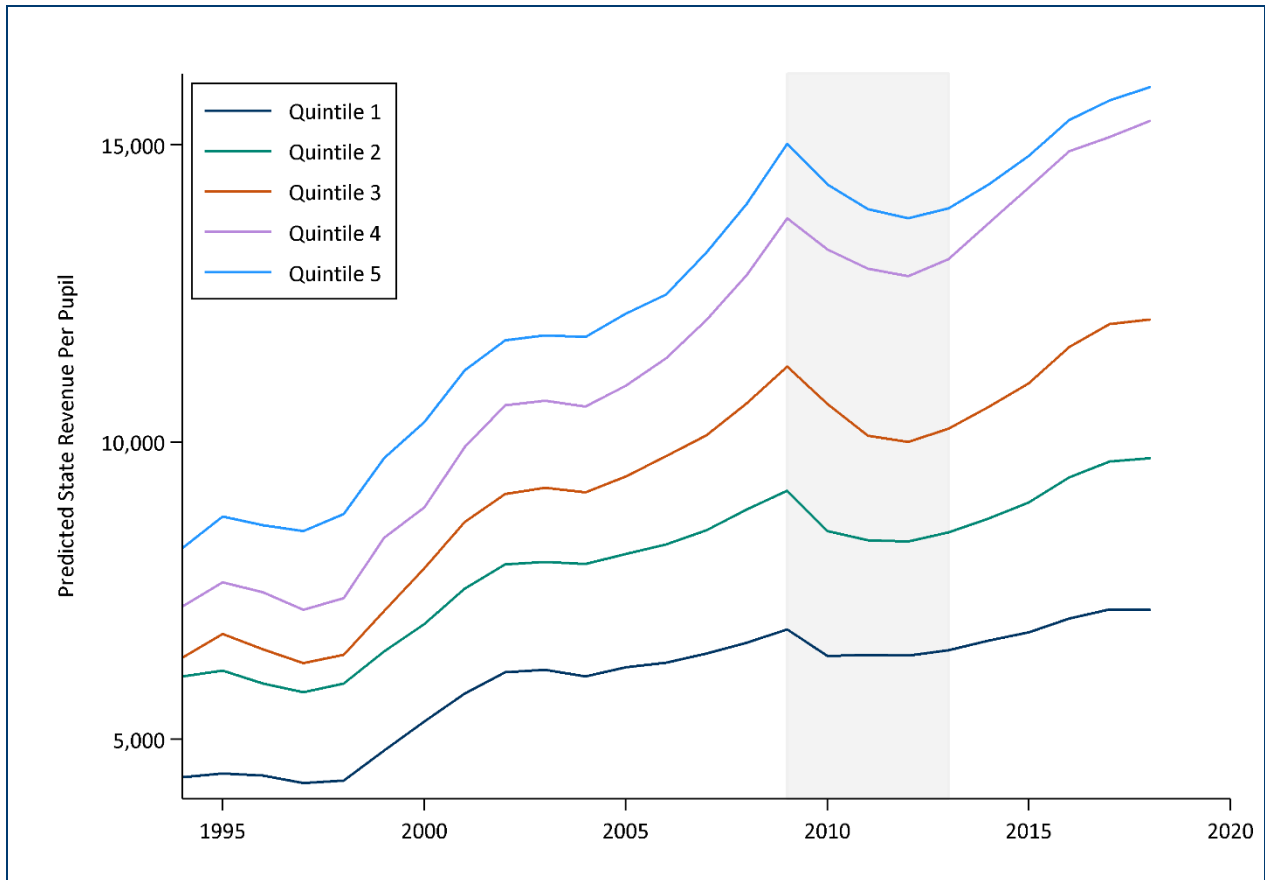
Exhibit 7. Trends in Local Revenue Per Pupil Over Time



Note. Dollars are adjusted for inflation to 2019 dollars and are adjusted for regional cost variation. Predicted values control for population density and district size. Regressions are weighted by the square root of district enrollment. The gray shaded area represents recession years (FY 2009 through FY 2013).

Exhibit 8 shows changes over time in state revenue per pupil with respect to district poverty. As shown, the highest poverty districts faced sharp declines in state revenue per pupil over multiple years. The lowest poverty districts lost revenue from 2009 to 2010, but then maintained their local revenue over the remainder of the Great Recession. Even the most affluent fifth of districts receive more than \$5,000 per pupil in state revenue on average. One argument for not cutting state aid in affluent districts as much as in higher-poverty districts is that they do not receive as much state aid. If the most affluent districts received little to no state revenue, it would not be possible to make different choices with respect to the cuts. But this exhibit shows that there is room to share cuts and freezes to state aid more equably across districts.

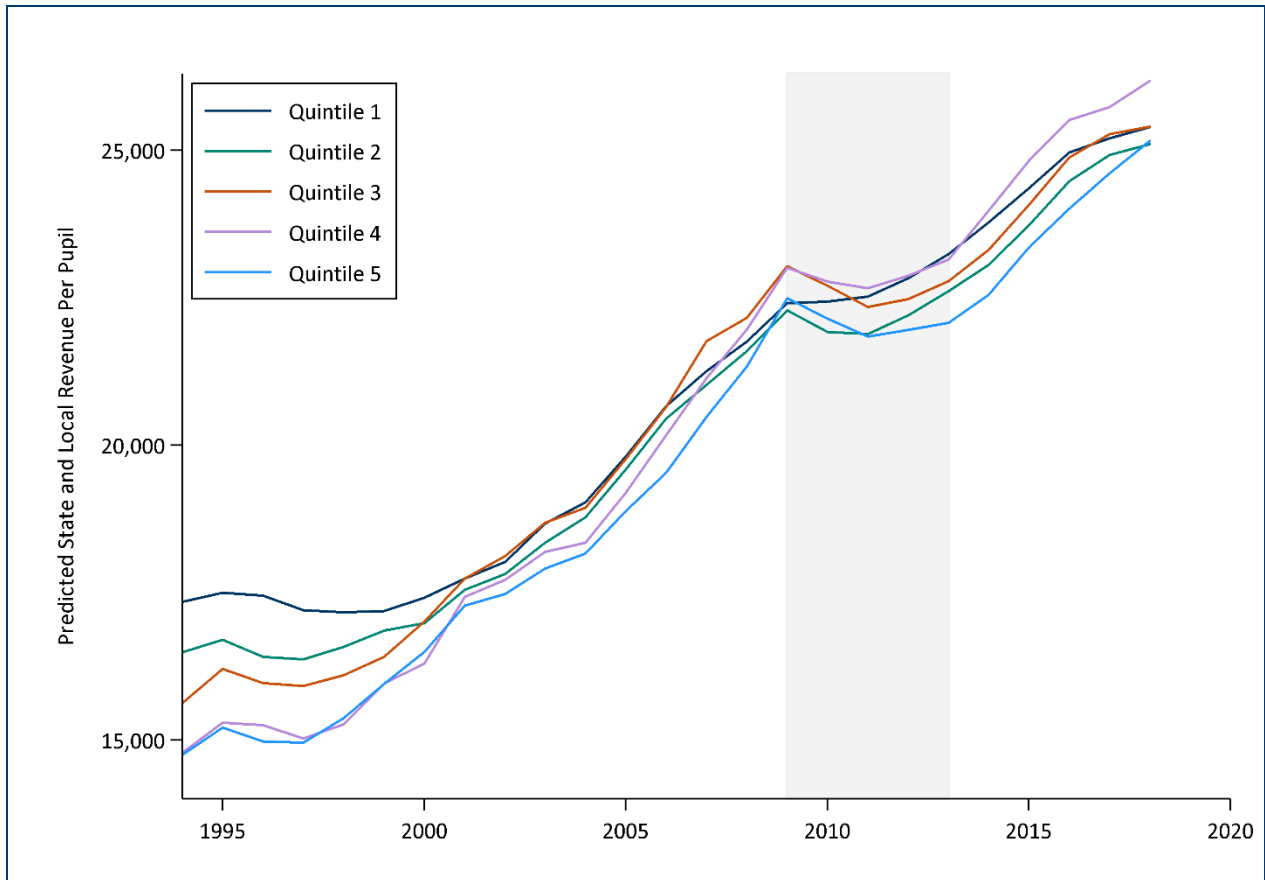
Exhibit 8. Trends in Total State Revenue Over Time



Note. Dollars are adjusted for inflation to 2019 dollars and are adjusted for regional cost variation. Predicted values control for population density and district size. Regressions are weighted by the square root of district enrollment. The total state revenue includes state aid and state revenue from the state's system of property tax relief (STAR). The gray shaded area represents recession years (FY 2009 through FY 2013).

When we examine combined state and local revenue per pupil over time, again we see that during the Great Recession (from 2009 to 2013), the lowest poverty districts (Quintile 1) fared the best (Exhibit 9). The increases in local revenue more than made up for the decreases in state revenue for the lowest poverty districts, and they did not face a single year of declining state and local revenue per pupil. In contrast, the highest poverty districts (Quintile 5) faced multiple years of declining state and local per-pupil revenue at the start of the Great Recession. While Quintiles 1 through 3 all began their recovery in 2011, substantially increasing their state and local revenue per pupil between 2011 and 2013, state and local revenue in the highest two quintiles of poverty was essentially flat over that time period. From 2014 to 2018, higher-poverty districts began to catch up due to substantial increases in state aid for those districts. However, by 2018, the highest poverty districts still received less in combined state and local revenue on a per-pupil basis than the lowest poverty districts.

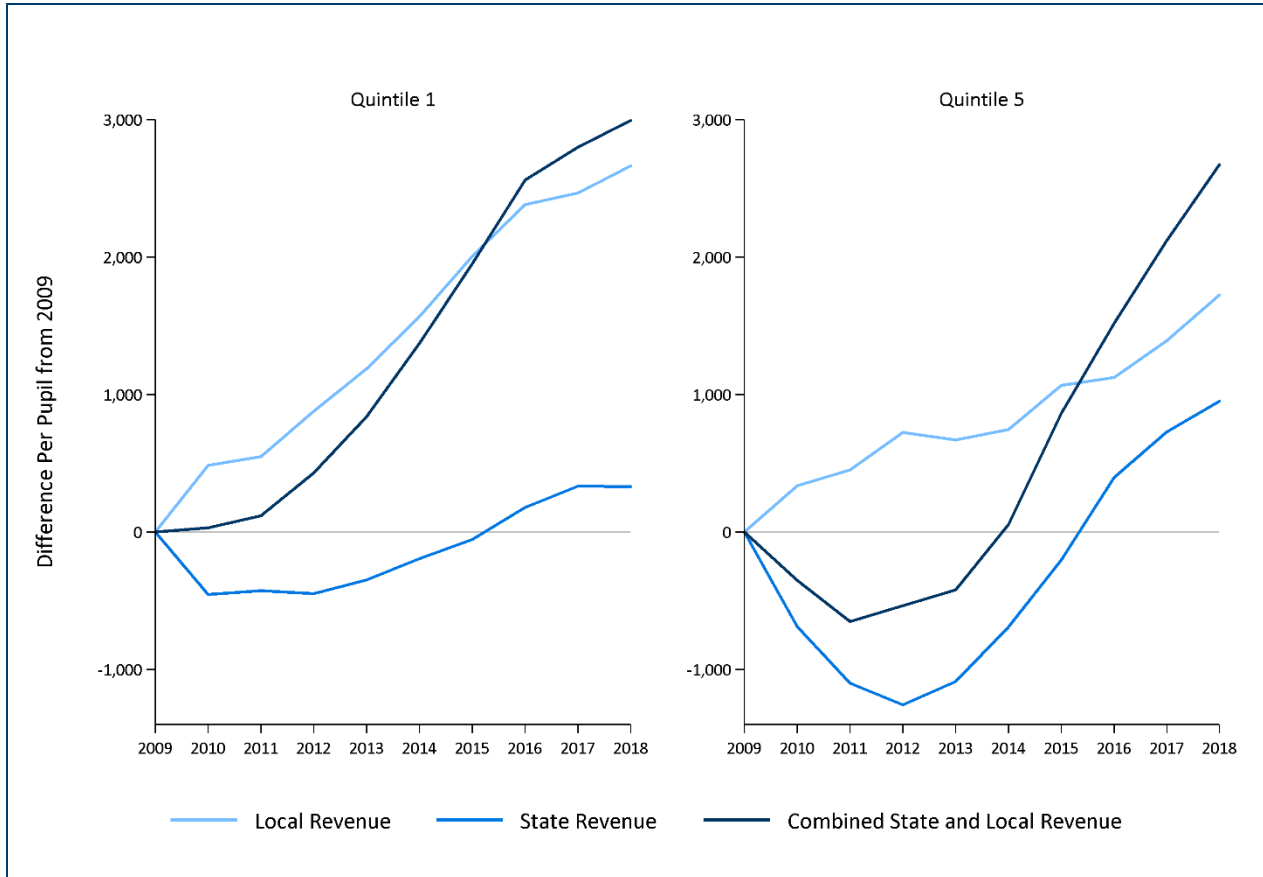
Exhibit 9. Trends in Total State and Local Revenue Over Time



Note. Dollars are adjusted for inflation to 2019 dollars and are adjusted for regional cost variation. Predicted values control for population density and district size. Regressions are weighted by the square root of district enrollment. The gray shaded area represents recession years (FY 2009 through FY 2013).

Exhibit 10 shows the change in average revenue per pupil by source for the lowest poverty (Quintile 1) and highest poverty (Quintile 5) districts. As previously described, the increases in local revenue for the lowest poverty districts (Quintile 1) more than compensated for declines in state revenue. State and local revenue in the lowest poverty districts in 2014 was more than \$1,000 per pupil higher than it was at the start of the Great Recession. In contrast, the increases in local revenue in the highest poverty districts (Quintile 5) were insufficient to overcome the decline in state revenue. For these districts, combined state and local revenue did not reach pre-recession levels until 2014.

Exhibit 10. Change in Local Revenue, State Revenue, and Combined State and Local Revenue Per Pupil Since 2009 for the First (Lowest Poverty) and Fifth (Highest Poverty) Quintiles



Note. Dollars are adjusted for inflation to 2019 dollars and are adjusted for regional cost variation. Predicted values control for population density and district size. Regressions are weighted by the square root of district enrollment.

Conclusion

To understand the effect of COVID-19 on district state aid budgets, I conducted a comparison of the Executive Budget projections, which were created before the COVID-19 pandemic, and the Enacted Budget projections, which were created after the COVID-19 pandemic. The Executive Budget gives us the best glimpse into how districts likely would have been funded in the absence of the COVID-19 crisis. However, the Executive Budget is likely conservative. For the past 2 years, the Enacted Budgets included far more state aid and Foundation Aid in particular than the Executive Budgets.

The analyses of New York budgets indicate that New York State's highest poverty districts are most affected by the COVID-19 crisis. Even with funding from the CARES Act, the differences between the two budgets are largest for high-poverty school districts. Including funds from the CARES Act, high-poverty districts will receive \$230 less per student, on average, than what they

would have received under the Executive Budget. For low-poverty districts, the difference is only approximately \$30 to \$40 per student, on average.

Because New York cut state aid dollar for dollar with the federal CARES Act dollars that districts receive, when CARES Act is excluded from the comparison, high-poverty districts saw substantially more drastic declines in budgeted state aid from the Executive to Enacted Budgets. Without CARES Act funding, the highest poverty districts will receive approximately \$800 per student less in state aid, on average, in the Enacted Budget than in the Executive Budget. In contrast, the magnitude of the difference between budgets for the lowest poverty districts was less than \$100, on average.

Furthermore, a longitudinal analysis of revenues raised by districts during the Great Recession suggests that the lowest poverty districts have traditionally been better equipped to weather a recession due to their ability to raise more local revenue, which was not drastically affected during the Great Recession. During the Great Recession, the lowest poverty districts were able to fully offset the minimal cuts to their state revenue with increases to local revenue and did not face a single year of declining revenue during the Great Recession. In contrast, the highest poverty districts faced steep cuts to state revenue and the increases in local revenue experienced by high-poverty districts were not large enough to offset the cuts to state revenue.

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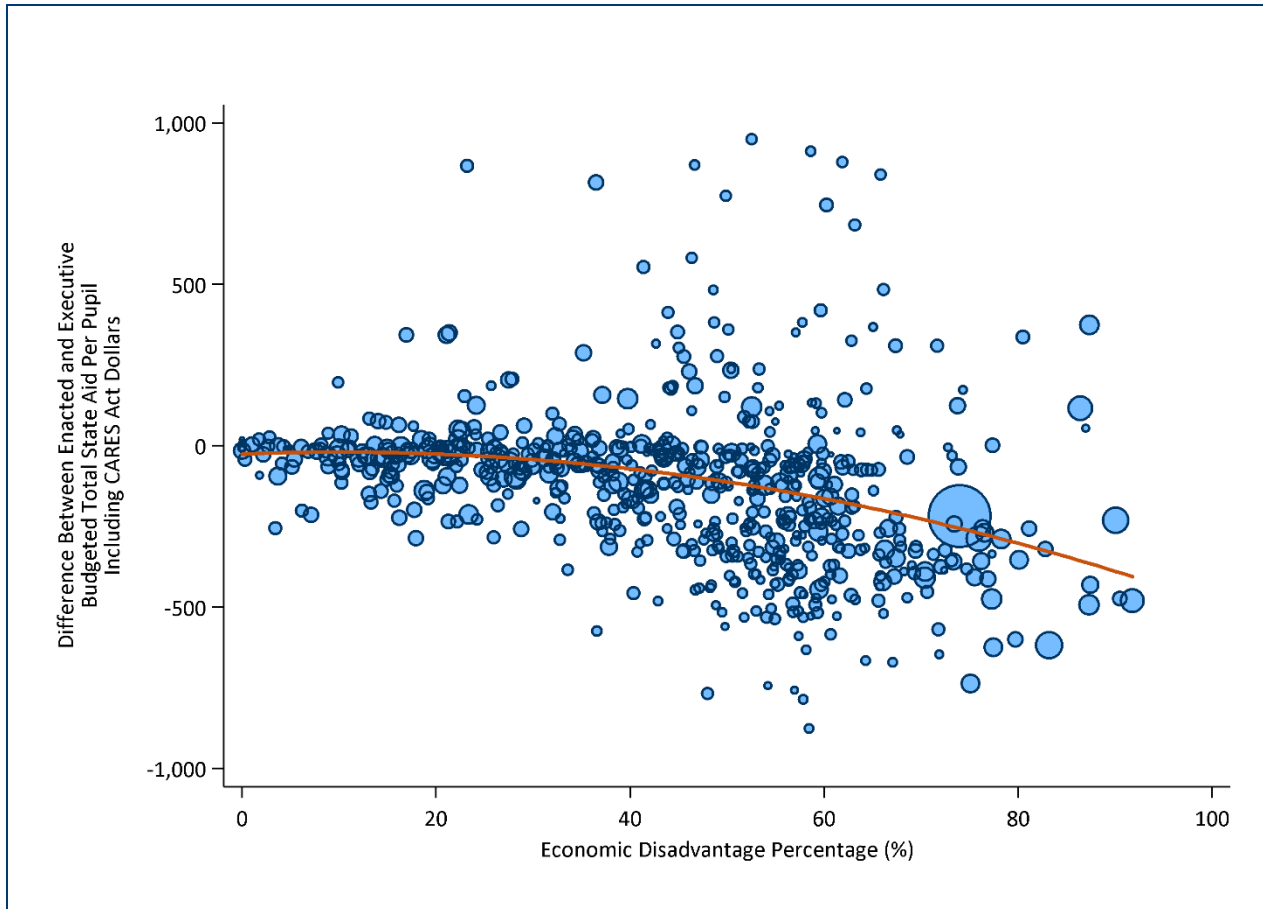
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Appendix A. Additional Figures

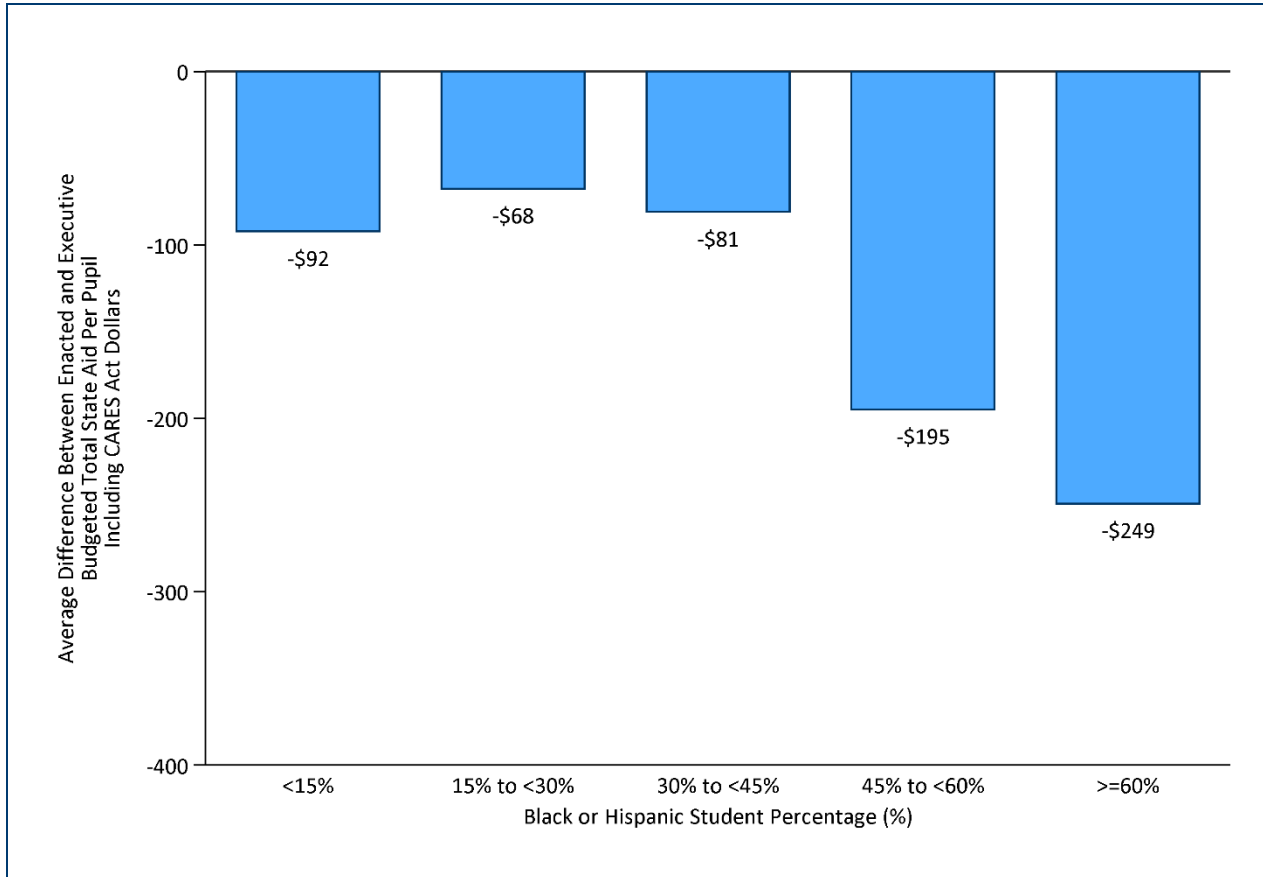
Comparison of Enacted Education Budget With Executive Budget Proposal

Exhibit A1. Scatter of Differences in Total State Aid Per Pupil Including Federal CARES Act Dollars Between the Two Budgets by Economic Disadvantage



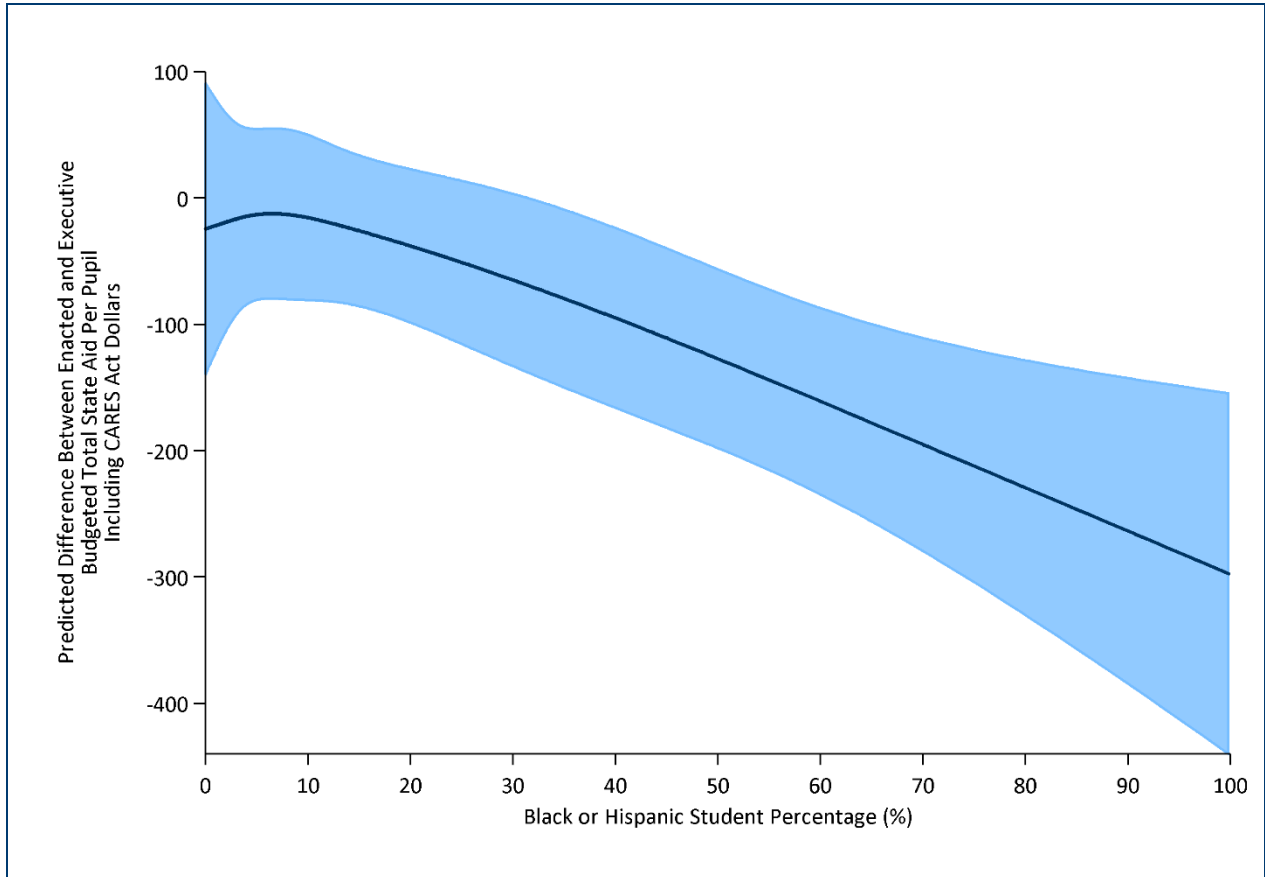
Note. Dollars are adjusted for regional cost variation. The scatters and quadratic fit line are weighted by the square root of enrollment.

Exhibit A2. Average Difference in Total State Aid Per Pupil Including Federal CARES Act Dollars Between the Two Budgets by Race/Ethnicity



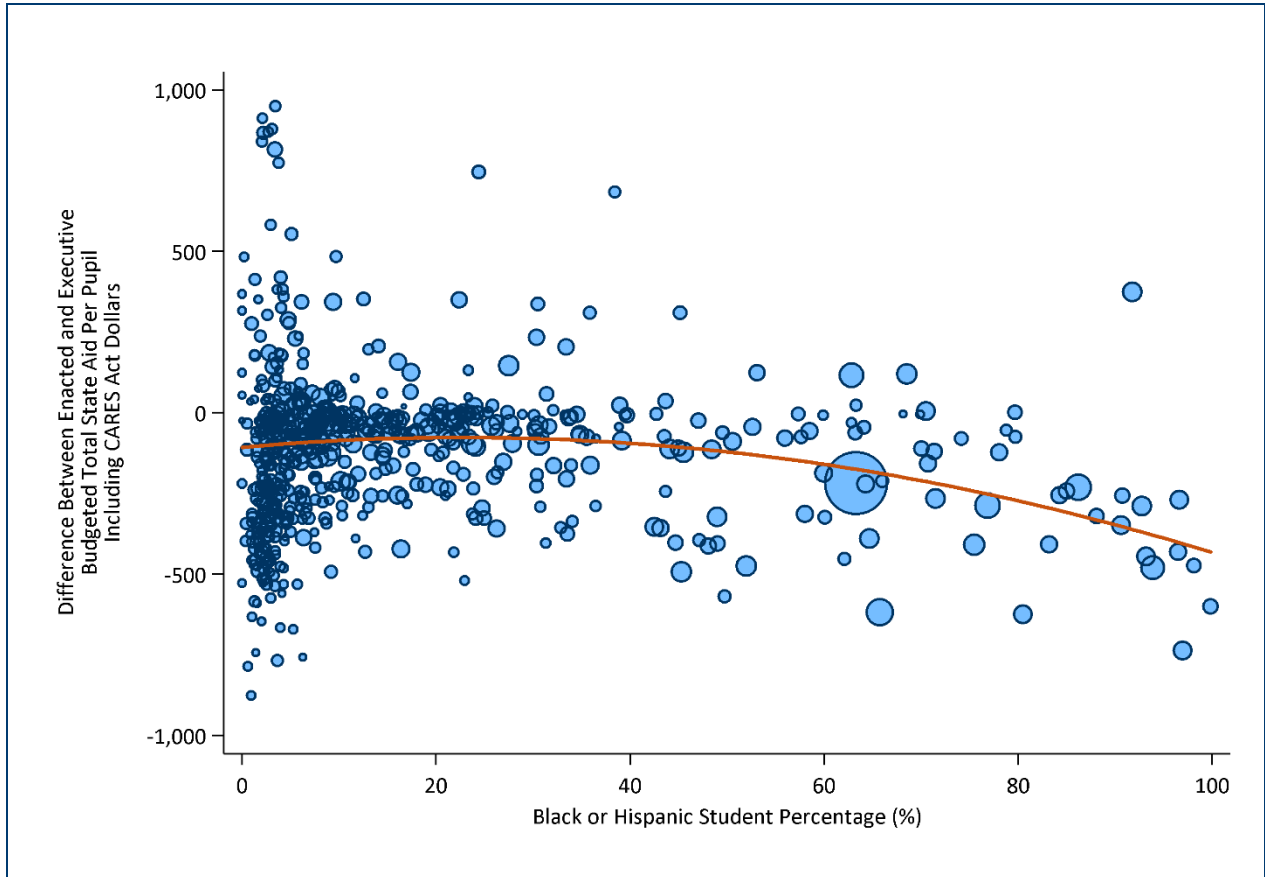
Note. Dollars are adjusted for regional cost variation. Averages are weighted by the square root of enrollment.

Exhibit A3. Predicted Difference in Total State Aid Per Pupil Including Federal CARES Act Dollars Between the Two Budgets by Race/Ethnicity



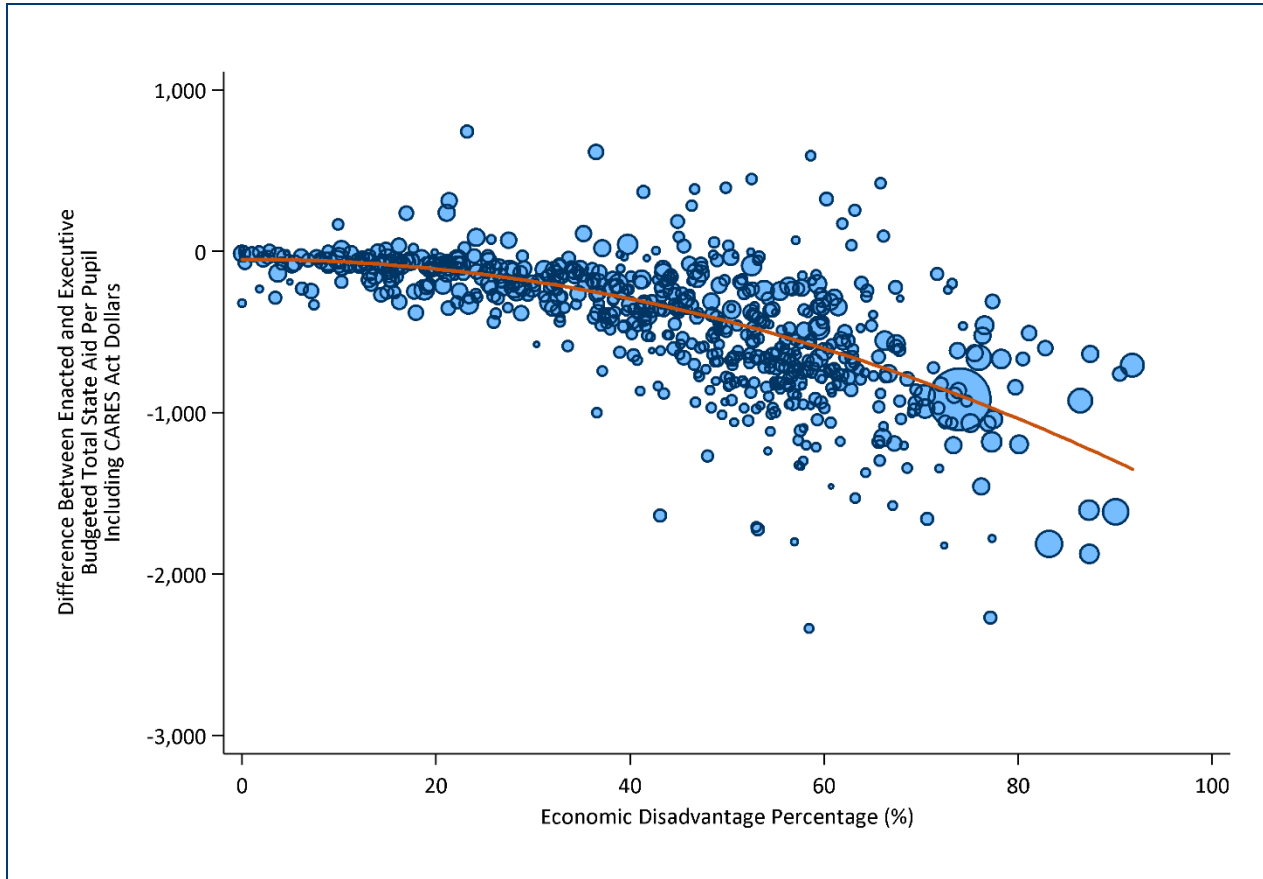
Note. Dollars are adjusted for regional cost variation. The model controls for the size of districts, population density of the location of the district, percentage of English learners, and percentage of students with disabilities. Estimated using spline regression with four knots. Regression is not weighted.

Exhibit A4. Scatter of Differences in Total State Aid Per Pupil Including Federal CARES Act Dollars Between the Two Budgets by Race/Ethnicity



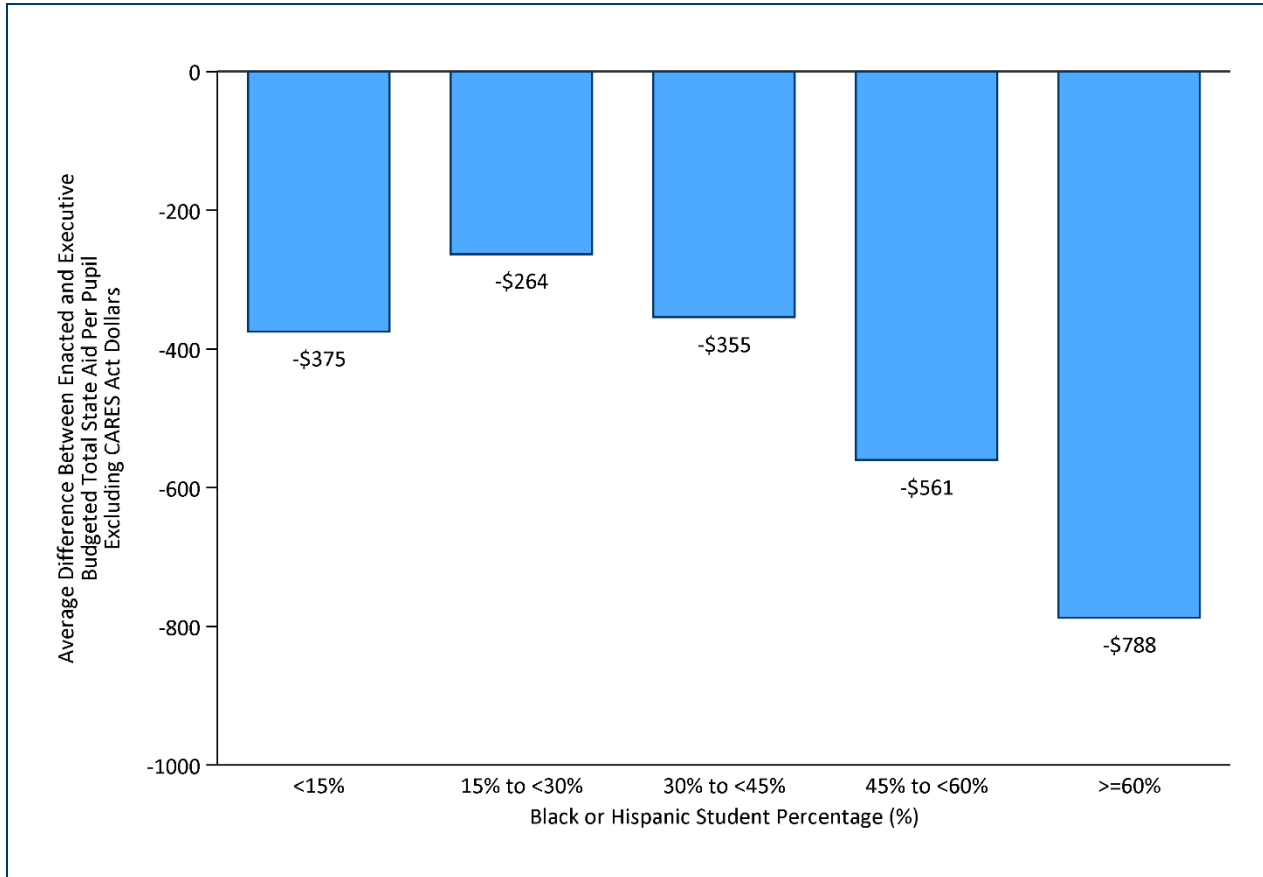
Note. Dollars are adjusted for regional cost variation. The scatters and quadratic fit line are weighted by the square root of enrollment.

Exhibit A5. Scatter of Differences in Total State Aid Per Pupil Excluding Federal CARES Act Dollars Between the Two Budgets by Economic Disadvantage



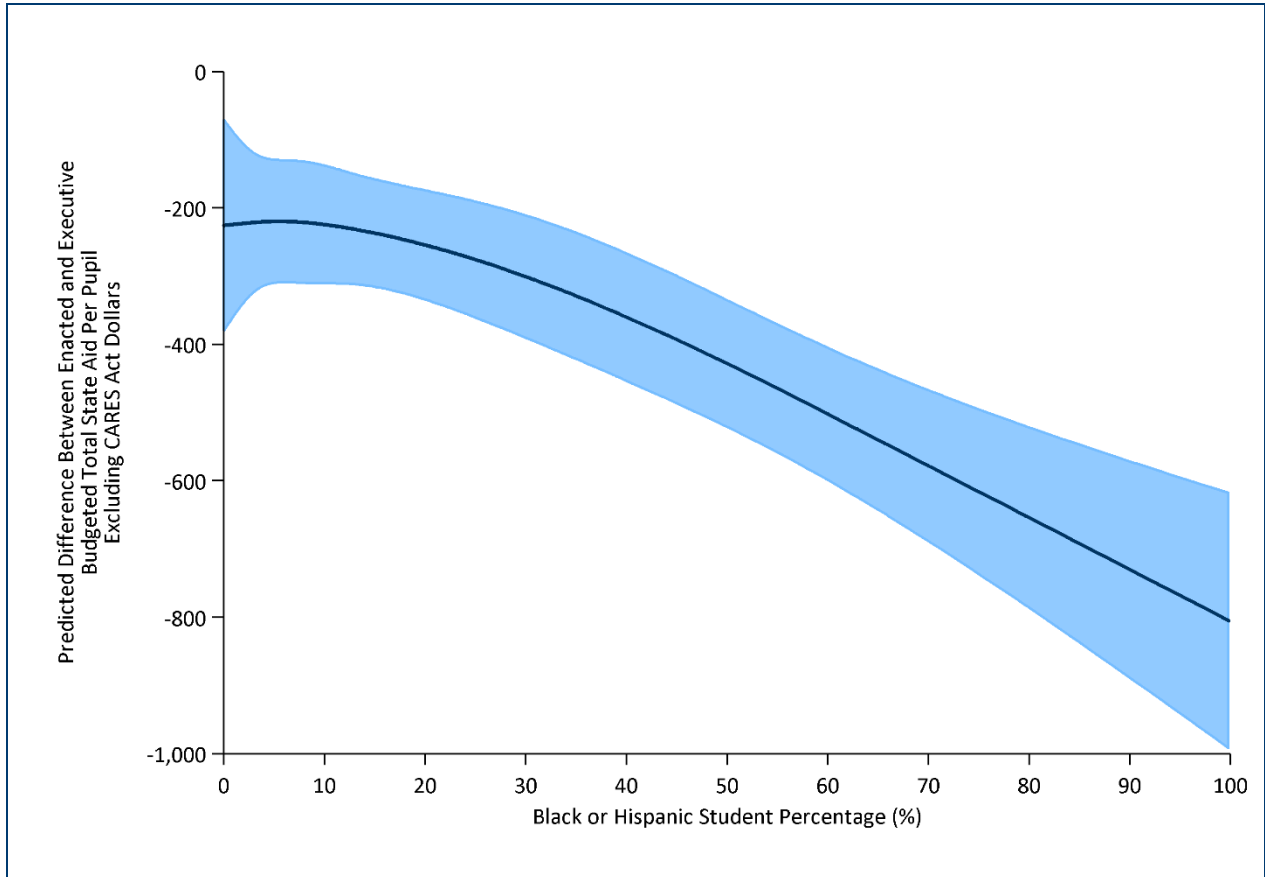
Note. Dollars are adjusted for regional cost variation. The scatters and quadratic fit line are weighted by the square root of enrollment.

Exhibit A6. Average Difference in Total State Aid Per Pupil Excluding Federal CARES Act Dollars Between the Two Budgets by Race/Ethnicity



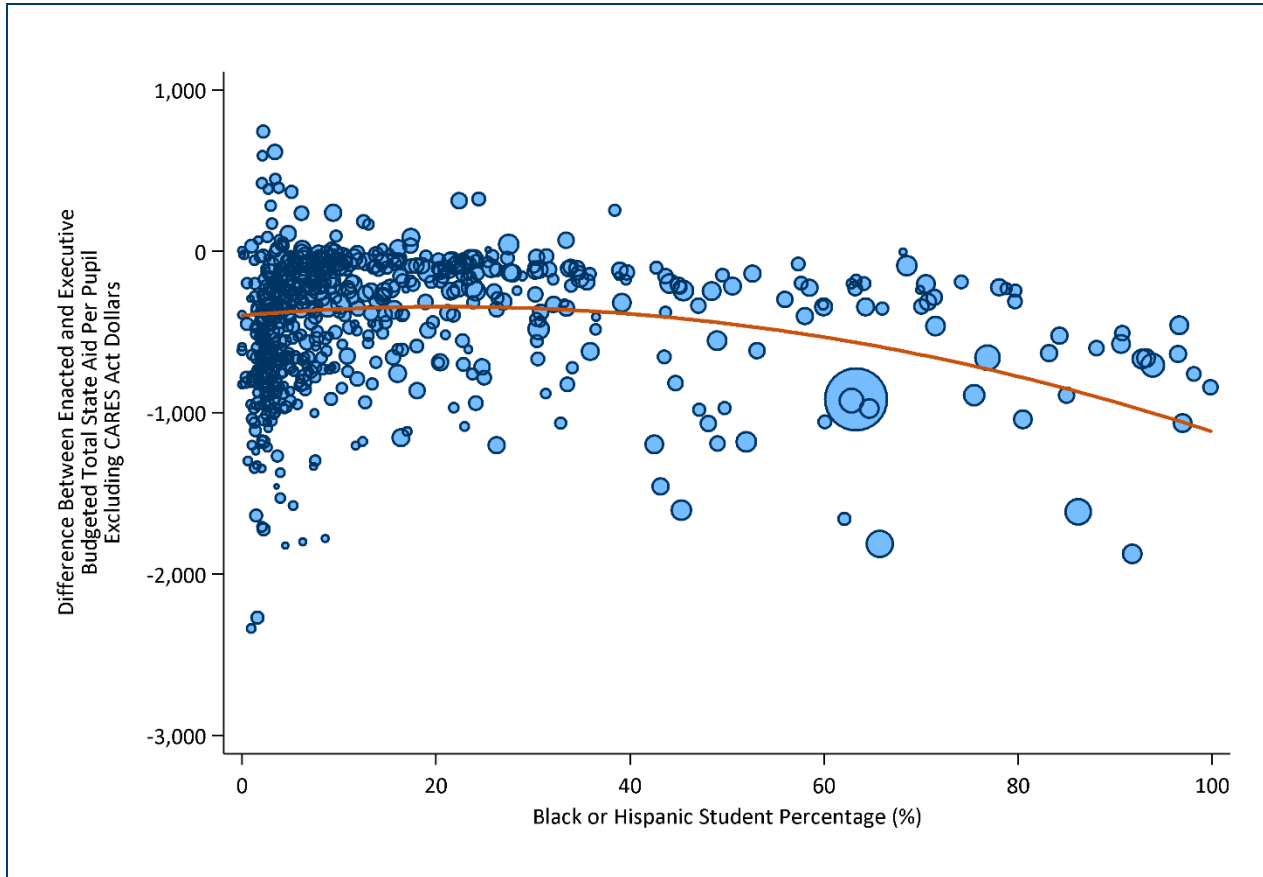
Note. Dollars are adjusted for regional cost variation. Averages are weighted by the square root of enrollment.

Exhibit A7. Predicted Difference in Total State Aid Per Pupil Excluding Federal CARES Act Dollars Between the Two Budgets by Race/Ethnicity



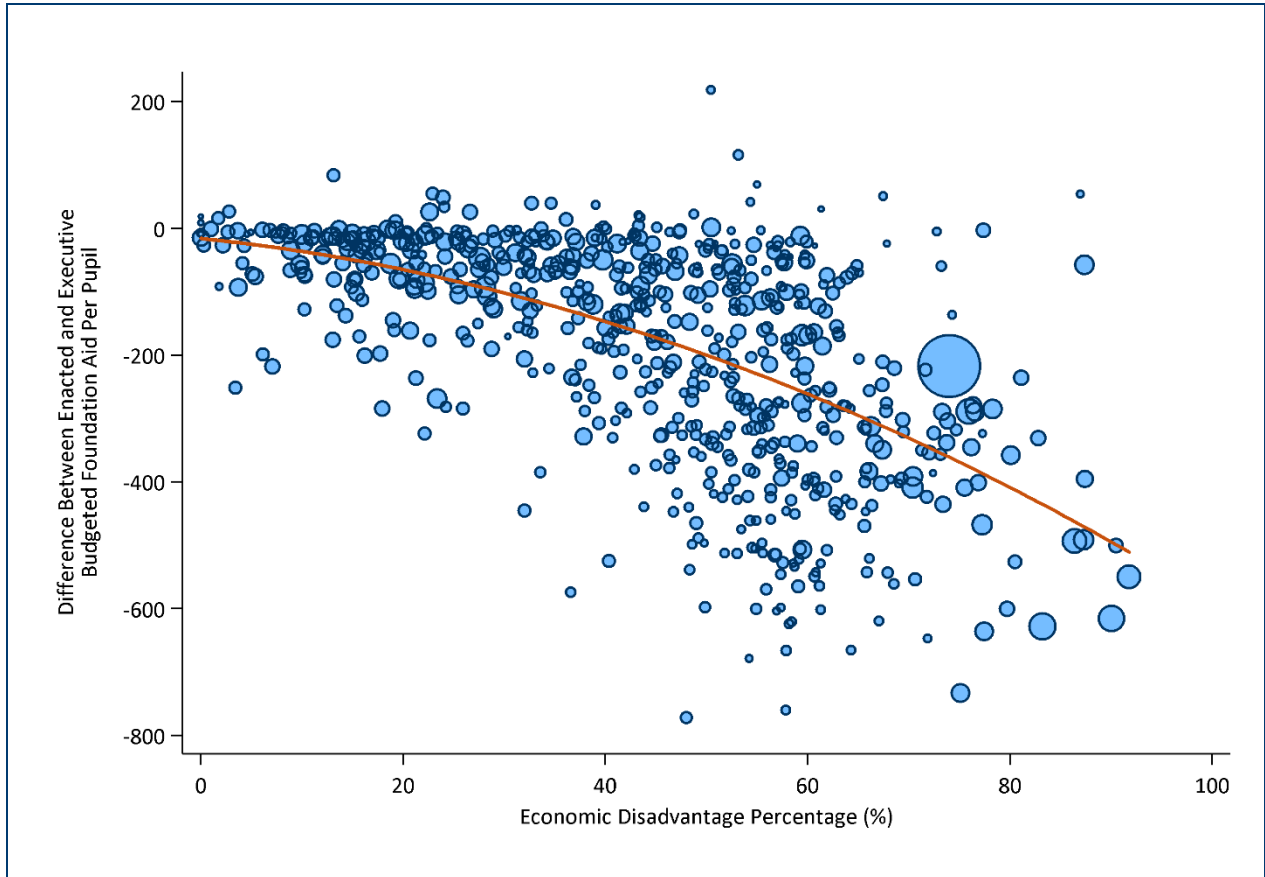
Note. Dollars are adjusted for regional cost variation. The model controls for the size of districts, population density of the location of the district, percentage of English learners, and percentage of students with disabilities. Estimated using spline regression with four knots. Regression is not weighted.

Exhibit A8. Scatter of Differences in Total State Aid Per Pupil Excluding Federal CARES Act Dollars Between the Two Budgets by Race/Ethnicity



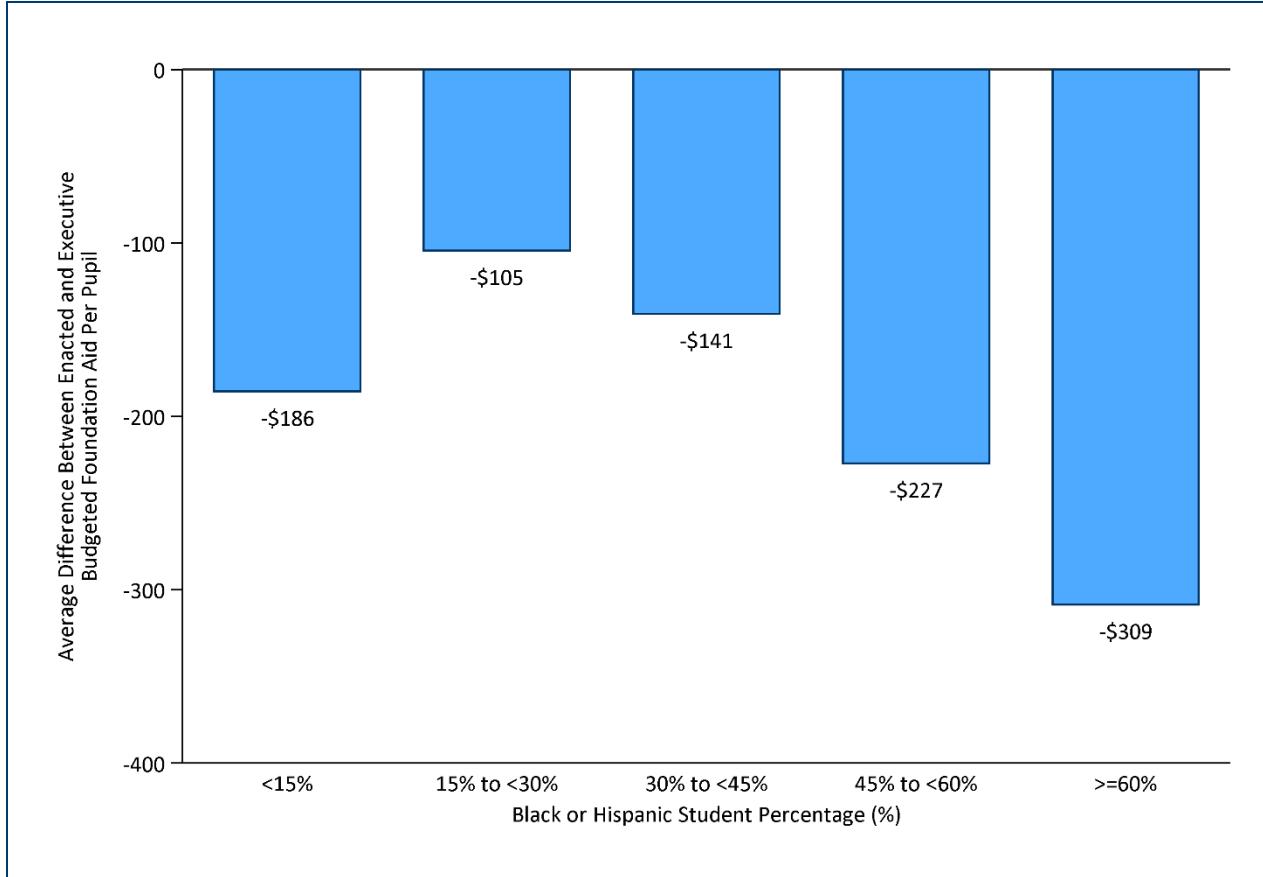
Note. Dollars are adjusted for regional cost variation. The scatters and quadratic fit line are weighted by the square root of enrollment.

Exhibit A9. Scatter of Differences in Foundation Aid Between the Two Budgets by Economic Disadvantage



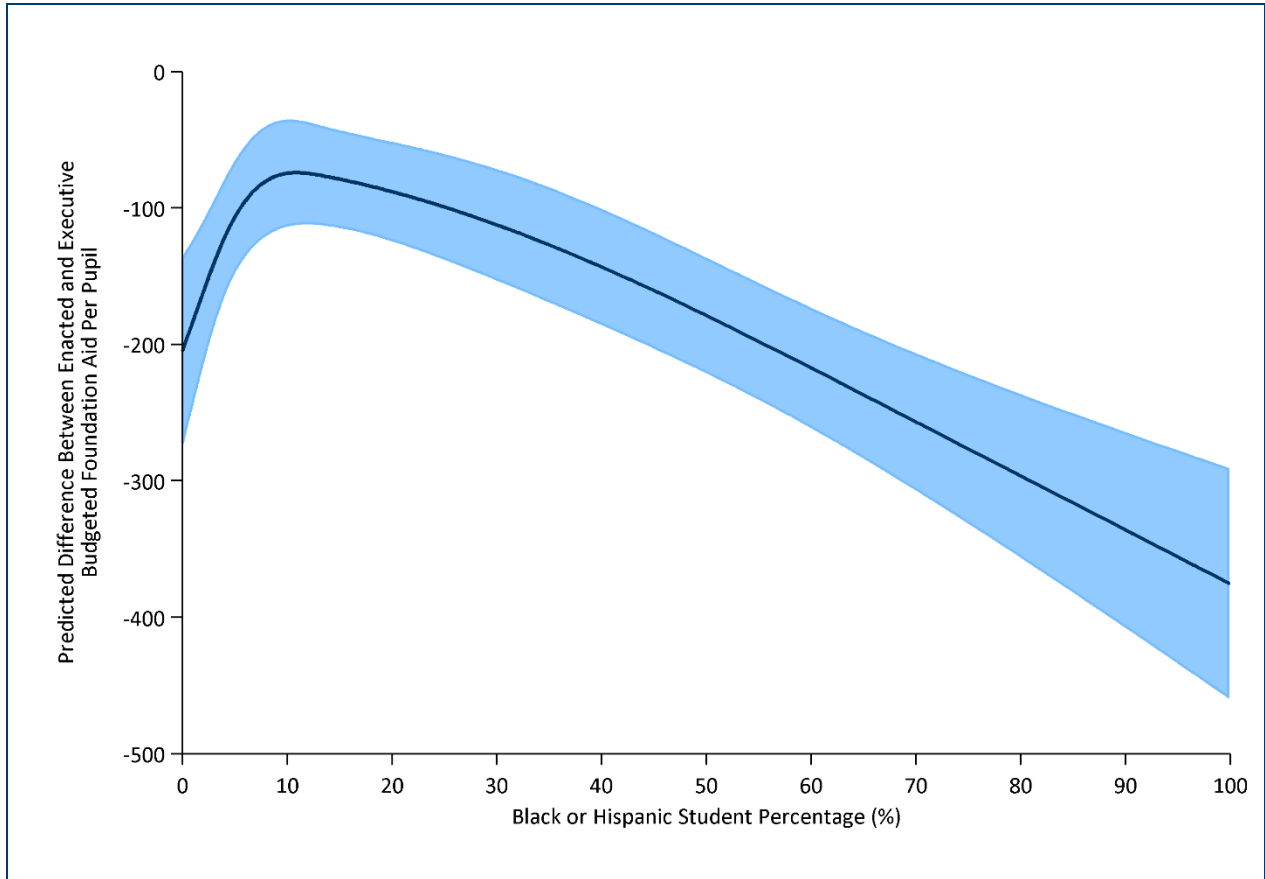
Note. Dollars are adjusted for regional cost variation. The scatters and quadratic fit line are weighted by the square root of enrollment. Foundation Aid in the Executive Budget was inclusive of funding for BOCES, high tax aid, special services, charter school transitional, hardware and technology, software, library and textbooks, supplemental public excess cost, and academic enhancement funding. Therefore, these categories are included with Foundation Aid for the purpose of this analysis.

Exhibit A10. Average Difference in Foundation Aid Between the Two Budgets by Race/Ethnicity



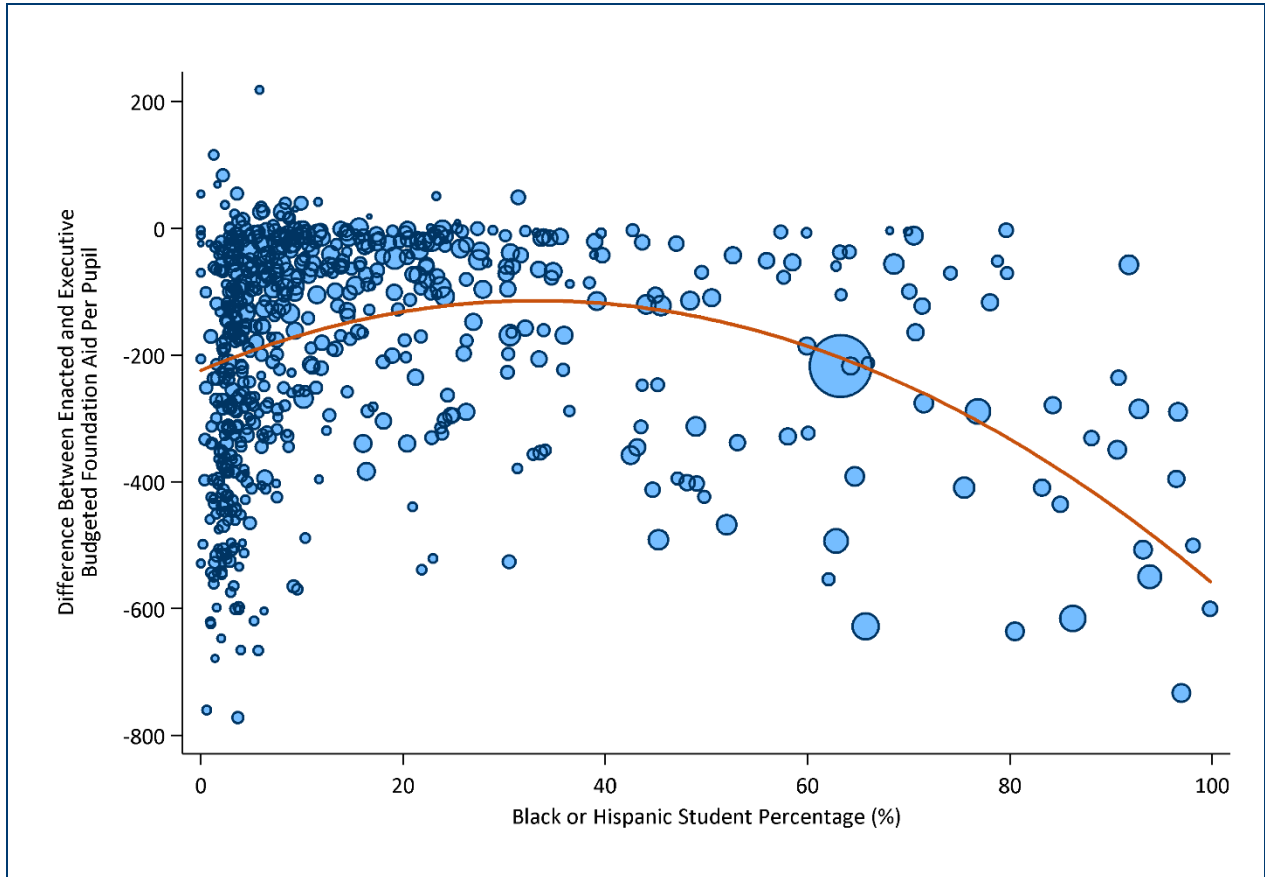
Note. Dollars are adjusted for regional cost variation. Averages are weighted by the square root of enrollment. Foundation Aid in the Executive Budget was inclusive of funding for BOCES, high tax aid, special services, charter school transitional, hardware and technology, software, library and textbooks, supplemental public excess cost, and academic enhancement funding. Therefore, these categories are included with Foundation Aid for the purpose of this analysis.

Exhibit A11. Predicted Difference in Foundation Aid Between the Two Budgets by Race/Ethnicity



Note. Dollars are adjusted for regional cost variation. The model controls for the size of districts, population density of the location of the district, and percentage of students with disabilities. Estimated using spline regression with four knots. Regression is not weighted. Foundation Aid in the Executive Budget was inclusive of funding for BOCES; high tax aid; special services; charter school transitional; hardware and technology; software, library, and textbooks; supplemental public excess cost; and academic enhancement funding. Therefore, these categories are included with Foundation Aid for the purpose of this analysis.

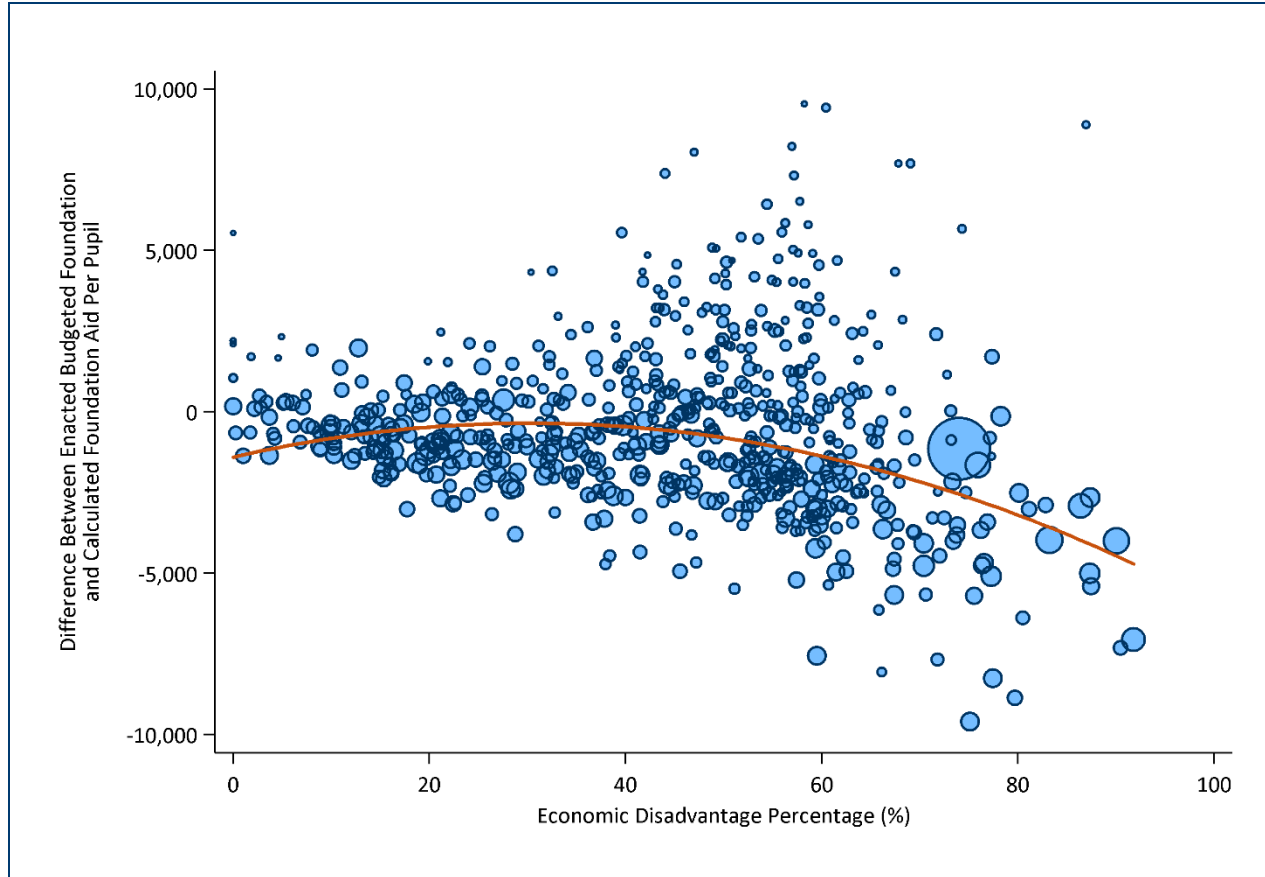
Exhibit A12. Scatter of Differences in Foundation Aid Between the Two Budgets by Race/Ethnicity



Note. Dollars are adjusted for regional cost variation. The scatters and quadratic fit line are weighted by the square root of enrollment. Foundation Aid in the Executive Budget was inclusive of funding for BOCES; high tax aid; special services; charter school transitional; hardware and technology; software, library, and textbooks; supplemental public excess cost; and academic enhancement funding. Therefore, these categories are included with Foundation Aid for the purpose of this analysis.

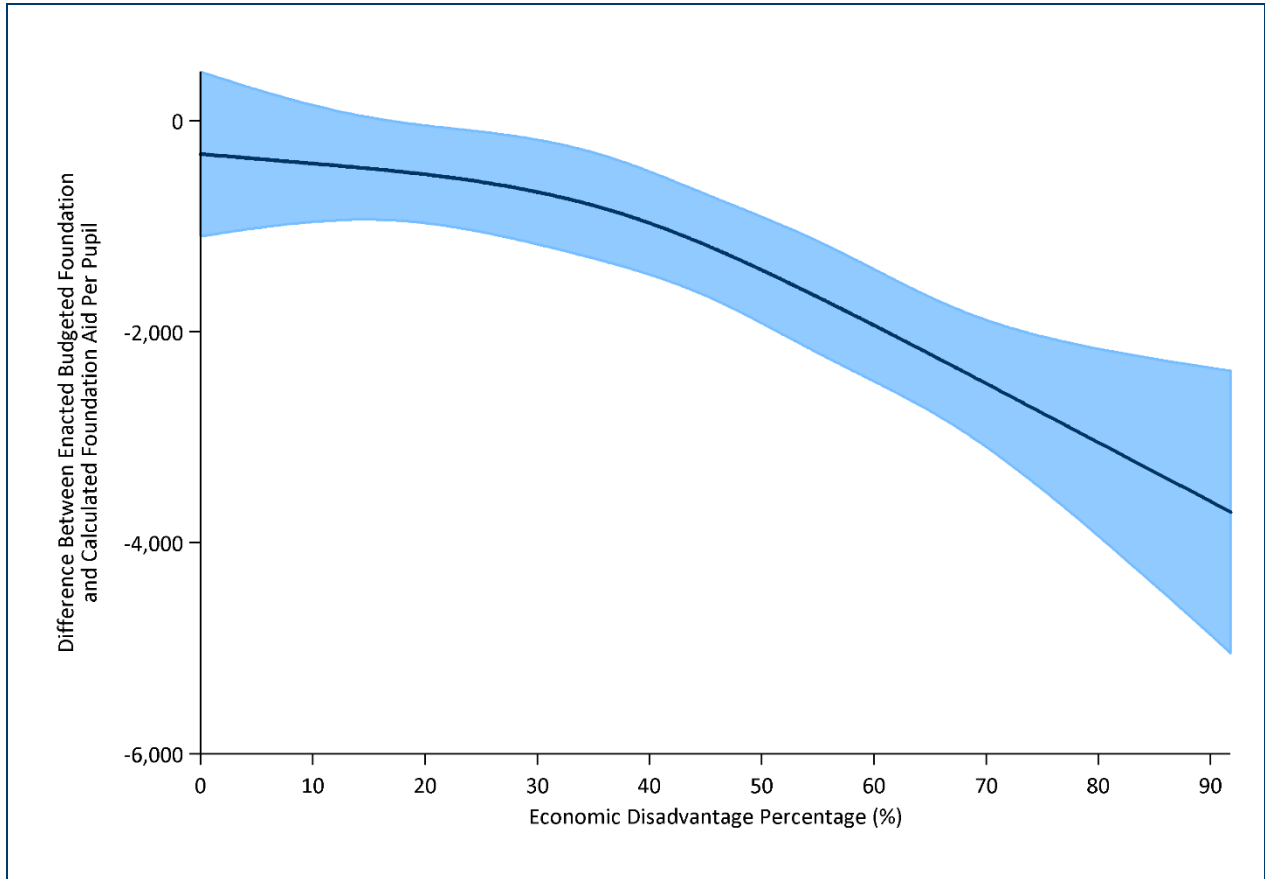
Comparison of Enacted Education Budget With Foundation Aid Goals

Exhibit A13. Scatter of Differences Between Budgeted Foundation Aid and Foundation Aid Goals by Economic Disadvantage



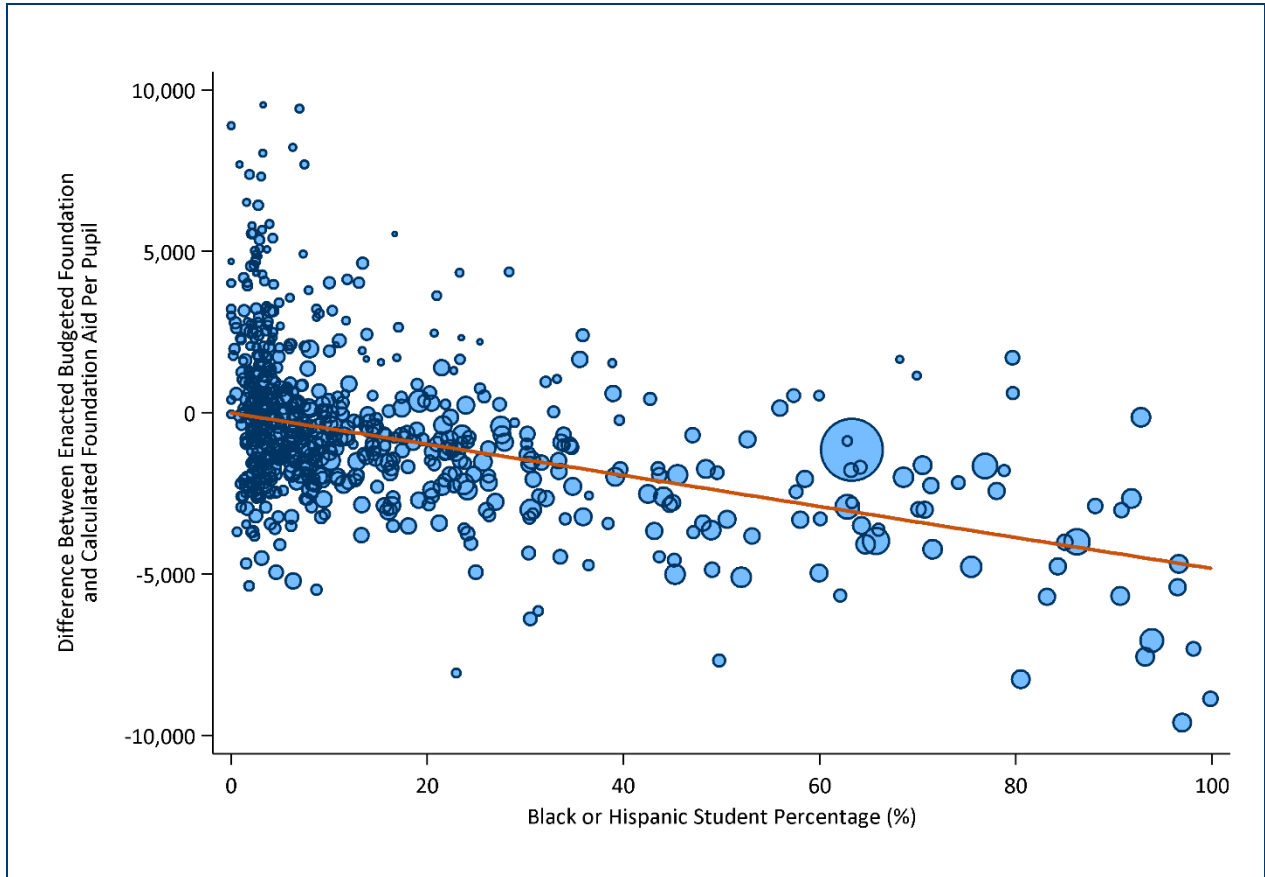
Note. Dollars are adjusted for regional cost variation. The scatters and quadratic fit line are weighted by the square root of enrollment.

Exhibit A14. Predicted Difference Between Budgeted Foundation Aid and Foundation Aid Goals by Economic Disadvantage



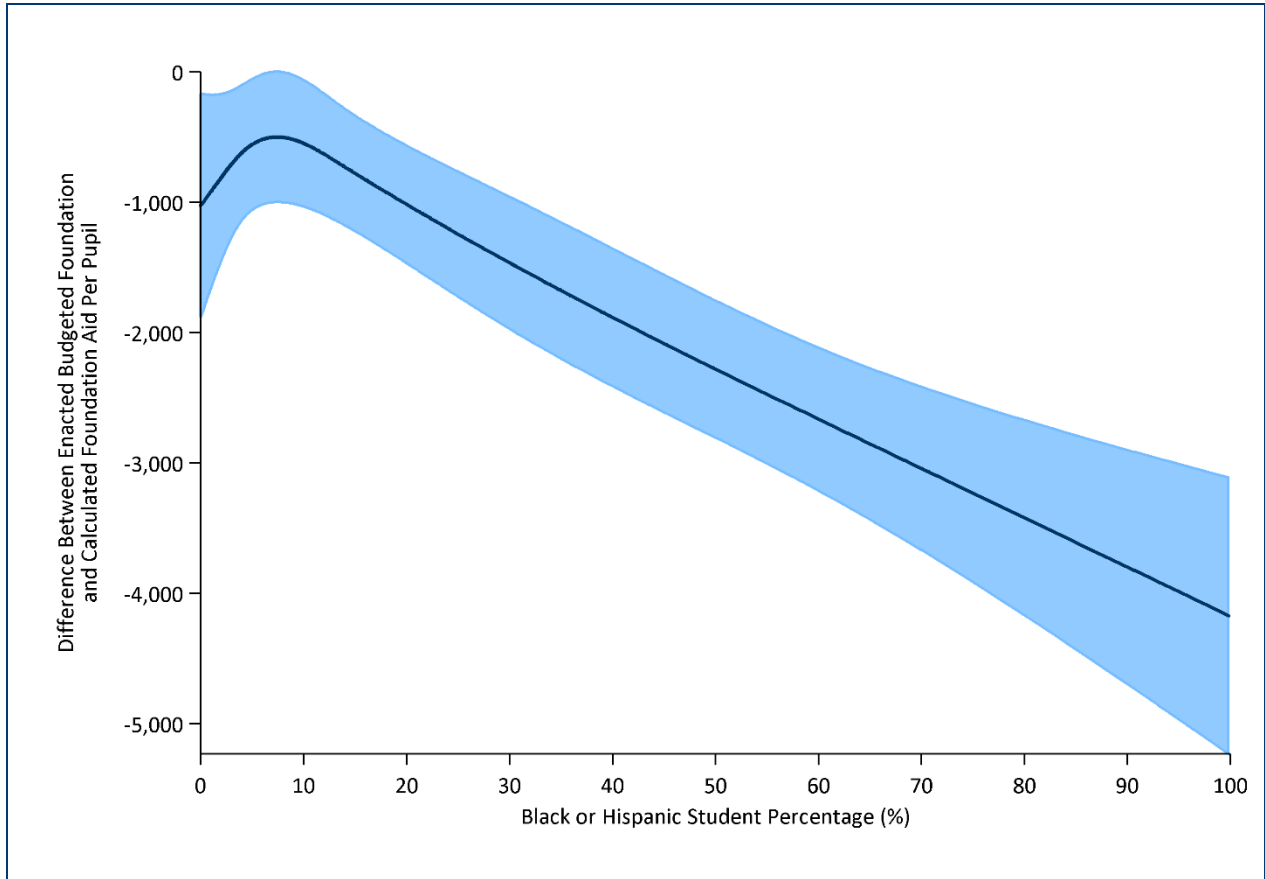
Note. Dollars are adjusted for regional cost variation. The model controls for the size of districts, population density of the location of the district, percentage of English learners, and percentage of students with disabilities. Estimated using spline regression with four knots. Regression is not weighted.

Exhibit A15. Scatter of Differences Between Budgeted Foundation Aid and Foundation Aid Goals by Race/Ethnicity



Note. Dollars are adjusted for regional cost variation. The scatters and quadratic fit line are weighted by the square root of enrollment.

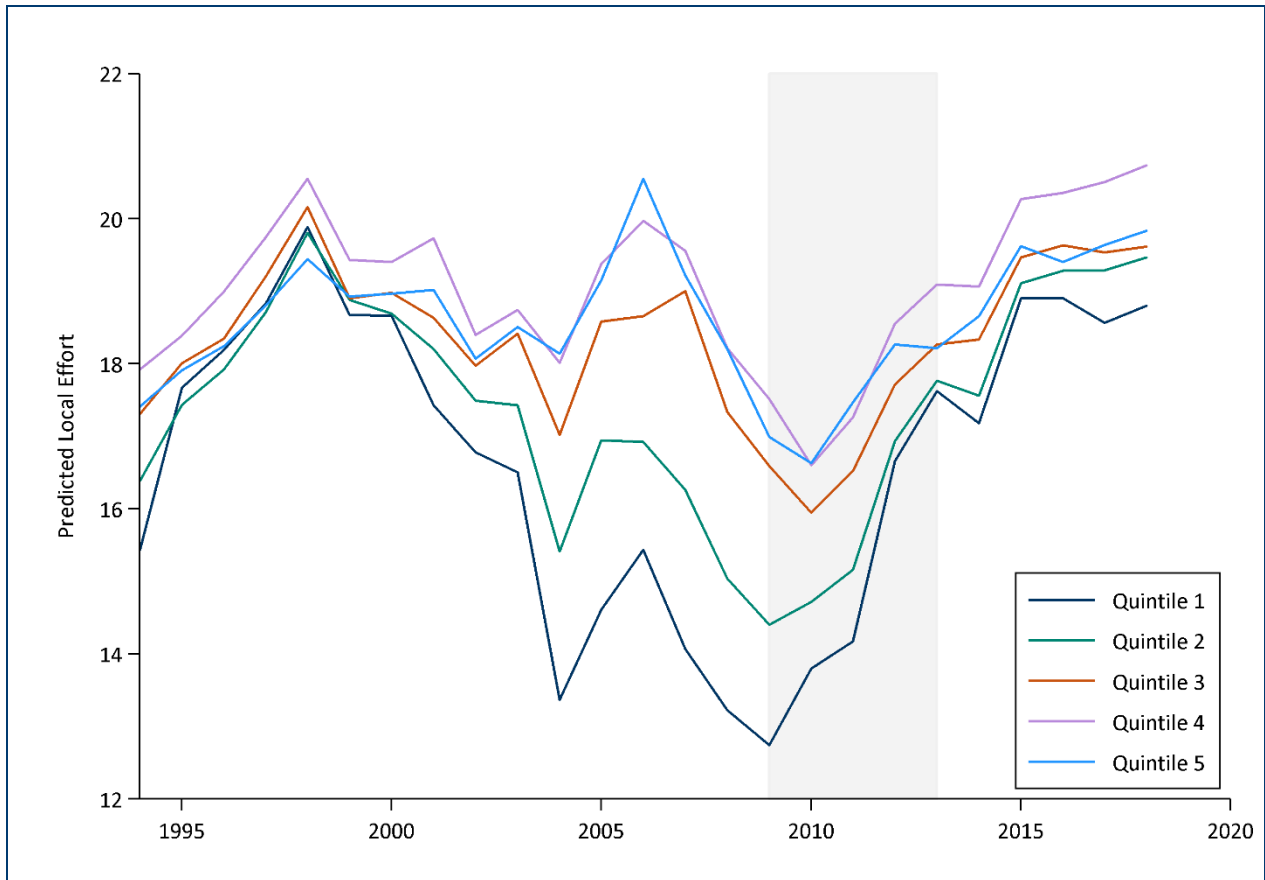
Exhibit A16. Predicted Difference Between Budgeted Foundation Aid and Foundation Aid Goals by Race/Ethnicity



Note. Dollars are adjusted for regional cost variation. The model controls for the size of districts, population density of the location of the district, and percentage of students with disabilities. Estimated using spline regression with four knots. Regression is not weighted.

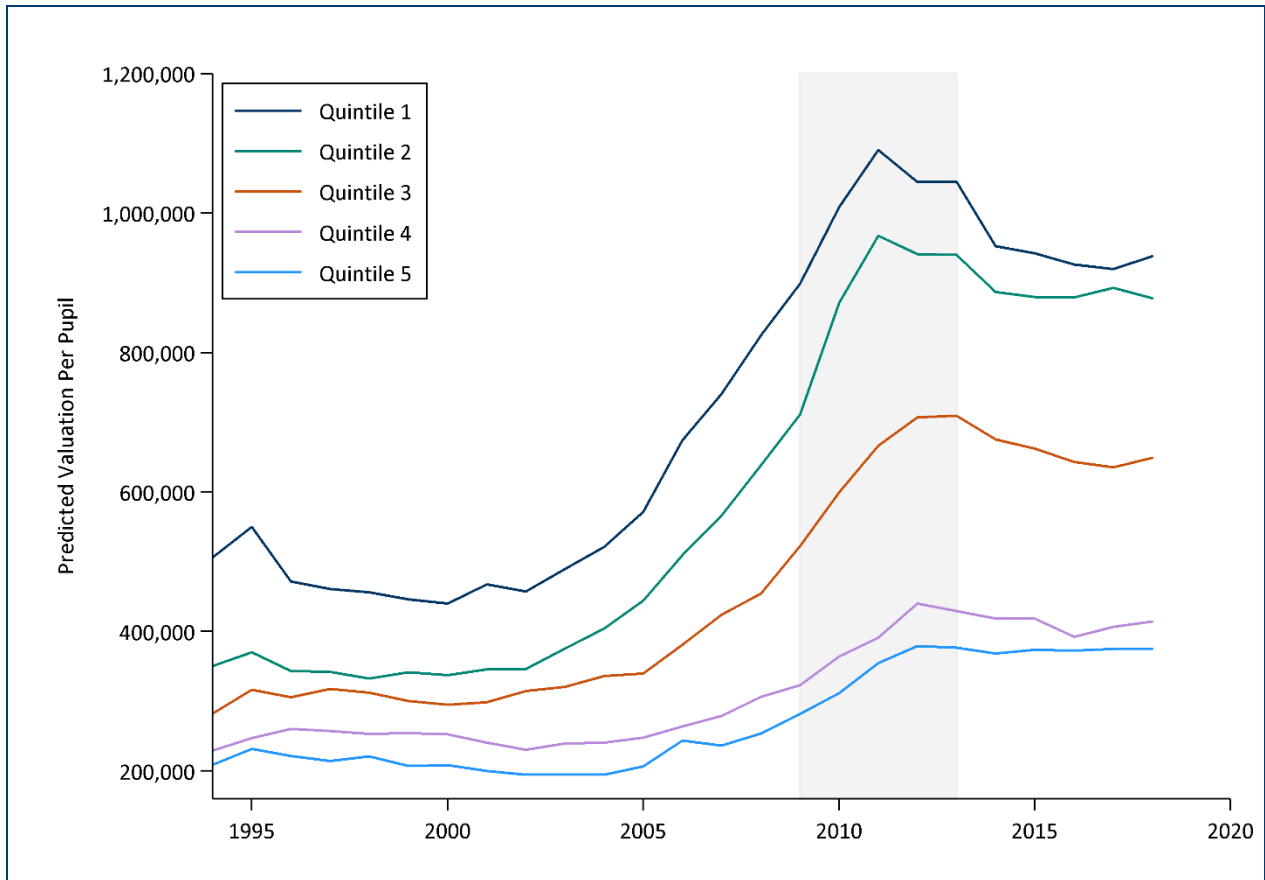
Longitudinal Analysis of Trends in New York

Exhibit A17. Trends in Local Effort Over Time



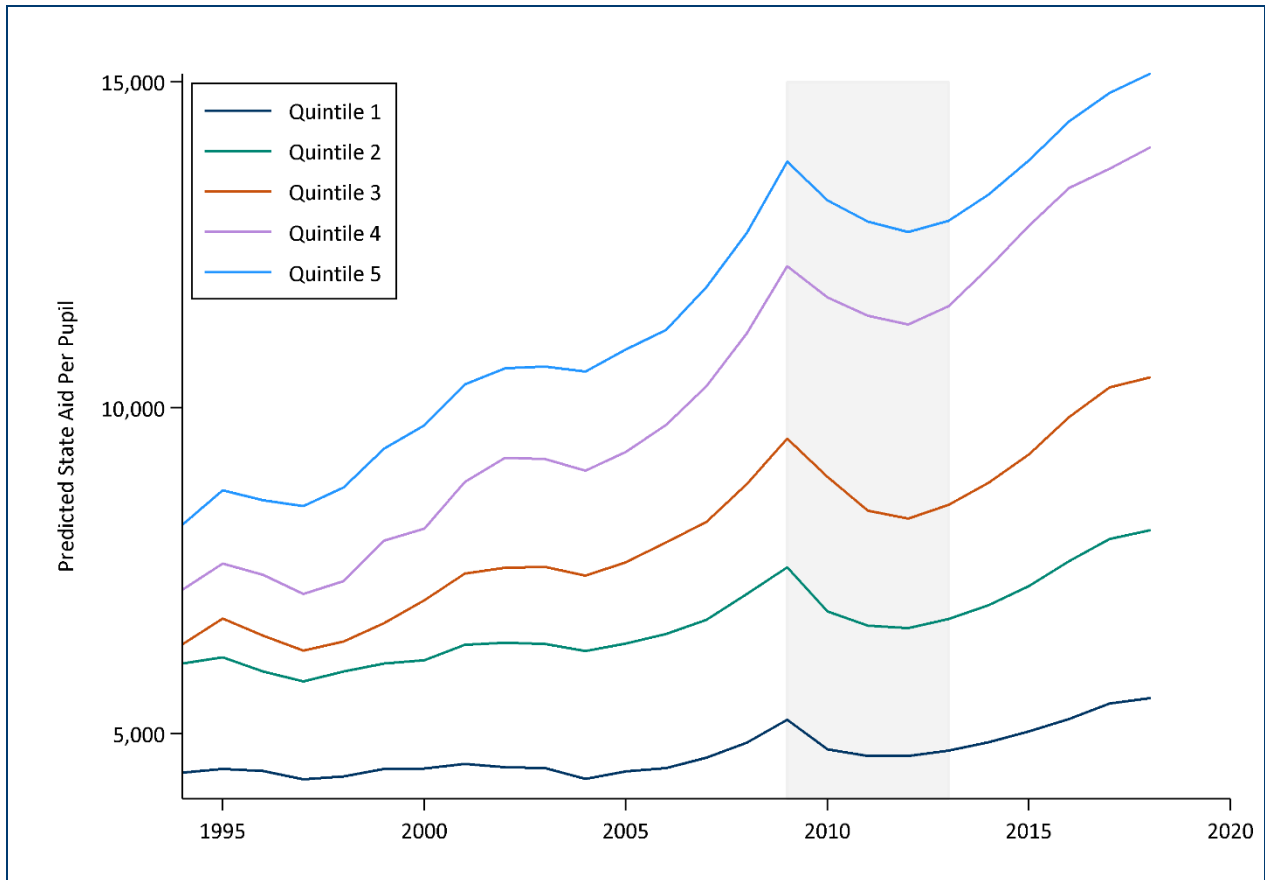
Note. Predicted values control for population density and district size. Regressions are weighted by the square root of district enrollment. The gray shaded area represents recession years (FY 2009 through FY 2013).

Exhibit A18. Trends in Property Valuation Over Time



Note. Dollars are adjusted for inflation to 2019 dollars and are adjusted for regional cost variation. The predicted values control for population density and district size. Regressions are weighted by the square root of district enrollment. The gray shaded area represents recession years (FY 2009 through FY 2013).

Exhibit A19. Trends in State Aid Over Time



Note. Dollars are adjusted for inflation to 2019 dollars and are also adjusted for regional cost variation. The predicted values control for population density and district size. Regressions are weighted by the square root of district enrollment. State aid does not include state revenue from the state's system of property tax relief (STAR). The gray shaded area represents recession years (FY 2009 through FY 2013).

Appendix B. Data and Methods

Budget Analysis Data and Methods

For the comparison of Executive and Enacted Budgets, I used district-level state aid projections published by the New York State Education Department (NYSED).¹ I supplemented these data with data on enrollments and student demographics for the 2018–19 school year from the NYSED data site (<https://data.nysed.gov/>) and variables on other district characteristics, such as population density, from the School Finance Indicators Database (<http://schoolfinancedata.org/>).

I converted total budgets into per-pupil dollars and adjusted all figures for geographic cost differences using Lori Taylor's ACS-based Comparable Wage Index (CWI).² I then calculated differences between figures in the Executive Budget and Enacted Budget for total state aid inclusive of CARES Act funds in the Enacted Budget, total state aid exclusive of CARES Act funds in the Enacted Budget, and Foundation Aid. Foundation Aid in the Executive Budget was inclusive of funding for BOCES; high tax aid; special services; charter school transitional; hardware and technology; software, library, and textbooks; supplemental public excess cost; and academic enhancement funding. Therefore, these categories are included with Foundation Aid for the purpose of calculating the difference between the two budgets.

I then examined the variation in the differences between the two budgets with respect to percentages of economically disadvantaged students and Black or Hispanic students. I used three approaches for this analysis. First, I created scatter plots showing the relationship between the difference in state aid and student demographics by economic disadvantage or race/ethnicity. Through the scatter plots, I fit a quadratic fit line. Second, I placed districts into five groups based on the percentage of economically disadvantaged or Black or Hispanic students. I then constructed bar graphs showing the average difference between the two budgets across these five groups of districts. Last, I performed regression analysis to examine the relationship between the difference between the budgets and economic disadvantage or Black or Hispanic percentage. The regressions controlled for district size, population density, percentage of English learners, and percentage of students with disabilities. I modeled the relationship of interest flexibly using cubic splines with four knots and allowed Stata to select the optimal placement of the knots.³

¹ An example of the Executive Budget projections for Albany, see <http://www.nysed.gov/STATEAID/DIST/exec20/010100.html>. For an example of the Legislated Budget projections for Albany, see <http://www.nysed.gov/STATEAID/DIST/legis20/010100.html>.

² See https://bush.tamu.edu/research/faculty/Taylor_CWI/ for information on the CWI.

³ This was performed using Stata's "mkspline" command. See <https://www.stata.com/manuals13/rmkspline.pdf>.

For the scatter analysis and placing of districts into groups, I weighted the analyses by the square root of enrollment. Typically, I would weight by enrollment. However, the distribution of enrollments across New York state is unlike any other state. New York City massively outweighs other districts, if weighted by enrollment. Weighting by the square of enrollment allows larger districts to carry more weight but tempers the weighting place on New York City relative to other smaller districts.

Longitudinal Analysis

Fiscal data for the longitudinal analysis was also downloaded from NYSED.⁴ As with the prior analysis, I supplemented this data with other district characteristics from the School Finance Indicators Database. I converted all data to per-pupil figures and adjusted the data to account for differences in geographic costs using the CWI and converted nominal dollars to 2019 dollars using the Consumer Price Index from the Bureau of Labor Statistics. For each district, I calculated the average poverty rate over a 10-year period between 2005 and 2014 using the Census Small Area Income and Poverty Estimates poverty estimate. Using this average poverty rate, I grouped districts into quintiles. In this way, I created time-constant poverty quintiles.

I then used regression to examine changes in revenue over time by poverty quintile, controlling for district size and population density. As with the several of the budget analyses, I weighted the regressions by the square root of district enrollment. I then used the regression to predict revenue in each year and quintile and graphed the results as line graphs.

⁴ See http://www.oms.nysed.gov/faru/Profiles/profiles_cover.html.



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