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Public school enrollment has decreased over the past few years and is forecast to continue decreasing for the foreseeable future. Experts and educators are concerned about the fiscal and resource effects of these enrollment declines. Using data on all public school districts from 1998 to 2019, we estimate the effects of enrollment changes on revenues and expenditures per pupil and a variety of resources for students. Our preferred empirical approach operationalizes all explanatory variables as spline variables, which allows for different covariates for growing and declining districts. This flexible approach allows for the possibility that school funding systems, and therefore fiscal and resource changes, differ between districts with growing and declining student enrollment. We find generally that districts with declining student enrollment have experienced larger per pupil increases in funding and resources, as compared to districts with growing enrollments. The one counterexample is total compensation (salary and benefits) per employee in the long run. While the estimates in our preferred models suggest a modest compensation advantage for growing districts over longer time periods, this result is not robust to alternative specifications, which tend to find null effects. All other fiscal and resource measures find an advantage for declining enrollment districts. This fiscal and resource advantage for declining districts was due to local and federal school finance systems not requiring declining districts to suffer revenue declines proportional to enrollment declines.

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The Fiscal and Resource Effects of Enrollment Increases and Decreases on American Public School Districts

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Abstract

Public school enrollment has decreased over the past few years and is forecast to continue decreasing for the foreseeable future. Experts and educators are concerned about the fiscal and resource effects of these enrollment declines. Using data on all public school districts from 1998 to 2019, we estimate the effects of enrollment changes on revenues and expenditures per pupil and a variety of resources for students. Our preferred empirical approach operationalizes all explanatory variables as spline variables, which allows for different covariates for growing and declining districts. This flexible approach allows for the possibility that school funding systems, and therefore fiscal and resource changes, differ between districts with growing and declining student enrollment. We find generally that districts with declining student enrollment have experienced larger per pupil increases in funding and resources, as compared to districts with growing enrollments. The one counterexample is total compensation (salary and benefits) per employee in the long run. While the estimates in our preferred models suggest a modest compensation advantage for growing districts over longer time periods, this result is not robust to alternative specifications, which tend to find null effects. All other fiscal and resource measures find an advantage for declining enrollment districts. This fiscal and resource advantage for declining districts was due to local and federal school finance systems not requiring declining districts to suffer revenue declines proportional to enrollment declines.

Keywords: school finance

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1. Introduction

There is a widely held concern that declining student enrollment represents a serious fiscal challenge for K-12 public school districts. Because many of their funding streams are determined by student enrollment or attendance counts, when a given district serves fewer students, it loses substantial funding. Given that districts have at least some fixed costs (Scafidi 2012; Bifulco and Reback 2014), these declines in funding could leave fewer resources for remaining students. Figure 1 displays several recent quotes showing concern regarding enrollment declines from researchers, the National Education Association, the mainstream news media, and the American Education Research Association. The dates of these quotes indicate that the fiscal effects of enrollment declines became a salient policy issue when school districts began experiencing large enrollment declines in fall 2020, in the throes of the COVID-19 pandemic.

<insert figure 1 about here>

The tone of the quotes in figure 1 suggests that enrollment declines are perhaps the most pressing public school finance question currently facing policymakers, as there have been large declines in district public school enrollment since fall 2019 (Dee 2023), and there are even further substantial declines forecasted at least through 2031 (U.S. Department of Education 2023). Dee (2023) documents that in the 22 states with complete data, public school enrollment declined by almost 705,000 students between the 2019-20 and 2021-22 academic years. He estimates that about 26% of the enrollment decline came from increased homeschooling; another 26% was due to a decrease in the number of school-aged children; and almost 15% was due to students migrating to private schools. The data sources Dee used could not account for the remaining third of the enrollment drop. Notably, Dee's data includes public charter schools,

which gained about 240,000 students nationally during this time period (U.S. Department of Education, 2022). In other words, while public school enrollment is declining overall, decreased enrollment is especially pronounced within district schools. Looking ahead, the National Center for Education Statistics projects that public school enrollment nationally will fall by an additional 2.7 million students between fall 2022 and fall 2031—a decline of 5.5% (U.S. Department of Education 2023). Overall, a decline is forecast in 40 states and eight states are projected to lose more than 10% of their 2022 enrollment by 2031. Given recent and forecasted trends, it is worth fully understanding the fiscal impacts of declining student enrollment on public school districts and their students.

In this study we document the effects of changes in school district enrollment over the short-term (1-year), medium-term (4-year), and long-term (20-year) on district expenditures, revenues, and resources for students. We analyze these fiscal and resource changes with a flexible spline empirical strategy that allows "growing" districts, districts that experienced increases in enrollment, and "declining" districts, districts with level or decreasing enrollment over the time frames considered, to be impacted differently by school finance systems.

To analyze these effects of enrollment changes, we use publicly available data on school district finances and resources from academic years 1999 to 2019, 1998-99 to 2018-19, which predates the large enrollment declines that occurred during the COVID-19 pandemic. Importantly this time frame also predates the large influx of federal funding that school districts received starting in 2020 that is likely not going to continue after these additional funds are exhausted. These data are reported annually for all school districts in the United States by the National Center for Education Statistics at the U.S. Department of Education. We use school districts as the unit of observation, because districts, not individual schools, receive K-12

education funds from state and federal governments. In addition, districts typically decide how much local funding to generate, how to set school zone boundaries that determine enrollment at individual schools, and make other decisions that impact resource levels for students across district schools. The time period covered in this study provides a rich historical experience to study this issue, as a majority of American public school districts, 62.5%, experienced a decline in enrollment between 1998 and 2019, even as national public school enrollment increased.

In our preferred estimates that control for changes in student characteristics, we find that districts with declining enrollment increased total and current expenditures per pupil by more than the rate of inflation. However, per pupil expenditures in growing districts did not keep pace with inflation. These trends were present for 1-year, 4-year, and the 20-year enrollment changes under study. While these effects became attenuated in the longer time periods, there were still substantial increases in per pupil expenditures over both 4-year and 20-year changes in districts with enrollment declines, and modest decreases, adjusted for inflation, in per-pupil expenditures in districts with growing enrollment over these longer time periods.

These divergent patterns translated into much larger increases in total staffing per 100 students and teachers per 100 students in declining districts relative to growing districts. Regarding compensation per teachers and other employees, declining districts had no detectable advantage per 1-year enrollment declines, while growing districts had a modest advantage in compensation per employee over longer time periods. However, this compensation advantage for growing districts over 4- and 20-year periods was not robust across alternative specifications.

This fiscal and resource advantage for declining districts was due to local and federal school finance systems favorable to them in that these finance systems did not require declining districts to suffer revenue declines proportional to enrollment declines. That is, declining districts

saw revenue declines that were smaller, in absolute value, than their declines in enrollment. Declining districts had an advantage with respect to state funding, but only in the short-run.

Over the next several years, total employment will likely eventually decline in districts with significant declines in enrollment, through attrition and/or reductions in force, as these districts will serve significantly fewer students. However, if the policy goal is providing sufficient resources for students, instead of focusing on districts with enrollment declines, our findings suggest policymakers and researchers should be cognizant of the funding and resource challenges facing growing districts. Our findings may also be relevant to researchers endeavoring to create exogenous measures of changes in per pupil funding when estimating the extent to which funding impacts student achievement, as changes in student enrollment over time, both increases and decreases, have a significant impact on resources available for students.

The rest of this paper is organized as follows. Section 2 reviews the literature that analyzed enrollment declines between the late 1960s and mid-1980s, the only prior time in American history when public school enrollment experienced a significant and sustained decline in enrollment. Section 3 describes some basic mechanics of K-12 public school finance and how these mechanics could impact school district funding when student enrollment increases or decreases. The public school district-level data used in our analyses are described in section 4. Our empirical models are described in section 5, and the results are presented and discussed in section 6. Section 7 offers concluding remarks and policy implications from the findings.

2. Literature Review

The late 1960s to the mid-1980s was the first time that American public schools experienced a large and sustained drop in enrollment, as enrollment declined by over five million students (National Center for Education Statistics, 1995). Using data from that period, several

studies analyzed the connection between the percentage change in enrollment and *levels* of per pupil expenditures. Easton (1993) used data from 55 school districts in Oregon to estimate the relationship between the percentage change in enrollment and levels of current expenditures per pupil, where current expenditures exclude expenditures on capital and debt service. Easton considered the percentage change in enrollment over five four-year intervals between 1965 and 1985 to estimate the effects of enrollment changes on the level of per pupil current expenditures at the end of the time frame. Easton's regression controlled for some economic characteristics of districts, and the results indicate that enrollment increases are associated with lower levels of current expenditures per pupil.

Using data from 181 districts in Colorado, Rodekohr (1975) showed that districts that experienced enrollment declines between academic years 1962 and 1970 had, on average, higher local and state revenues per pupil in 1970 and higher current per pupil expenditures as well. Rodekohr also found that districts that experienced enrollment declines over that time period had smaller pupil-teacher ratios and higher capital expenditures per student, relative to growing districts. Rodekohr's results are bi-variate correlations and were not produced with a multiple regression framework. The concern with using *levels* of fiscal variables and resources as the outcome of interest is that declining districts could have had higher levels of these variables at the start of the time period under study.

Although they did not control for changes in district characteristics, Odden and Vincent (1978), did not use *levels* as outcome measures. They used data on school districts from four states Michigan, Missouri, South Dakota, and Washington to demonstrate the relationship between the percentage change in student enrollment between 1971 and 1975 and *changes* in per pupil expenditures and in resources available to students. Odden and Vincent separated districts

into deciles based on the percent change in enrollment and found consistently that enrollment declines are associated with larger percentage increases in per pupil expenditures on operations, transportation, administration, instructional salaries, operations and maintenance, and capital between 1971 and 1975. Odden and Vincent also reported largely monotonic and positive relationships between increases in enrollment and pupil-staff ratios.

Cavin et al. (1985) used a multiple regression model with district fixed effects to estimate the effect of annual percent changes in student enrollment on percent changes in total expenditures per pupil between 1971 and 1980. Their study had data on 509 Michigan school districts over this 10-year period. Different from prior studies, which only considered the percentage change in enrollment as a single variable, Cavin et al. employed a spline approach that allows the effect of enrollment changes on current expenditures per student to differ between districts with enrollment increases and districts with enrollment decreases. They estimated an elasticity of current expenditures per pupil with respect to enrollment declines of 0.79, which means that for every one percentage point decrease in enrollment, there was a 0.79 percent increase in current expenditures per student. Among districts with growing enrollment, their elasticity estimate was -0.10, which means for every one percentage point increase in enrollment, current expenditures per pupil fell by 0.1%. These authors adjusted their expenditure data for inflation. In unreported results, the authors mention they found that enrollment declines led to large decreases in pupils per teacher and pupils per administrator, but smaller declines in pupils per teacher, relative to districts with enrollment gains. Finally, Cavin et al. also found that differences in the changes in staffing ratios between declining and growing districts became smaller over the 10-year period of their time period under study. Cavin et al. included various measures of enrollment as control variables, but did not operationalize them as spline functions.

Compared to this prior literature, in the present study we consider a larger array of revenues, expenditures, and resources. Like Cavin et al. (1985) we employ a district fixed effects approach and use a spline functional form that allows for the possibility that the magnitudes of the relationship between enrollment declines and fiscal and resource outcomes differ from the relationship between enrollment increases and these outcomes. Finally, as presented below, we use more recent data, all school districts in the United States with complete data, and control for changes in student characteristics that often influence how much funding districts receive from state and federal governments. Finally, we use the spline approach for all control variables that allow coefficient estimates to differ, depending on whether districts are experiencing enrollment increases or enrollment declines.

Given the large enrollment declines that have occurred in district schools since 2020, with projections for even further significant declines in upcoming years, refreshing our understanding of the fiscal implications of enrollment changes is warranted.

3. Some Mechanics of K-12 Public School Finance

K-12 public school districts in America typically receive funding from state, local, and federal governments. While the proportions vary across states and across districts within states, on average in 2019, districts received 46.7% of their funding from states, 45.6% of funding was generated locally, and the remaining 7.7% was provided by the federal government (U.S. Census Bureau, 2019). Of particular interest here is to what extent each of these three funding sources impacts district finances differently, depending on whether they experience either enrollment increases or enrollment decreases. Next, we briefly discuss each funding source in turn.

State Funding

State funding to public school districts tends to be a function of enrollment, often with "weighted" formulas where some students, typically students with special needs and students from low-income families, generate larger per pupil allocations from states. Per pupil allocations are also often weighted based on other factors as well (Congressional Research Service 2019). However, states often provide relatively minor funding streams that are flat grants to districts that do not depend on enrollment counts and, more importantly, often have "hold harmless" provisions for a large portion of total state funding to districts. These hold harmless provisions typically mean that a significant portion of state funding is not reduced, or not reduced proportionally, when student enrollment declines from one year to the next. Thus, state funding is not "harmed" (reduced), for districts that experience an enrollment decline. However, these provisions often, but not always, expire after 1-3 years (Lueken and Hanover Research 2023).

To the extent that a minor portion of state funding is not driven by student enrollment counts and that states have hold harmless provisions that allow districts to retain enrollment-driven funding when their enrollments decline, declining districts would have a funding advantage over growing districts. However, if hold harmless provisions are temporary, this funding advantage would also be temporary.

Local Funding

Typically, local revenues are not automatically reduced when school districts experience enrollment declines, as local revenues, at the margin, are under the purview of an appointed or elected school board or other local government (Congressional Research Service 2019). Nevertheless, declining districts could face less political support for local school funding, as there are fewer families with public school students and perhaps fewer employees who desire higher spending on public schools. In this respect, declining districts could face a relative

disadvantage with respect to local funding, compared to growing districts, which may be garnering higher levels of local political support via more families and employees. Families with children in public schools prefer higher levels of local public school funding, relative to other voters, on average (Peterson 2014; Rubinfeld 1977).

Alternatively, if there is asymmetric information, where school boards or other local taxing and spending authorities have better information about enrollment changes and resource needs than voters, it is possible that local revenues will not be reduced, or reduced in a lower proportion, when there are student enrollment declines. If the preference for public school funding was stronger among school board members as compared to voters, districts with declining enrollment would face a funding advantage relative to districts with growing enrollment, in this respect, due to this information asymmetry. For example, if tax bases remained constant, a district that experienced a 3-percent enrollment decline could hold tax rates constant, yielding a 3-percent increase in local revenue per student, while a district with growing enrollment would have to raise tax rates, all else equal, to provide their public schools with a 3-percent increase in per pupil local revenues.

This latter scenario is akin to a flypaper effect, where an increase in intergovernmental aid of $1 to a local government has a larger impact on public service spending than a $1 increase in household income (i.e., money is more likely to stick where it hits, even when both provide the same income increase to the community). There is evidence of a flypaper effect in public school funding (e.g., Saastamoinen and Kortelainen 2020, Nguyen-Hoang and Yinger 2020). However, Gordon (2004) found that increases in Title I funding from the federal government are completely offset by declines in state and local funding after three years, suggesting that flypaper effects in K-12 education may not persist long term.

Finally, changes in local tax bases per student that result from enrollment changes may lower the "tax price" of funding in declining districts if local tax bases remain constant or decrease by less than enrollment declines, allowing local school boards to generate more local revenue on a per pupil basis at a lower tax price to taxpayers. For example, if a district experienced an enrollment decline of 5%, and the local property tax base only declined by 1%, the district could lower property tax millage rate modestly, yet increase revenues per student. Local property taxpayers may be more willing to support this increase in local revenue per pupil, given that their tax price (millage rate) declined.

Conversely, local tax bases per pupil may not keep pace with enrollment growth in growing districts, leading to higher tax prices for taxpayers, which makes it more difficult for school boards to increase or even maintain local revenues per pupil over time. In this situation, districts would have to raise property tax millage rates to increase or maintain local revenue per pupil. This tax price effect suggests that declining districts would have a more favorable funding situation than growing districts with respect to local funding.

This first effect (more political support) suggests growing districts have an advantage with respect to local funding, but the latter two effects (information asymmetry and tax price) suggest declining districts would have the advantage. Thus, *a priori*, one cannot say theoretically whether an enrollment decline would advantage or disadvantage declining districts relative to districts with growing enrollment when it comes to local funding.

Federal Funding

Federal funding for public schools is often tied to the number of school-aged children in a community, not enrollment in public schools per se (Reber and Gordon 2023; Congressional Research Service 2019). However, if a student enrolls in a private school that participates in

federal programs or if a student enrolls in a charter school, federal dollars are supposed to flow to the private and charter schools to pay for services for these students (U.S. Government Accountability Office 2023). However, private and charter schools periodically lament that public school districts do not give them the federal dollars for which they are entitled (U.S. Government Accountability Office 2023). Even when all charter public schools and private schools receive all federal funds to which they are entitled, some private schools do not participate in federal education programs and homeschool students are not typically allowed to receive federal funding, so local public school districts retain federal education funds for would-be-eligible students who attend these non-participating private and homeschools. Finally, some federal education programs have hold harmless provisions, where funding is not reduced when enrollment declines across years (Congressional Research Service 2023, 2019). Given these details regarding federal education funding, we expect to see, in practice, a funding advantage for declining enrollment districts regarding federal dollars.

These mechanics of state, local, and federal funding and the likelihood that public school districts face some fixed costs indicate that the effect of enrollment increases and decreases on resources available for students is an empirical question. In addition, these mechanics also suggest that funding patterns likely differ between districts with enrollment increases as compared to districts with enrollment decreases.

4. Data

The data come from the National Center for Education Statistics' (NCES) Common Core of Data (CCD). We start with all district-by-year observations from 1998-99 to 2018-19 for districts ever classified as a "regular local school district that is NOT a component of a supervisory union" during that time period, dropping any school districts labeled as an

"Accommodation School District," "Special Services School District," or "Educational Services School District." In total, we identify 11,451 traditional public school districts with observations in 47 states and Washington, D.C., in each of the 21 years.[1] We use district-level data on district revenues, expenditures, and resources from the CCD to analyze the effects of enrollment increases and decreases on fiscal outcomes for districts and resource levels for students.

The CCD provides data on district enrollments during the fall of each school year. We use the three sources of district revenues and report them on a per-pupil basis: *Total State Revenues*, *Total Local Revenues*, and *Total Federal Revenues*. We use two measures of district expenditures and report them on a per-pupil basis: *Total Expenditures* and *Total Current Expenditures*, where the latter equals total expenditures minus capital and debt service expenditures. Researchers often use the latter, as capital and debt service expenditures can oscillate significantly over time, especially in smaller school districts (e.g., building a new school in a given year, etc.).

We generate a *Salary and Benefits Per Staff* measure dividing total salary and benefits expenditures by total staff and multiplying by total enrollment. We create a variable, *Net Funds Per Pupil*, that equals total unspent bond funds, debt service funds, and other unspent funds minus outstanding long-term debt and short-term debt, on a per pupil basis. *Net Funds Per Pupil* measures the long-term fiscal health of school districts. The CCD also provides *Total Capital*

[1] New Hampshire and Vermont are excluded from analysis because during the time period under study, school districts in these states were part of supervisory unions that prevent researchers from getting accurate measures of revenues, expenditures, and staff for individual districts. Ohio was excluded from the analysis because through work with the state of Ohio, one of the authors was alerted to misreporting of state revenues to the U.S. Department of Education. Specifically, funds provided under the state's large school voucher programs have been counted for many years as state revenues to public school districts, even though those funds go to families to offset tuition payments at private schools—and therefore are not available for districts to spend.

Outlay Per Pupil. All fiscal measures, including revenues, expenditures, salary and benefits, net funds, and capital outlay, are inflation-adjusted and reported in constant 2019 dollars.

We use six measures of district staffing. The CCD reports full-time equivalent counts of Total Staff, Teachers, Aides, and Counselors by district. We generate *Total Administrators* as the sum of Instructional Coordinators, Local Education Administration (LEA) Administrators, and School Administrators by district. *Total Other Staff* is Total Staff minus the count of Teachers and minus the count of *Total Administrators*. We report each of these measures per 100 students.

Finally, we use six measures of student characteristics to control for factors that likely influence underlying costs of educating students. For student classifications, the CCD reports the total number of students in each district who qualify for free- or reduced-price lunch (FRL), who are supported by an Individualized Education Plan (IEP), or who are classified as having Limited English Proficiency (LEP). For student race and ethnicity, the CCD reports the total number of Asian, Black, Hispanic, and White students, along with other racial and ethnic categories. We focus on these race and ethnicity measures because the greatest number of non-white students are reported in the first three of these categories and because other race and ethnicity measures suffer from a greater degree of missing data. However, race and ethnicity data are not consistently collected (see Appendix Table A1) and are thus excluded from our preferred model specifications. Our models are robust to the inclusion or exclusion of these covariates (see appendix tables A2-A85). We report the proportion of students in a district in each category via dividing student counts by race and ethnicity by total fall enrollments.

We present (unweighted) summary statistics for academic year 2019 in Table 1, reporting all 11,451 districts in column (1), 4,788 “growing” districts (that is, districts whose 2019 fall enrollments exceeded their 2018 fall enrollments) in column (2), and 6,633 “declining” districts

(that is, districts whose 2019 fall enrollments declined relative to their 2018 fall enrollments) in column (3).[2] On average, districts received $16,768 in per-pupil revenues from state ($7,641), local ($7,881), and federal sources ($1,246). Total expenditures per pupil were $16,485 and total current expenditures per pupil were $13,843. Districts spent an average of $76,797 per each staff member's salary and benefits and employed 15.36 employees per 100 students, including 7.55 teachers, 0.98 administrators, and 6.90 other staff. Among these "other staff," districts employed 2.10 aides and 0.24 counselors per 100 students. On average, districts had -$1,254 in net funds per pupil, indicating that districts owed outstanding debt at a higher level relative to their unspent funds at the end of the year. On average, districts spent $1,286 on capital outlay per pupil.

Table 1 also shows some key differences in the *levels* of funding and resources between growing and declining districts in 2019. First, declining districts had higher levels of total and current expenditures per student. Specifically, declining districts had $16,947 in total expenditures per student, while this figure for growing districts was $15,844. With regards to current expenditures, declining districts spent $14,325 per student, while the corresponding figure for growing districts was $13,183. Growing districts have higher average compensation per staff member ($79,085 relative to $75,141 for declining districts), while declining districts have more staffing than growing districts, 15.83 staff per 100 students in declining districts and 14.72 for growing districts. As expected, growing districts ($1,358) invested more than declining districts ($1,235) in capital expenditures, as some of the former created new schools to accommodate their enrollment growth. Given their lower capital needs, declining districts had a

[2] Consistent with our main regression analyses, to account for transcription errors in district reporting, we exclude districts whose one-year percentage change in each variable was smaller than the 1st percentile or greater than the 99th percentile. For example, a given district may have reported 100 teachers in year 1, 10 in year 2, and 105 teachers in year 3. Such district-year observations with extremely wide annual swings were excluded from our main analyses.

better long term fiscal position than growing districts with -$978 in net funds per student in declining districts and -$1,634 net funds per student in growing districts.

< insert table 1 about here>

While Table 1 shows the levels in funding and resources, given the widespread policy concern regarding declining enrollment, we are interested in how changes in enrollment impact changes in revenues and expenditures in school districts and the resulting changes in resources for students. In Table 2, we compare the average 1-, 4-, and 20-year percentage changes for growing and declining districts. All district-year percentage changes over the 1998 to 2019 time period under study are reflected in Table 2 and are used in the regressions that follow. Again, dollars for all years are in inflation-adjusted constant 2019 dollars, so a positive change represents a change over the rate of inflation. On average, growing districts gained 3.3% in enrollment over one year, 8.3% over four years, and 27.6% over 20 years, while declining districts lost 3.2% of enrollment over one year, 7.4% over four years, and 20.9% over 20 years.

Table 2 also shows that local revenues per pupil declined for growing districts over one year (-0.2%), but generally state, local, and federal revenues per pupil increased for both growing and declining districts over all intervals. Similarly, total expenditures per pupil (-0.1%) and total current expenditures per pupil (-0.4%) declined for growing districts over one year but increased for growing districts over longer intervals and for declining districts over all intervals.

The staffing data have a pronounced pattern showing how school funding systems have very different impacts on districts with declining enrollment and districts with growing enrollment. As shown in figure 2, declining districts increased their total FTE staff slightly (by 17,410 FTE personnel) between 1999 and 2019, despite experiencing an enrollment decline of over 3.7 million students.

Growing districts increased their staffing in a manner that increased their total staff per 100 students from 10.7 to 12.2, an 18.4% increase over the 20-year period (Table 2). However, declining districts saw a larger increase in this ratio, from 10.9 to 13.3, a 33.2% increase (Table 2). Likewise, growing districts saw a decline of net funds per student (-31.6%) over 20 years, where net funds is end-of-year unspent funds net of outstanding debt, while declining districts increased net funds by 10.4% per student over the same interval.

Growing and declining districts had somewhat different changes in student demographic characteristics, with large changes in the proportion of students classified as LEP (314.2% for growing districts and 303.3% for declining districts). Declining districts saw less growth in the percent of students supported by IEPs (37.1%, relative to 53.1% for growing districts), and declining districts also saw less growth in the percent of students eligible for FRL (52.1% growth for growing districts and 45.5% for declining districts) over 20 years. Districts also grew in the proportion of Asian (82.4% and 50.8%), Black (77.8% and 63.8%), and Hispanic students (376.4% and 416.8%) over 20 years, for growing and declining districts, respectively. Table 2 also shows 1-year and 4-year changes in these variables.

<insert table 2 and figure 2 about here>

5. Empirical Model

We estimate the effect of enrollment changes on various district revenues, expenditures, and resources using a district fixed effects model. The base model is:

$$y_{dt} = \beta_0 + \beta_1 \%\Delta growth_{dt} + \beta_2 \%\Delta decline_{dt} + \boldsymbol{\delta} + \boldsymbol{\gamma} + \epsilon_d \quad (1)$$

where y_{dt} is the percentage change in a fiscal or resource measure for district d over interval $t = 1, 4, 20$ years. For *Net Funds Per Pupil* and *Total Capital Outlay*, the dependent variable is a dollar change rather than a percentage change, because many percentage changes were extremely

large, given the lumpiness of capital expenditures across time. The key variables of interest are spline variables for percentage changes in district enrollment, where $\%\Delta growth_{dt}$ assumes the value of the percentage change in enrollment if district d grew over interval t and 0 otherwise; conversely, $\%\Delta decline_{dt}$ assumes the absolute value of the percentage change in enrollment if district d declined over interval t and 0 otherwise—so a 5-percentage point decline in enrollment would be a positive .05. We include both district fixed effects $\boldsymbol{\delta}$ and year fixed effects $\boldsymbol{\gamma}$ and cluster our standard errors ϵ_d by district. Given this specification, estimates of the coefficients of interest, β_1 and β_2, are estimates of the effects of enrollment increases and decreases, respectively, relative to districts with no enrollment change.

In our preferred model specification in equation (2) below, we include spline indicator variables for growing (g_{dt}) and declining districts (d_{dt}) where $g_{dt} = 1$ if district d saw growing enrollment and 0 otherwise, and $d_{dt} = 1$ if district d saw declining enrollment over time period t and 0 otherwise. To allow for differential changes between growing and declining districts, these spline indicator variables are interacted with percentage changes in the proportion of students who qualify for FRL, who are supported by an IEP, or who are classified as LEP, student classifications that are often directly tied to district funding and resources:

$$y_{dt} = \beta_0 + \beta_2 \%\Delta growth_{dt} + \beta_3 \%\Delta decline_{dt} + \beta_4 \%\Delta FRL(g)_{dt} + \beta_5 \%\Delta FRL(d)_{dt} + \beta_6 \%\Delta IEP(g)_{dt} + \beta_7 \%\Delta IEP(d)_{dt} + \beta_8 \%\Delta LEP(g)_{dt} + \beta_9 \%\Delta LEP(d)_{dt} + \boldsymbol{\delta} + \boldsymbol{\gamma} + \epsilon_d \quad (2)$$

By using this flexible spline approach, our preferred model allows for the possibility that state, local, and federal funding systems treat growing and declining districts differently as their enrollments and composition of students change over time.

Our base model results and the results from our preferred model are very similar and are presented in the next section. We estimate several alternative specifications as robustness checks

and show those results in Appendix Tables A2-A85.[3] The alternative models include adding covariates for the race/ethnicity of students; using changes instead of percentage changes; and changing how outlier values are excluded. Generally, our preferred results are very robust to these alternative specifications, with one exception. As presented in the next section, the small disadvantages we estimate for declining districts with respect to compensation per employee over the 4-year and 20-year periods in our preferred model are null in most alternative specifications.

For 20-year changes, we regress each outcome of interest on spline enrollment change variables using ordinary least squares (OLS) without district and year fixed effects and estimate heteroskedasticity-robust standard errors—since there is only a single 20-year time change in the time period under study. For the 20-year changes, we also exclude controls for percentage changes in LEP, as its inclusion would reduce our sample sizes by roughly 50%.

6. Results

Tables 3 through 7 display the results from estimating our empirical models from equations (1) and (2), where the outcomes of interest are per pupil revenues, per pupil expenditures, and resources (compensation per staff member, staffing per 100 students, net funds, and capital outlay). We report results for all 1-year changes, all 4-year changes, and the 20-year change available from our time period under study, academic year 1998 to 2019. All dollar amounts are adjusted for inflation using the PCE price index from each January (mid-academic year). Panel A of each table shows the results with no control covariates (conditional on not missing the control covariates used in panel B), while panel B of each table contains the

[3] In addition to the appendix tables, we explored using linear, squared, and cubic enrollment and spline measures of enrollment as control variables, and these variables did not impact the results.

results with controls for changes in student characteristics. As described in the previous section, all explanatory variables are operationalized as spline variables, which allows for different covariates for growing and declining districts. This flexible spline approach allows for the possibility that school funding systems, and therefore expenditure and resource changes, differ between districts with growing student enrollment and districts with declining student enrollment. The coefficients of interest are *% Δ Enrollment (growing)* and *% Δ Enrollment (declining)* that provide estimates of how the percent change in enrollment impacts the percentage change in revenues, expenditures, and resources on a per pupil basis. Any differences between these two estimates will show to what extent districts with declining enrollment are treated differently by school funding formulas as compared to districts with growing enrollment. We discuss each table in turn, and then briefly discuss results from alternative specifications that are contained in the appendix.

Effects of Enrollment Changes on State, Local, and Federal Revenues Per Pupil

The outcomes in Table 3 are percent changes over time in state, local, and federal revenues per pupil. The time intervals considered are 1-year changes, 4-year changes, and a 20-year change, where the latter spans the entire time period of our data. Since the dependent variables are percent changes, and the spline enrollment variables of interest, are also percent changes, the point estimates in Table 3 (and Tables 4 through 7) are elasticities. If all state, local, and federal funding were enrollment-driven (exactly proportional to enrollment), then the estimates coefficients on *% Δ Enrollment (growing)* and *% Δ Enrollment (declining)* would be highly similar, as each empirical model has state and year fixed effects, and our preferred estimates in panel B control for percent changes in student characteristics that typically have a direct relationship with several sources of state and federal funding. However, as shown in Table

3 (and in later tables), state, local, and federal funding systems are more favorable to declining districts than they are to growing districts.

Panel A of Table 3 shows the estimated effects of enrollment changes on changes in per pupil revenues, with no control covariates. As a reminder, each of these estimates are relative to districts that had no change in enrollment over time. For 1-year changes, column (1) shows that for every percentage point increase in annual enrollment that total state revenue per pupil, adjusted for inflation, decreased by an estimated -0.416 percentage points. However, column (1) also shows for each percentage point decline in annual enrollment, where percent declines in enrollment are in absolute values (positive) in our spline approach, that state revenues per pupil increased by 0.827 percentage points. Both estimates are statistically significant ($p<.001$). Panel B shows the results when we include controls for the percent change in students eligible for a free or reduced price lunch (*Δ % FRL*), percent change in students with an Individualized Education Plan (*Δ % IEP*), and percent change in limited English proficient students (*Δ % LEP*). The results that include these controls are our preferred specification throughout this paper—because students in these categories tend to have higher resource needs than other students, and several state and local funding streams are functions of these variables. All of that said, including these results does not impact the estimates in meaningful ways. Column (1) in panel B shows that a 1-percentage point increase in enrollment led to a -0.405 percentage point decline in state revenue per pupil, and a 1-percentage point decrease in enrollment led to a 0.832 percentage point increase in state revenue per pupil, percent change in student characteristics held equal. Both estimates are statistically significant ($p<.001$).

Clearly, declining districts have a state funding advantage over growing districts, at least when considering 1-year changes in enrollment. As noted in section 2, this result was expected

given that most states have hold harmless provisions and minor streams of state funding that are not enrollment driven—not proportional to enrollment. However, these provisions often expire within three years. Therefore, we also estimated the effects of enrollment changes on per pupil state revenues over 4-year periods and the 20-year period that spans the range of our data, and these estimates are shown in columns (2) and (3).

The coefficients of interest are virtually the same in panels A and B, so hereafter we focus on the estimates in panel B in our discussion of Table 3. Columns (2) and (3) of Table 3 show that the state funding advantage for declining districts lessens over time, but this advantage is still present over 4-year periods. Specifically, a 1-percentage point increase in enrollment over four years led to a smaller in absolute value (-0.165) statistically significant decline in state per pupil revenue, while a 1-percentage point decrease in enrollment led to a 0.522 percentage point increase, also smaller than column 1 and statistically significant. Over the 20-year period, enrollment changes, both increases and decreases, had statistically insignificant and small increases in state per pupil revenue. To summarize, the evidence indicates that declining districts had an advantage with respect to state revenues per pupil as compared to growing districts over 1-year and 4-year time periods, but we cannot detect a funding advantage or disadvantage for declining districts over the 20-year period.

In addition to state funding, districts also receive funding from local and federal governments. As noted in section 2, local revenues are not automatically reduced when school districts experience enrollment declines, as local revenues, at the margin, are typically under the purview of an appointed or elected school board or other local government. However, section 3 provided reasons why, *a priori*, we cannot say whether declining districts would be at a

disadvantage or have an advantage over growing districts with respect to federal funding. Thus, it is an empirical question.

Columns 4, 5, and 6 in Table 3 show a large local funding advantage for declining districts, which is consistent with the information asymmetry and/or tax price scenario discussed in section 2. Using our preferred estimates with controls in panel B, over 1-year and 4-year periods, declining districts have a large advantage with respect to local funding over growing districts, but the advantage narrowed a bit over the longer time period. Over 4-year periods, a 1 percentage point decline in enrollment leads to a 1.019 percentage point increase in local revenue per student ($p<.001$), while a 1 percentage point increase in enrollment led to a -0.372 percentage point decline in per pupil local revenue ($p<.001$).

Interestingly, this advantage for declining districts increased a bit over the 20-year period, with a 1 percentage point decline in enrollment causing a 1.445 percent increase in local revenue per student. A 1 percentage point increase in enrollment led to a -0.122 percentage point decline. Supposing one hypothetical district saw a 10-percentage point decline in enrollment over the 20-year period, while an otherwise observationally equivalent district saw a 10-percentage point increase in enrollment, these estimates imply that the declining district would realize a 14.45% increase in per pupil local revenue, while the growing district would see a 1.22 percentage point decline, both relative to the increase in inflation. This funding advantage for declining enrollment districts is large for policy and resource purposes.

As noted in section 3, given the details regarding federal education funding, we expect to see a funding advantage for declining enrollment districts regarding federal dollars, and the estimates in columns 7, 8, and 9 on Table 3 support this contention.

Using the results from panel B, with covariates capturing changes in student characteristics, a 1-year decline in enrollment of 1 percentage point led to a 0.949% increase in federal revenue per pupil, while a 1 percentage point increase in enrollment resulted in -0.414% decline in federal revenue per pupil. Longer time periods led to a smaller advantage for declining districts with respect to federal funding, with an estimated elasticity for declining districts of 0.447 over the 20-year period ($p<.001$) and an elasticity of 0.232 for growing districts ($p<.001$).

Given these advantages that districts with enrollment declines have regarding local and federal funding, and the advantage they have over shorter time periods regarding state funding, it is reasonable to expect that these favorable school funding systems will translate into expenditure advantages for declining districts as well.

<insert table 3 about here>

Effects of Enrollment Changes on Changes in Total and Current Expenditures Per Student

Table 4 shows estimates of the effects of enrollment changes on total and current per pupil expenditures, where current expenditures equal total expenditures minus expenditures on capital and debt service. All dollar figures are adjusted for inflation, and given the similarities between the estimates of the coefficients of interest between panel A (no control covariates) and panel B (with control covariates), we focus on the latter, which are our preferred estimates.

Columns 1, 2, and 3 of Table 4 show that declining districts increased total expenditure per student at a much higher rate than growing districts, but this difference becomes attenuated over longer time periods. Nevertheless, the elasticity in total expenditures per pupil with respect to enrollment declines was a statistically significant ($p<.001$) 0.690 during the full 20-year time period under study. The elasticity for growing districts was -0.092, which was also statistically

significant (p<.001). By construction, both estimates are relative to changes in total expenditure per pupil for districts that had no enrollment change over the time periods considered.

The pattern for current expenditures per pupil was the same. Regarding 1-year changes in panel B, declining districts increased total current expenditures per pupil by 0.843 percentage points for each 1-percentage point decline in enrollment. The corresponding estimate for growing districts was -0.568 percentage points, and both estimates are statistically significant (p<.001). The difference in these estimates was smaller for 4-year changes, and even closer over the full 20-year period. But the differences in the estimates remained large, pointing to a significant advantage for declining districts with regard to growth in current expenditures per pupil, even over the long term. Specifically, regarding 20-year changes in enrollment, the elasticity of current expenditures per pupil with respect to enrollment declines was 0.612 (p<.001), and the elasticity for growing districts was -0.070 (p<.001), a material difference.

For a district with a 10% decline in enrollment over the 20-year time frame, as compared to an otherwise identical district with a 10% increase in enrollment, the declining district would have about a 7% greater increase in current expenditures per student.

<insert table 4 about here>

Effects of Enrollment Changes on Resources for Students

While declining districts have a distinct and large advantage over growing districts in terms of revenues and expenditures, it is still possible that declining districts would be at a disadvantage with respect to resources for students, given that public school districts have fixed costs (Bifulco and Reback 2014; Scafidi 2012). Thus, it remains an empirical question as to whether declining districts are at an advantage or disadvantage, as compared to districts with growing enrollment in terms of providing resources for students.

Columns 7, 8, and 9 of Table 4 show the estimated effects of enrollment changes on average salary and benefits per employee. We cannot detect any short-term advantage or disadvantage for declining districts with respect to compensation per employee. However, for both the 4-year and 20-year time periods, there was a slight advantage for growing districts. Over the 20-year period, the elasticity of average compensation per employee was 0.035 ($p<.01$), but the corresponding figure for declining districts was -.006 and not statistically significant. For a district with a 10% increase in enrollment over the 20-year time frame, as compared to an otherwise identical district with a 10% decline in enrollment, the growing district would have about a 4% greater increase in average compensation per employee. This magnitude was approximately the same over 4-year periods. As shown in appendix Tables A18-A19, this modest advantage for growing districts over the longer time periods is null in alternative specifications.

In Table 5, we show the estimated effects of enrollment changes on total staff, teachers, and administrators per 100 students. These employment counts are measured in full-time equivalents (FTEs), and total staff includes teachers and all other district and public school employees; teachers include only lead teachers and lead special education teachers but does not include aides or paraprofessionals; and administrators includes district and school administrators and instructional coordinators but does not include administrative support staff.

Regarding these employee categories, declining districts increased these staffing ratios over time at higher rates than growing districts, with larger advantages over shorter time periods. However, even over the full 20-year period under study, declining districts retained a significant advantage in staffing increases per 100 students.

Using the estimates in panel B in Table 5 with control covariates, the elasticity of total staff per 100 students with respect to enrollment declines was estimated to be 0.843, 0.696, and 0.484 when considering 1-year, 4-year, and 20-year enrollment declines, respectively. Each estimate is statistically significant ($p<.001$). For growing districts, the corresponding elasticities were -0.591, -0.330, and -0.096, where $p<.001$ for each. In terms of magnitude, for a district with a 10% decline in enrollment, as compared to an otherwise identical district with a 10% increase in enrollment, the declining district would have a total growth in staffing per 100 students that was about 5.8% larger over the 20-year time frame relative to the growing district.

For teachers per 100 students, columns 4, 5, and 6 of Table 5, there was a similar pattern. Considering 1-year enrollment changes, a 1-percentage point decrease in enrollment led to a 0.828 percentage point increase in teachers per 100 students. Four-year declines in enrollment produced 0.602 percentage point increases in teachers per 100 students for each percentage point decline in enrollment. Over the full 20-year period, this elasticity was 0.370. Each of these estimates was statistically significant ($p<.001$). For growing districts, the corresponding elasticities were -0.559 ($p<.001$), -0.271 ($p<.001$), and -0.060 for 1-year, 4-year, and 20-year enrollment increases.

Columns 7, 8, and 9 of Table 5 show a large increase in the number of FTE administrators employed per 100 students for declining districts, relative to growing districts. This finding was expected as most administrators are likely fixed inputs (e.g. a district needs one superintendent regardless of whether its enrollment is growing or declining). Other administrators such as assistant principals and instructional coordinators may be variable inputs in some cases, however, that can grow and decline as enrollment grows or declines. While the increase in administration per 100 students attenuated a bit between the 1-year and 4-year time

periods, the 4-year and 20-year periods advantages for declining districts over growing districts was about the same. For a district with a 10% decrease in enrollment over the 20-year time frame, as compared to an otherwise identical district with a 10% increase in enrollment, the declining district would have about a 12.5% greater increase in administrators per 100 students.

"Other staff" includes all public school employees except teachers and administrators. There was a distinct advantage in increasing other staff per 100 students for declining districts, and their advantage over growing districts was approximately the same over 1-year, 4-year, and the 20-year periods. These results are presented in the first three columns of Table 6. Using our preferred estimates in panel B, for a district with a 10% decrease in enrollment over the 20-year time frame, as compared to an otherwise identical district with a 10% increase in enrollment, the declining district would have about a 15% greater increase in other staff per 100 students.

<insert table 5 about here>

Table 6 also presents results for two employee categories included in other staff: aides/paraprofessionals (hereafter "aides") and counselors. While declining districts had large advantages in increasing aides per 100 students over the 1-year and 4-year periods, we detect no statistically significant advantage or disadvantage for declining districts over the 20-year period. Regarding counselors per 100 students, declining districts had a large advantage, but this advantage attenuated over the longer time periods. Using our preferred estimates from panel B, for a district with a 10% decrease in enrollment over the 20-year time frame, as compared to an otherwise identical district with a 10% increase in enrollment, the declining district would have about a 3.6% greater increase in counselors per 100 students.

<insert table 6 about here>

Table 7 shows the results from models explaining two long-term fiscal outcomes for districts: *Net Funds Per Pupil* and *Capital Expenditures Per Pupil*. Net funds equal total unspent end-of-year funds minus total debt owed. Both variables are in absolute changes, as percentage changes have extremely wide swings for many districts. As an example, suppose a medium or small size district builds a new school in year 1, and incurs a large increase in debt and a large increase in capital expenditures, but the district does not build a school in year 2—this would yield a massive percentage change. Given these changes are absolute changes (year 2 - year 1, for example), the coefficients in Table 7 are not elasticities.

With regards to net funds per pupil, we find an extremely large advantage for declining districts over all periods, and this advantage grows significantly over time. Using our preferred estimates in panel B of Table 7, over the 20-year period, for every one percentage point decrease in enrollment, declining districts saw an increase in net funds of $6,358 per student ($p<.001$). Growing districts saw a decline in net funds per student of -$2,279 for each percentage point increase in enrollment. Thus, enrollment declines will allow declining districts more ability in the future to repay prior debts, relative to districts with growing enrollment.

Declining districts had an advantage with respect to capital expenditures per student, but this difference attenuated significantly as the time periods got larger. Over the 4-year periods, declining districts saw an increase of $721 in capital expenditures per student for each percentage point decline in enrollment ($p<.001$), while growing districts saw a decline of $57 for each one percentage point growth in enrollment (not statistically significant). This difference was much larger over 1-year periods, but over the 20-year period we estimated only a $518 per student increase in capital expenditures per student for every percentage point decline in enrollment ($p<.01$). For growing districts, the corresponding figure was -$118 (not statistically

significant). This advantage regarding capital expenditures for declining districts is noteworthy given that districts with enrollment declines do not need to build new schools to accommodate enrollment growth, as will sometimes be the case in districts with enrollment increases.

<insert table 7 about here>

We generally find our results to be robust to model specification and all outcome variables, with the exception of compensation (salary and benefits) per employee, where we often found null results in alternative specifications with respect to an advantage or disadvantage between growing and declining districts. Our preferred estimates in Table 4 found a modest advantage for growing districts over the 4-year and 20-year periods. The estimates from six alternative specifications for all fiscal and resource outcomes are reported in the appendix.

7. Conclusion and Policy Implications

This study has illuminated an important dynamic in public education finance: generally speaking, school districts experiencing enrollment declines witness substantially larger increases in per pupil expenditures and per pupil resources compared to growing districts. This fiscal and resource advantage for declining districts was due to local and federal school finance systems not requiring declining districts to suffer revenue declines proportional to enrollment declines. That is, declining districts saw revenue declines that were smaller, in absolute value, than their declines in enrollment.

The relevance of these observations has been amplified in the post-COVID-19 era, where enrollment declines have become a widespread phenomenon across the United States. The pandemic triggered a large drop in public school enrollment in history, with national figures falling from 50.8 million students in fall 2019 to 49.4 million in fall 2020—a 2.7% decline that

persisted into subsequent years. With enrollment projected to decline further in most of the nation, districts must adapt to a "new normal" of declining enrollment.

Future work should seek to estimate the effects of enrollment changes in specific locales and the effects of enrollment changes on student outcomes. Finally, researchers endeavoring to create exogenous measures of changes in expenditures per student to estimate its effects on student outcomes should be cognizant of how enrollment changes directly impact expenditures per student and resource levels for students, as these enrollment change effects may complicate, or aid, their analyses.

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9. Tables and Figures

Table 1. Analytic sample descriptive statistics in 2019

	Overall	Growing	Declining
	(1)	(2)	(3)
Enrollment	3,887.20	4,231.76	3,636.59
Total Revenues Per Pupil: State	$7,641.20	$7,455.89	$7,775.76
Total Revenues Per Pupil: Local	$7,880.99	$7,463.74	$8,184.51
Total Revenues Per Pupil: Federal	$1,246.03	$1,159.81	$1,308.55
Total Expenditures Per Pupil	$16,484.99	$15,843.91	$16,946.78
Total Current Expenditures Per Pupil	$13,842.90	$13,183.42	$14,324.65
Salary and Benefits Per Staff	$76,796.81	$79,085.19	$75,141.26
Total Staff Per 100 Students	15.36	14.72	15.83
Total FTE Per 100 Students	7.55	7.32	7.72
Total Administrators Per 100 Students	0.98	0.93	1.01
Total Other Staff Per 100 Students	6.90	6.49	7.20
Total Aides Per 100 Students	2.10	2.04	2.14
Total Counselors Per 100 Students	0.24	0.23	0.24
Net Funds Per Pupil	-$1,253.56	-$1,634.34	-$978.04
Total Capital Outlay Per Pupil	$1,286.42	$1,358.36	$1,234.91
% FRL	0.48	0.46	0.50
% IEP	0.15	0.15	0.16
% LEP	0.07	0.07	0.07
% Asian	0.02	0.02	0.02
% Black	0.07	0.06	0.08
% Hispanic	0.17	0.17	0.17
n Districts	11,451	4,788	6,663

Notes. "Growing" districts are districts whose enrollment in 2019 exceeded their enrollment in 2018. All other districts are considered "declining." Summary statistics exclude outliers in the top and bottom 1% for each variable.

Table 2. Average 1-, 4-, and 20-year changes for growing and declining districts

	1-year		4-year		20-year	
	Growing	Declining	Growing	Declining	Growing	Declining
	(1)	(2)	(3)	(4)	(5)	(6)
Enrollment	3.3%	-3.2%	8.3%	-7.4%	27.6%	-20.9%
State Revenues Per Pupil	0.0%	4.5%	5.1%	10.0%	46.3%	48.5%
Local Revenues Per Pupil	-0.2%	5.5%	4.2%	14.6%	40.9%	72.6%
Federal Revenues Per Pupil	3.9%	8.8%	17.1%	25.3%	103.6%	108.4%
Total Expenditures Per Pupil	-0.1%	5.2%	4.7%	12.2%	41.1%	59.7%
Total Current Expenditures Per Pupil	-0.4%	4.1%	3.5%	10.3%	37.8%	53.6%
Salary and Benefits Per Staff	1.2%	1.2%	4.0%	3.6%	20.1%	18.1%
Total Staff Per 100 Students	-1.5%	3.7%	0.2%	8.0%	18.4%	33.2%
Teachers Per 100 Students	-1.8%	2.7%	-2.0%	4.3%	3.5%	14.0%
Administrators Per 100 Students	0.9%	6.2%	7.3%	16.2%	47.7%	74.6%
Other Staff Per 100 Students	0.5%	5.8%	9.0%	18.9%	90.2%	113.7%
Aides Per 100 Students	1.6%	5.9%	9.6%	14.0%	72.1%	85.9%
Counselors Per 100 Students	-1.9%	2.6%	-0.5%	5.2%	14.5%	23.5%
Net Funds Per Pupil	-7.7%	-1.2%	-22.2%	-14.8%	-31.6%	10.4%
Total Capital Outlay	66.4%	75.6%	179.2%	183.2%	145.2%	167.7%
% FRL	0.6%	1.5%	8.4%	10.8%	52.1%	45.5%
% IEP	0.1%	2.5%	2.0%	6.4%	37.1%	53.1%
% LEP	5.6%	6.0%	31.9%	31.8%	314.2%	303.3%
% Asian	1.6%	0.0%	11.6%	7.2%	82.4%	50.8%
% Black	2.7%	0.9%	11.9%	9.9%	77.8%	63.8%
% Hispanic	7.7%	6.9%	36.3%	39.0%	376.4%	416.8%
n	103,780	124,426	82,656	111,204	4,273	7,124

Notes. "Growing" districts are those whose enrollment increased over the 1-, 4-, or 20-year interval. "Declining" districts includes districts whose enrollment declined or stayed the same over those respective intervals. Summary statistics exclude outlier districts in the top or bottom 1% of each variable. All changes reported as percentage changes.

Table 3. Effects of enrollment changes on per pupil revenues (% Δ)

Dependent Variable:	Total Revs. Per Pupil (State)			Total Revs. Per Pupil (Local)			Total Revs. Per Pupil (Federal)		
Interval (years):	1	4	20	1	4	20	1	4	20
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PANEL A. No control covariates									
% Δ Enrollment (growing)	-0.416**	-0.176**	-0.028	-0.611**	-0.376**	-0.095**	-0.431**	-0.388**	0.209*
	(0.015)	(0.016)	(0.029)	(0.013)	(0.014)	(0.023)	(0.027)	(0.026)	(0.064)
% Δ Enrollment (declining)	0.827**	0.532**	0.199**	1.006**	1.026**	1.404**	0.970**	0.742**	0.573**
	(0.015)	(0.019)	(0.049)	(0.013)	(0.017)	(0.046)	(0.031)	(0.034)	(0.092)
Constant	0.067**	0.091**	0.447**	0.037**	0.118**	0.425**	0.120**	0.576**	0.956**
	(0.002)	(0.003)	(0.010)	(0.002)	(0.003)	(0.008)	(0.004)	(0.007)	(0.018)
PANEL B. With control covariates									
% Δ Enrollment (growing)	-0.405**	-0.165**	0.005	-0.609**	-0.372**	-0.122**	-0.414**	-0.351**	0.232**
	(0.015)	(0.016)	(0.029)	(0.013)	(0.015)	(0.023)	(0.028)	(0.026)	(0.063)
% Δ Enrollment (declining)	0.832**	0.522**	0.093	1.000**	1.019**	1.445**	0.949**	0.713**	0.447**
	(0.015)	(0.019)	(0.050)	(0.014)	(0.018)	(0.047)	(0.032)	(0.034)	(0.094)
Δ % FRL (growing)	0.003	0.066**	0.423**	0.003	-0.035**	-0.406**	0.027	0.213**	0.285**
	(0.006)	(0.012)	(0.033)	(0.005)	(0.008)	(0.027)	(0.013)	(0.018)	(0.055)
Δ % IEP (growing)	-0.004	0.136*	0.303	0.089*	0.218**	0.765**	0.395**	0.507**	1.227**
	(0.029)	(0.047)	(0.141)	(0.027)	(0.035)	(0.144)	(0.063)	(0.078)	(0.273)
Δ % LEP (growing)	0.029	0.039		-0.014	-0.028		-0.146*	0.050	
	(0.018)	(0.033)		(0.022)	(0.038)		(0.049)	(0.072)	
Δ % FRL (declining)	-0.020**	-0.062**	0.202	-0.011	-0.029*	0.063	-0.037*	-0.105**	-1.218**
	(0.005)	(0.011)	(0.132)	(0.005)	(0.010)	(0.134)	(0.014)	(0.019)	(0.273)
Δ % IEP (declining)	-0.158**	-0.152**	-0.769	-0.031	-0.040	0.896**	-0.139	-0.479**	0.580
	(0.031)	(0.037)	(0.438)	(0.028)	(0.033)	(0.161)	(0.061)	(0.075)	(0.316)
Δ % LEP (declining)	0.063**	-0.008		-0.023	-0.035		-0.204**	-0.465**	
	(0.016)	(0.026)		(0.022)	(0.030)		(0.030)	(0.046)	
Constant	0.068**	0.086**	0.352**	0.036**	0.119**	0.478**	0.120**	0.560**	0.858**
	(0.002)	(0.003)	(0.014)	(0.002)	(0.003)	(0.011)	(0.004)	(0.008)	(0.022)
Year x District obs.	169,351	136,235		169,443	136,429		168,896	136,094	
District obs.	11,413	11,407	10,760	11,415	11,410	10,769	11,412	11,396	10,721
District FEs	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Year FEs	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Standard Errors	Clustered	Clustered	Robust	Clustered	Clustered	Robust	Clustered	Clustered	Robust

Notes. Standard errors in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table 4. Effects of enrollment changes on expenditures (% Δ)

Dependent Variable:	Total Expenditures Per Pupil			Total Curr. Exps. Per Pupil			Salary and Benefits Per Staff		
Interval (years):	1	4	20	1	4	20	1	4	20
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PANEL A. No control covariates									
% Δ Enrollment (growing)	-0.551**	-0.238**	-0.099**	-0.573**	-0.325**	-0.077**	0.010	-0.000	0.039*
	(0.013)	(0.013)	(0.018)	(0.008)	(0.009)	(0.011)	(0.009)	(0.008)	(0.012)
% Δ Enrollment (declining)	0.885**	0.721**	0.740**	0.847**	0.700**	0.650**	0.013	-0.020	-0.033
	(0.012)	(0.015)	(0.033)	(0.007)	(0.010)	(0.024)	(0.009)	(0.010)	(0.021)
Constant	0.055**	0.150**	0.435**	0.045**	0.149**	0.399**	0.018**	0.075**	0.191**
	(0.002)	(0.003)	(0.006)	(0.001)	(0.001)	(0.004)	(0.001)	(0.002)	(0.004)
PANEL B. With control covariates									
% Δ Enrollment (growing)	-0.547**	-0.238**	-0.092**	-0.568**	-0.321**	-0.070**	-0.001	-0.003	0.035*
	(0.014)	(0.013)	(0.018)	(0.008)	(0.009)	(0.011)	(0.009)	(0.008)	(0.013)
% Δ Enrollment (declining)	0.884**	0.699**	0.690**	0.843**	0.684**	0.612**	0.006	-0.033**	-0.006
	(0.013)	(0.015)	(0.033)	(0.007)	(0.010)	(0.024)	(0.009)	(0.010)	(0.022)
Δ % FRL (growing)	-0.017**	-0.013	0.077**	-0.002	0.027**	0.051**	0.014*	0.038**	-0.036
	(0.005)	(0.007)	(0.021)	(0.003)	(0.004)	(0.015)	(0.005)	(0.005)	(0.014)
Δ % IEP (growing)	0.053	0.415**	0.545**	0.068**	0.351**	0.432**	-0.015	0.178**	-0.364**
	(0.025)	(0.033)	(0.101)	(0.013)	(0.020)	(0.088)	(0.020)	(0.024)	(0.056)
Δ % LEP (growing)	0.042	0.092**		0.025	0.001		0.102**	0.070**	
	(0.017)	(0.024)		(0.010)	(0.015)		(0.020)	(0.020)	
Δ % FRL (declining)	-0.003	-0.041**	0.188	-0.014**	-0.033**	0.102	-0.004	0.005	0.476**
	(0.005)	(0.009)	(0.085)	(0.003)	(0.005)	(0.056)	(0.005)	(0.006)	(0.067)
Δ % IEP (declining)	-0.060	0.038	0.018	-0.065**	-0.020	-0.256	0.078**	0.042	-0.210
	(0.025)	(0.032)	(0.246)	(0.014)	(0.017)	(0.363)	(0.020)	(0.022)	(0.113)
Δ % LEP (declining)	0.008	-0.070*		0.010	-0.002		0.026	0.028	
	(0.017)	(0.023)		(0.009)	(0.015)		(0.013)	(0.018)	
Constant	0.055**	0.144**	0.399**	0.045**	0.142**	0.376**	0.017**	0.068**	0.209**
	(0.002)	(0.003)	(0.009)	(0.001)	(0.001)	(0.008)	(0.001)	(0.002)	(0.006)
Year x District obs.	169,594	136,437		170,934	137,322		167,052	134,466	
District obs.	11,418	11,416	10,778	11,417	11,408	10,805	11,416	11,410	10,608
District FEs	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Year FEs	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Standard Errors	Clustered	Clustered	Robust	Clustered	Clustered	Robust	Clustered	Clustered	Robust

Notes. Standard errors in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table 5. Effects of enrollment changes on total staff, teachers, and administrators per 100 students (% Δ)

Dependent Variable:	Total Staff			Full-Time Equivalent Teachers			Administrators		
Interval (years):	1	4	20	1	4	20	1	4	20
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PANEL A. No control covariates									
% Δ Enrollment (growing)	-0.601**	-0.334**	-0.111**	-0.566**	-0.276**	-0.067**	-0.546**	-0.361**	-0.134**
	(0.010)	(0.011)	(0.015)	(0.009)	(0.009)	(0.008)	(0.022)	(0.024)	(0.034)
% Δ Enrollment (declining)	0.847**	0.707**	0.545**	0.826**	0.610**	0.409**	0.941**	0.836**	1.020**
	(0.010)	(0.013)	(0.030)	(0.008)	(0.010)	(0.016)	(0.023)	(0.030)	(0.063)
Constant	0.039**	0.080**	0.214**	0.023**	0.032**	0.055**	0.047**	0.280**	0.526**
	(0.001)	(0.002)	(0.005)	(0.001)	(0.001)	(0.003)	(0.002)	(0.006)	(0.011)
PANEL B. With control covariates									
% Δ Enrollment (growing)	-0.591**	-0.330**	-0.096**	-0.559**	-0.271**	-0.060**	-0.543**	-0.364**	-0.136**
	(0.011)	(0.011)	(0.015)	(0.009)	(0.009)	(0.008)	(0.022)	(0.025)	(0.034)
% Δ Enrollment (declining)	0.843**	0.696**	0.484**	0.828**	0.602**	0.370**	0.943**	0.828**	1.039**
	(0.011)	(0.013)	(0.031)	(0.008)	(0.010)	(0.017)	(0.024)	(0.030)	(0.064)
Δ % FRL (growing)	-0.014**	-0.015*	0.144**	-0.008	-0.007	0.035**	-0.003	-0.003	0.070
	(0.004)	(0.006)	(0.021)	(0.003)	(0.004)	(0.010)	(0.009)	(0.015)	(0.041)
Δ % IEP (growing)	0.146**	0.247**	0.501**	0.045*	0.179**	0.530**	-0.006	0.135	-0.654**
	(0.025)	(0.029)	(0.096)	(0.014)	(0.020)	(0.048)	(0.049)	(0.062)	(0.167)
Δ % LEP (growing)	-0.034	0.007		0.040*	0.039*		0.092	0.036	
	(0.020)	(0.023)		(0.012)	(0.015)		(0.036)	(0.052)	
Δ % FRL (declining)	-0.000	-0.041**	-0.210*	-0.010*	-0.036**	-0.058	0.016	0.073**	0.387
	(0.006)	(0.007)	(0.072)	(0.004)	(0.005)	(0.046)	(0.010)	(0.022)	(0.210)
Δ % IEP (declining)	-0.121**	-0.006	-0.255	-0.098**	-0.082**	-0.149	-0.060	0.027	-0.298
	(0.023)	(0.028)	(0.321)	(0.015)	(0.018)	(0.085)	(0.048)	(0.064)	(0.283)
Δ % LEP (declining)	-0.026	-0.014		-0.003	-0.033		-0.079	-0.120	
	(0.014)	(0.020)		(0.009)	(0.014)		(0.036)	(0.047)	
Constant	0.039**	0.078**	0.171**	0.023**	0.030**	0.032**	0.047**	0.278**	0.533**
	(0.001)	(0.002)	(0.009)	(0.001)	(0.001)	(0.004)	(0.003)	(0.007)	(0.016)
Year x District obs.	167,927	134,937		166,297	133,279		155,639	122,842	
District obs.	11,417	11,414	10,652	11,415	11,405	10,657	11,325	11,247	9,244
District FEs	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Year FEs	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Standard Errors	Clustered	Clustered	Robust	Clustered	Clustered	Robust	Clustered	Clustered	Robust

Notes. Standard errors in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table 6. Effects of enrollment changes on other staff, aides, and counselors per 100 students (% Δ)

Dependent Variable:	Other Staff			Aides			Counselors		
Interval (years):	1	4	20	1	4	20	1	4	20
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PANEL A. No control covariates									
% Δ Enrollment (growing)	-0.548**	-0.384**	-0.115	-0.375**	-0.235**	-0.210*	-0.869**	-0.456**	-0.151**
	(0.023)	(0.032)	(0.130)	(0.030)	(0.034)	(0.067)	(0.035)	(0.032)	(0.031)
% Δ Enrollment (declining)	0.956**	0.844**	1.322**	0.752**	0.476**	0.279	0.638**	0.536**	0.173*
	(0.025)	(0.042)	(0.261)	(0.031)	(0.045)	(0.121)	(0.040)	(0.042)	(0.064)
Constant	0.087**	0.224**	0.886**	0.090**	0.204**	0.785**	0.014**	0.061**	0.193**
	(0.004)	(0.008)	(0.047)	(0.005)	(0.009)	(0.023)	(0.004)	(0.006)	(0.011)
PANEL B. With control covariates									
% Δ Enrollment (growing)	-0.558**	-0.380**	-0.102	-0.376**	-0.196**	-0.156	-0.858**	-0.457**	-0.148**
	(0.023)	(0.032)	(0.130)	(0.031)	(0.034)	(0.066)	(0.035)	(0.032)	(0.031)
% Δ Enrollment (declining)	0.914**	0.835**	1.421**	0.713**	0.443**	0.005	0.652**	0.546**	0.207*
	(0.026)	(0.041)	(0.274)	(0.032)	(0.045)	(0.124)	(0.041)	(0.042)	(0.064)
Δ % FRL (growing)	-0.033**	-0.040	0.411	-0.022	0.009	-0.313**	-0.066**	-0.000	-0.147**
	(0.007)	(0.017)	(0.195)	(0.010)	(0.019)	(0.080)	(0.013)	(0.019)	(0.041)
Δ % IEP (growing)	0.531**	0.302*	-3.257**	0.540**	0.735**	5.636**	-0.164	-0.275*	0.011
	(0.063)	(0.094)	(0.620)	(0.072)	(0.115)	(0.528)	(0.075)	(0.087)	(0.186)
Δ % LEP (growing)	-0.054	0.260*		0.092	-0.148		0.012	-0.020	
	(0.036)	(0.097)		(0.048)	(0.075)		(0.046)	(0.070)	
Δ % FRL (declining)	0.022	-0.054	0.805	0.014	-0.050	-0.339	0.032	-0.044	-0.989**
	(0.010)	(0.022)	(0.722)	(0.013)	(0.020)	(0.337)	(0.014)	(0.020)	(0.179)
Δ % IEP (declining)	0.025	-0.072	-2.423	-0.122	-0.787**	-1.190	-0.242*	0.088	-0.764
	(0.060)	(0.095)	(1.406)	(0.082)	(0.091)	(1.092)	(0.084)	(0.080)	(0.403)
Δ % LEP (declining)	-0.020	-0.112		-0.103	-0.268**		-0.076	-0.136	
	(0.032)	(0.066)		(0.046)	(0.056)		(0.053)	(0.062)	
Constant	0.085**	0.220**	0.931**	0.087**	0.204**	0.672**	0.017**	0.066**	0.240**
	(0.004)	(0.009)	(0.060)	(0.005)	(0.009)	(0.035)	(0.004)	(0.007)	(0.015)
Year x District obs.	155,958	122,796		152,170	123,738		143,892	114,380	
District obs.	11,340	11,285	9,286	11,076	11,015	9,190	10,608	10,498	9,295
District FEs	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Year FEs	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Standard Errors	Clustered	Clustered	Robust	Clustered	Clustered	Robust	Clustered	Clustered	Robust

Notes. Standard errors in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table 7. Effects of enrollment changes on net funds and capital outlay (Δ$)

Dependent Variable:	Net Funds Per Pupil			Total Capital Outlay Per Pupil		
Interval (years):	1	4	20	1	4	20
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. No control covariates						
% Δ Enrollment (growing)	-1,323**	-3,057**	-2,244**	-528**	-72	-109
	(289)	(366)	(426)	(151)	(117)	(120)
% Δ Enrollment (declining)	3,577**	3,318**	6,742**	1,010**	721**	416
	(269)	(379)	(716)	(136)	(109)	(167)
Constant	-173**	-710**	-872**	123**	44	182**
	(25)	(59)	(136)	(19)	(27)	(34)
Panel B. With control covariates						
% Δ Enrollment (growing)	-1,379**	-3,073**	-2,279**	-559**	-57	-118
	(293)	(367)	(426)	(155)	(118)	(120)
% Δ Enrollment (declining)	3,460**	3,199**	6,358**	1,027**	772**	518*
	(276)	(382)	(722)	(142)	(112)	(168)
Δ % FRL (growing)	267*	758**	-328	-147*	-258*	92
	(93)	(176)	(432)	(55)	(80)	(108)
Δ % IEP (growing)	1,053	1,885	6,326**	-341	-60	-1,996**
	(567)	(775)	(1,838)	(265)	(294)	(403)
Δ % LEP (growing)	-483	-249		323	458	
	(323)	(736)		(189)	(192)	
Δ % FRL (declining)	-302*	-926**	9,520**	121	-187	505
	(115)	(240)	(2,223)	(58)	(78)	(415)
Δ % IEP (declining)	717	2,381*	-2,420	274	2	-111
	(676)	(775)	(4,068)	(297)	(258)	(693)
Δ % LEP (declining)	137	272		136	-610*	
	(322)	(569)		(200)	(213)	
Constant	-179**	-791**	-1,040**	122**	60	223**
	(26)	(62)	(186)	(19)	(28)	(44)
Year x District obs.	159,770	127,309		169,051	136,099	
District obs.	11,416	11,394	9,917	11,417	11,415	10,751
District FEs	Yes	Yes	No	Yes	Yes	No
Year FEs	Yes	Yes	No	Yes	Yes	No
Standard Errors	Clustered	Clustered	Robust	Clustered	Clustered	Robust

Notes. Standard errors in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Figure 1.
Concerns About Enrollment Declines on Districts and Students

- In October 2020, the Urban Institute published a brief entitled "Declining School Enrollment Spells Trouble for Education Funding. (Lee et al. 2020)"

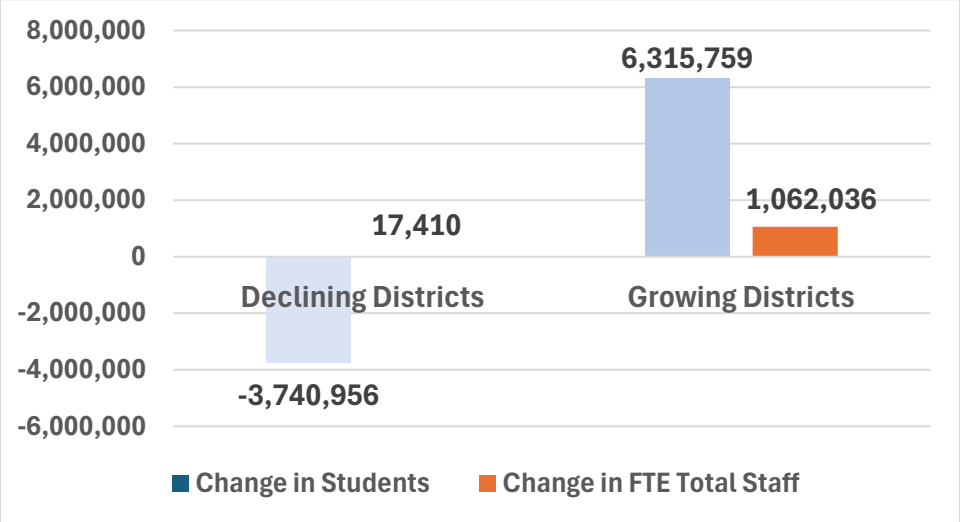
- In December 2021, the National Education Association stated, "(Vouchers) take scarce funding from public schools—which serve 90 percent of students—and give it to private schools—institutions that are not accountable to taxpayers. This means public school students have less access to music instruments and science equipment, modern technology and textbooks, and after-school programs. (National Education Association 2021)"

- In October 2023, a report published by the Hamilton Project at the Brookings Institution concluded that "because state and federal financial support to public schools is typically proportional to student counts while costs are more fixed, enrollment declines may threaten some schools' financial and operational viability. Schools with diminishing enrollment may have to lay off teachers or shut down completely. (Burtis and Goulas 2023)"

- An April 2024 NBC News story ended with the following conclusion: "When more kids are leaving the public schools, that's less funding for the public schools and those who are left, are left with less. (Allen 2024)"

- The call for papers for the 2025 American Education Research Association Conference noted that, "(E)ducation institutions are facing fiscal cliffs, born of declining enrollments and rising costs, and are struggling with teacher, staff, and school leader shortages, burnout, and insufficient staffing for school psychologists and counselors for the students who remain. (Scott et al. 2024)"

Figure 2. Change in Total FTE Staff and Pupil Enrollment, 1999 to 2019



Source: Common Core of Data, National Center for Education Statistics, U.S. Department of Education.

10. Appendix

Methodology

In Table 1, we summarize data completeness for the 11,451 districts in our analytic sample. We have nearly complete data (>99%) for the following variables used in our analysis: enrollment; total state, local, and federal revenues; total expenditures and current expenditures; total capital outlay; students who qualify for free- or reduced-priced lunch; Asian, Black, and Hispanic students. With some exceptions, we generally have 90% completeness for the following variables: salary and benefits; total staff; total full-time equivalent teachers; total administrators; total other staff; total aides; total counselors; net funds; total capital outlay; students who qualify for individualized education plans. The variable capturing the number of students with limited English proficiency has the greatest degree of missingness (57% in 1999) and is thus excluded from any 20-year analysis.

The remainder of tables present full results for our analyses, which includes all alternative specifications of our models, to analyze the extent to which the results in the body of the paper are robust. Each table contains seven columns, each representing a separate regression model. In Model 1, we use the following fixed effects model:

$$y_{dt} = \beta_0 + \beta_1 \%\Delta growth_{dt} + \beta_2 \%\Delta decline_{dt} + \boldsymbol{\delta} + \boldsymbol{\gamma} + \epsilon_d \quad (1)$$

where y_{dt} is the percentage change in resource measure for district d over interval $t = 1, 4, 20$. For Net Funds Per Pupil and Total Capital Outlay, the dependent variable is a dollar change rather than a percentage change. We include spline variables for percentage changes in district enrollment, where $\%\Delta growth_{dt}$ assumes the value of the percentage change in enrollment if district d grew over interval t and 0 otherwise; conversely, $\%\Delta decline_{dt}$ assumes the value of the percentage change in enrollment if district d declined over interval t and 0 otherwise. We include both district fixed effects $\boldsymbol{\delta}$ and year fixed effects $\boldsymbol{\gamma}$ and cluster our standard errors ϵ_d by district. We omit district fixed effects and year fixed effects in our 20-year analyses and estimate heteroskedasticity-robust standard errors.

Model 2 uses the same regression model but only includes districts on the condition that they are not missing FRL, IEP, and LEP student characteristics. We do not include the LEP condition for our 20-year analyses. The estimates from Model 2 are reported in Panel A of Tables 3-7 of the main manuscript. Model 3 uses the same regression model but adds the condition that districts are not missing student race and ethnicity data.

In Model 4, we use the following fixed effects model:

$$y_{dt} = \beta_0 + \beta_1 \%\Delta growth_{dt} + \beta_2 \%\Delta decline_{dt} + \beta_3 \%\Delta FRL_{dt} + \beta_4 \%\Delta IEP_{dt} + \beta_5 \%\Delta LEP_{dt} + \boldsymbol{\delta} + \boldsymbol{\gamma} + \epsilon_d \quad (2)$$

adding in control covariates for the change in proportion of students who qualify for free- and reduced-price lunch $\%\Delta FRL_{dt}$, who qualify for individualized education plans $\%\Delta IEP_{dt}$, and who are classified as having limited English proficiency $\%\Delta LEP_{dt}$. Again, we exclude district fixed effects, year fixed effects, and proportion LEP for our 20-year analyses.

We extend Model 4 by adding in control covariates for student race and ethnicity in Model 5:

$$y_{dt} = \beta_0 + \beta_1 \%\Delta growth_{dt} + \beta_2 \%\Delta decline_{dt} + \beta_3 \%\Delta FRL_{dt} + \beta_4 \%\Delta IEP_{dt} + \beta_5 \%\Delta LEP_{dt} + \beta_6 \%\Delta asian_{dt} + \beta_7 \%\Delta black_{dt} + \beta_7 \%\Delta hispanic_{dt} + \boldsymbol{\delta} + \boldsymbol{\gamma} + \epsilon_d \quad (3)$$

Thus, the analytic samples used in Model 2 and Model 4 are identical, and the analytic samples used in Model 3 and Model 5 are identical.

In Model 6, our preferred model specification, we introduce spline variables by interacting FRL, IEP, and LEP control covariates with indicator variables for growing g'_{dt} and declining d'_{dt}:

$$y_{dt} = \beta_0 + (\beta \%\Delta enroll_{dt} + \beta \%\Delta FRL_{dt} + \beta \%\Delta IEP_{dt} + \beta \%\Delta LEP_{dt}) * (g'_{dt} + d'_{dt}) + \boldsymbol{\delta} + \boldsymbol{\gamma} + \epsilon_d \quad (4)$$

including spline variables by growing g'_{dt} and declining d'_{dt} districts for percentage changes in the proportion of students who qualify for FRL, who are supported by an IEP, or who are classified as LEP. Again, we exclude district fixed effects, year fixed effects, and proportion LEP for our 20-year analyses. The estimates from Model 6 are reported in Panel B of Tables 3-7 of the main manuscript.

Finally, in Model 7, we introduce spline variables for all control covariates, including student race and ethnicity variables:

$$y_{dt} = \beta_0 + (\beta\%\Delta enroll_{dt} + \beta\%\Delta FRL_{dt} + \beta\%\Delta IEP_{dt} + \beta\%\Delta LEP_{dt} + \beta\%\Delta asian_{dt} + \beta\%\Delta black_{dt} + \beta\%\Delta hispanic_{dt}) * (g'_{dt} + d'_{dt}) + \boldsymbol{\delta} + \boldsymbol{\gamma} + \epsilon_d \quad (5)$$

Because district finances are explicitly tied to FRL, IEP, and LEP characteristics and not to student race and ethnicity, and because our data are more complete for FRL, IEP, and LEP than student race and ethnicity, we prefer Model 6 over Model 7.

In Tables A2-A43 (and in the main paper), we trim our analytic sample by excluding districts whose 1-, 4-, or 20-year changes were less than the 1st percentile or greater than the 99th percentile of enrollment changes or changes in the dependent variable. By doing so, we exclude outliers with unusually large positive or negative changes in enrollment or the dependent variable, many of which appear to be the result of clerical errors.

We generally find our results to be robust to model specification, with the exception of salary and benefits per staff, where we find a modest advantage over longer time periods for growing districts, but in Tables A18 and A19 this effect tends to be null across the alternative specifications.

Appendix Tables

Table A1. Data completeness by variable and year (numbers round to 1) for the analytic sample of 11,451 districts

Year:	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
Enrollment	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00
State Revenues	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	1.00	0.99	0.99	1.00	1.00
Local Revenues	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	1.00	0.99	0.99	1.00	1.00
Federal Revs.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	1.00	0.99	0.99	1.00	1.00
Total Exps.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	1.00	0.99	0.99	1.00	1.00
Tot. Curr. Exps.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	1.00	0.99	0.99	1.00	1.00
Sal. and Ben.	0.99	1.00	0.95	0.99	0.99	1.00	0.97	1.00	1.00	1.00	1.00	0.99	0.99	1.00	0.95	0.99	0.96	0.99	0.99	0.99	0.99
Total Staff	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	1.00	0.95	1.00	0.96	0.99	0.99	0.99	0.99
Total FTEs	0.99	1.00	0.95	0.99	0.99	1.00	0.97	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.92	0.99	0.89	0.99	0.99	0.99	0.99
Total Admins.	0.94	0.95	0.90	0.97	0.94	0.97	0.94	0.99	0.95	0.88	0.96	0.90	0.98	0.99	0.89	0.86	0.95	0.91	0.92	0.91	0.92
Total Other Staff	0.94	0.95	0.90	0.97	0.94	0.97	0.94	0.99	0.94	0.88	0.96	0.90	0.98	0.99	0.89	0.86	0.89	0.91	0.92	0.91	0.92
Total Aides	0.87	0.88	0.84	0.88	0.92	0.92	0.89	0.92	0.81	0.90	0.92	0.91	0.89	0.92	0.98	0.92	0.95	0.97	0.98	0.98	0.98
Tot. Couns.	0.99	1.00	0.95	0.99	0.99	0.99	0.97	0.99	0.94	0.93	0.97	0.90	0.97	0.97	0.96	0.96	0.73	0.94	0.99	0.99	0.99
Net Funds	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.95	0.99	0.99	0.99	0.99	0.99	1.00	1.00
Tot. Cap. Outlay	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	1.00	0.99	0.99	1.00	1.00
% FRL	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99	0.99	1.00	1.00
% IEP	1.00	1.00	0.95	1.00	0.99	0.97	0.87	1.00	0.90	0.89	0.91	1.00	0.98	1.00	0.99	1.00	0.97	0.98	0.97	0.97	0.97
% LEP	0.57	0.67	0.69	0.85	0.88	0.84	0.79	0.86	0.70	0.77	0.91	1.00	0.92	1.00	0.98	0.99	0.96	0.76	0.77	0.79	0.79
% Asian	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99	0.99	1.00	1.00
% Black	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99	0.99	1.00	1.00
% Hispanic	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99	0.99	1.00	1.00

Table A2. Effects of enrollment changes on total state revenues per pupil, 1-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.451**	-0.416**	-0.416**	-0.412**	-0.412**	-0.405**	-0.412**
	(0.013)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
% Δ Enrollment (declining)	0.826**	0.827**	0.827**	0.822**	0.824**	0.832**	0.825**
	(0.012)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Δ % FRL (growing if spline)				0.011*	0.009	0.003	-0.001
				(0.004)	(0.004)	(0.006)	(0.005)
Δ % IEP (growing if spline)				0.073**	0.072**	-0.004	-0.013
				(0.020)	(0.020)	(0.029)	(0.029)
Δ % LEP (growing if spline)				-0.018	-0.028	0.029	0.016
				(0.011)	(0.013)	(0.018)	(0.019)
Δ % Asian (growing if spline)					0.402**		0.851**
					(0.095)		(0.162)
Δ % Black (growing if spline)					0.010		-0.060
					(0.050)		(0.036)
Δ % Hispanic (growing if spline)					0.023		0.075*
					(0.019)		(0.026)
Δ % FRL (declining)						-0.020**	-0.020**
						(0.005)	(0.005)
Δ % IEP (declining)						-0.158**	-0.165**
						(0.031)	(0.031)
Δ % LEP (declining)						0.063**	0.067**
						(0.016)	(0.017)
Δ % Asian (declining)							0.134
							(0.090)
Δ % Black (declining)							-0.153*
							(0.052)
Δ % Hispanic (declining)							0.061
							(0.034)
Constant	0.046**	0.067**	0.067**	0.067**	0.067**	0.068**	0.067**
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Year x District obs.	219,654	169,351	169,351	169,351	169,351	169,351	169,351
District obs.	11,418	11,413	11,413	11,413	11,413	11,413	11,413

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A3. Effects of enrollment changes on total state revenues per pupil, 4-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.215**	-0.176**	-0.176**	-0.165**	-0.167**	-0.165**	-0.163**
	(0.014)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
% Δ Enrollment (declining)	0.568**	0.532**	0.532**	0.523**	0.525**	0.522**	0.525**
	(0.017)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.020)
Δ % FRL (growing if spline)				0.065**	0.057**	0.066**	0.057**
				(0.008)	(0.009)	(0.012)	(0.012)
Δ % IEP (growing if spline)				0.144**	0.128**	0.136*	0.090
				(0.026)	(0.029)	(0.047)	(0.056)
Δ % LEP (growing if spline)				0.022	0.011	0.039	0.041
				(0.020)	(0.021)	(0.033)	(0.038)
Δ % Asian (growing if spline)					0.352		0.678
					(0.142)		(0.264)
Δ % Black (growing if spline)					0.059		-0.175
					(0.041)		(0.069)
Δ % Hispanic (growing if spline)					0.013		0.040
					(0.028)		(0.037)
Δ % FRL (declining)						-0.062**	-0.057**
						(0.011)	(0.011)
Δ % IEP (declining)						-0.152**	-0.157**
						(0.037)	(0.038)
Δ % LEP (declining)						-0.008	0.004
						(0.026)	(0.025)
Δ % Asian (declining)							0.012
							(0.130)
Δ % Black (declining)							-0.504**
							(0.075)
Δ % Hispanic (declining)							-0.072
							(0.050)
Constant	0.112**	0.091**	0.091**	0.086**	0.085**	0.086**	0.086**
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)
Year x District obs.	186,547	136,235	136,235	136,235	136,235	136,235	136,235
District obs.	11,416	11,407	11,407	11,407	11,407	11,407	11,407

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A4. Effects of enrollment changes on total state revenues per pupil, 20-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.022	-0.028	-0.028	0.003	-0.059	0.005	-0.067
	(0.029)	(0.029)	(0.029)	(0.029)	(0.029)	(0.029)	(0.030)
% Δ Enrollment (declining)	0.220**	0.199**	0.198**	0.099	0.261**	0.093	0.272**
	(0.049)	(0.049)	(0.049)	(0.050)	(0.050)	(0.050)	(0.050)
Δ % FRL (growing if spline)				0.364**	0.301**	0.423**	0.381**
				(0.030)	(0.029)	(0.033)	(0.033)
Δ % IEP (growing if spline)				0.488**	0.435**	0.303	0.162
				(0.111)	(0.108)	(0.141)	(0.134)
Δ % Asian (growing if spline)					2.283**		3.690**
					(0.283)		(0.330)
Δ % Black (growing if spline)					0.674**		0.600*
					(0.136)		(0.223)
Δ % Hispanic (growing if spline)					0.895**		0.798**
					(0.078)		(0.082)
Δ % FRL (declining)						0.202	0.224
						(0.132)	(0.130)
Δ % IEP (declining)						-0.769	-0.621
						(0.438)	(0.376)
Δ % Asian (declining)							4.456**
							(0.930)
Δ % Black (declining)							-0.718**
							(0.177)
Δ % Hispanic (declining)							0.182
							(0.525)
Constant	0.447**	0.447**	0.447**	0.360**	0.277**	0.352**	0.240**
	(0.010)	(0.010)	(0.010)	(0.011)	(0.012)	(0.014)	(0.014)
District obs.	10,958	10,760	10,759	10,760	10,760	10,760	10,760

Notes. Heteroskedasticity-robust standard errors reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A5. Effects of enrollment changes on total local revenues per pupil, 1-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.633**	-0.611**	-0.611**	-0.608**	-0.609**	-0.609**	-0.611**
	(0.011)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
% Δ Enrollment (declining)	1.003**	1.006**	1.006**	1.002**	1.003**	1.000**	1.000**
	(0.011)	(0.013)	(0.013)	(0.013)	(0.013)	(0.014)	(0.014)
Δ % FRL (growing if spline)				0.006	0.005	0.003	-0.000
				(0.004)	(0.004)	(0.005)	(0.005)
Δ % IEP (growing if spline)				0.061**	0.061**	0.089*	0.086*
				(0.018)	(0.018)	(0.027)	(0.027)
Δ % LEP (growing if spline)				0.004	-0.009	-0.014	-0.027
				(0.017)	(0.016)	(0.022)	(0.023)
Δ % Asian (growing if spline)					0.136		0.110
					(0.060)		(0.068)
Δ % Black (growing if spline)					0.061		0.037
					(0.031)		(0.040)
Δ % Hispanic (growing if spline)					0.022		0.055
					(0.025)		(0.033)
Δ % FRL (declining)						-0.011	-0.011
						(0.005)	(0.006)
Δ % IEP (declining)						-0.031	-0.033
						(0.028)	(0.028)
Δ % LEP (declining)						-0.023	-0.011
						(0.022)	(0.020)
Δ % Asian (declining)							-0.163
							(0.096)
Δ % Black (declining)							-0.102*
							(0.034)
Δ % Hispanic (declining)							0.028
							(0.027)
Constant	0.030**	0.037**	0.037**	0.036**	0.036**	0.036**	0.036**
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Year x District obs.	219,919	169,443	169,443	169,443	169,443	169,443	169,443
District obs.	11,421	11,415	11,415	11,415	11,415	11,415	11,415

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A6. Effects of enrollment changes on total local revenues per pupil, 1-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.390**	-0.376**	-0.376**	-0.372**	-0.373**	-0.372**	-0.372**
	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)	(0.015)	(0.015)
% Δ Enrollment (declining)	1.021**	1.026**	1.026**	1.021**	1.023**	1.019**	1.021**
	(0.015)	(0.017)	(0.017)	(0.017)	(0.017)	(0.018)	(0.018)
Δ % FRL (growing if spline)				-0.010	-0.012	-0.035**	-0.035**
				(0.006)	(0.006)	(0.008)	(0.009)
Δ % IEP (growing if spline)				0.125**	0.123**	0.218**	0.219**
				(0.022)	(0.022)	(0.035)	(0.035)
Δ % LEP (growing if spline)				0.003	-0.009	-0.028	-0.037
				(0.021)	(0.021)	(0.038)	(0.033)
Δ % Asian (growing if spline)					0.339**		0.335**
					(0.066)		(0.084)
Δ % Black (growing if spline)					0.022		0.056
					(0.037)		(0.059)
Δ % Hispanic (growing if spline)					0.016		-0.023
					(0.027)		(0.035)
Δ % FRL (declining)						-0.029*	-0.021
						(0.010)	(0.010)
Δ % IEP (declining)						-0.040	-0.030
						(0.033)	(0.033)
Δ % LEP (declining)						-0.035	-0.021
						(0.030)	(0.032)
Δ % Asian (declining)							-0.294
							(0.117)
Δ % Black (declining)							-0.032
							(0.074)
Δ % Hispanic (declining)							-0.105*
							(0.033)
Constant	0.095**	0.118**	0.118**	0.118**	0.117**	0.119**	0.118**
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Year x District obs.	187,011	136,429	136,429	136,429	136,429	136,429	136,429
District obs.	11,420	11,410	11,410	11,410	11,410	11,410	11,410

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A7. Effects of enrollment changes on total local revenues per pupil, 1-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.091**	-0.095**	-0.095**	-0.115**	-0.113**	-0.122**	-0.118**
	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
% Δ Enrollment (declining)	1.412**	1.404**	1.402**	1.470**	1.470**	1.445**	1.444**
	(0.046)	(0.046)	(0.046)	(0.047)	(0.049)	(0.047)	(0.049)
Δ % FRL (growing if spline)				-0.367**	-0.355**	-0.406**	-0.384**
				(0.026)	(0.027)	(0.027)	(0.030)
Δ % IEP (growing if spline)				0.141	0.151	0.765**	0.763**
				(0.145)	(0.145)	(0.144)	(0.134)
Δ % Asian (growing if spline)					0.229		0.069
					(0.131)		(0.135)
Δ % Black (growing if spline)					-0.273*		-0.578**
					(0.090)		(0.112)
Δ % Hispanic (growing if spline)					-0.034		0.064
					(0.066)		(0.068)
Δ % FRL (declining)						0.063	0.060
						(0.134)	(0.137)
Δ % IEP (declining)						0.896**	0.867**
						(0.161)	(0.149)
Δ % Asian (declining)							-0.984
							(0.453)
Δ % Black (declining)							-0.139
							(0.162)
Δ % Hispanic (declining)							1.497
							(0.707)
Constant	0.423**	0.425**	0.425**	0.498**	0.496**	0.478**	0.478**
	(0.008)	(0.008)	(0.008)	(0.010)	(0.011)	(0.011)	(0.012)
District obs.	10,979	10,769	10,767	10,769	10,769	10,769	10,769

Notes. Heteroskedasticity-robust standard errors reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A8. Effects of enrollment changes on total federal revenues per pupil, 1-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.453**	-0.431**	-0.431**	-0.416**	-0.417**	-0.414**	-0.416**
	(0.023)	(0.027)	(0.027)	(0.027)	(0.027)	(0.028)	(0.028)
% Δ Enrollment (declining)	0.986**	0.970**	0.970**	0.955**	0.954**	0.949**	0.947**
	(0.026)	(0.031)	(0.031)	(0.031)	(0.031)	(0.032)	(0.032)
Δ % FRL (growing if spline)				0.032**	0.031**	0.027	0.025
				(0.008)	(0.008)	(0.013)	(0.012)
Δ % IEP (growing if spline)				0.273**	0.271**	0.395**	0.389**
				(0.041)	(0.041)	(0.063)	(0.063)
Δ % LEP (growing if spline)				0.031	0.012	-0.146*	-0.168**
				(0.029)	(0.025)	(0.049)	(0.039)
Δ % Asian (growing if spline)					-0.035		-0.163
					(0.121)		(0.162)
Δ % Black (growing if spline)					0.172**		0.243*
					(0.049)		(0.091)
Δ % Hispanic (growing if spline)					-0.001		0.016
					(0.051)		(0.057)
Δ % FRL (declining)						-0.037*	-0.042**
						(0.014)	(0.011)
Δ % IEP (declining)						-0.139	-0.141
						(0.061)	(0.061)
Δ % LEP (declining)						-0.204**	-0.194**
						(0.030)	(0.032)
Δ % Asian (declining)							-0.034
							(0.230)
Δ % Black (declining)							-0.079
							(0.085)
Δ % Hispanic (declining)							0.012
							(0.086)
Constant	0.112**	0.120**	0.120**	0.120**	0.120**	0.120**	0.120**
	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Year x District obs.	219,190	168,896	168,896	168,896	168,896	168,896	168,896
District obs.	11,418	11,412	11,412	11,412	11,412	11,412	11,412

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A9. Effects of enrollment changes on total federal revenues per pupil, 4-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.384**	-0.388**	-0.388**	-0.355**	-0.357**	-0.351**	-0.354**
	(0.023)	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)
% Δ Enrollment (declining)	0.810**	0.742**	0.742**	0.716**	0.717**	0.713**	0.715**
	(0.029)	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)
Δ % FRL (growing if spline)				0.168**	0.168**	0.213**	0.213**
				(0.014)	(0.012)	(0.018)	(0.017)
Δ % IEP (growing if spline)				0.500**	0.497**	0.507**	0.496**
				(0.050)	(0.050)	(0.078)	(0.080)
Δ % LEP (growing if spline)				0.272**	0.272**	0.050	0.039
				(0.042)	(0.035)	(0.072)	(0.058)
Δ % Asian (growing if spline)					0.447		0.949**
					(0.183)		(0.275)
Δ % Black (growing if spline)					0.094		-0.092
					(0.172)		(0.185)
Δ % Hispanic (growing if spline)					-0.055		0.013
					(0.085)		(0.078)
Δ % FRL (declining)						-0.105**	-0.100**
						(0.019)	(0.019)
Δ % IEP (declining)						-0.479**	-0.473**
						(0.075)	(0.076)
Δ % LEP (declining)						-0.465**	-0.466**
						(0.046)	(0.047)
Δ % Asian (declining)							0.086
							(0.254)
Δ % Black (declining)							-0.460**
							(0.136)
Δ % Hispanic (declining)							0.012
							(0.084)
Constant	0.542**	0.576**	0.576**	0.560**	0.559**	0.560**	0.558**
	(0.006)	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)
Year x District obs.	186,241	136,094	136,094	136,094	136,094	136,094	136,094
District obs.	11,411	11,396	11,396	11,396	11,396	11,396	11,396

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A10. Effects of enrollment changes on total federal revenues per pupil, 20-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	0.222**	0.209*	0.209*	0.239**	0.141	0.232**	0.128
	(0.064)	(0.064)	(0.064)	(0.064)	(0.064)	(0.063)	(0.064)
% Δ Enrollment (declining)	0.644**	0.573**	0.573**	0.461**	0.660**	0.447**	0.654**
	(0.094)	(0.092)	(0.092)	(0.094)	(0.096)	(0.094)	(0.095)
Δ % FRL (growing if spline)				0.375**	0.216**	0.285**	0.108
				(0.050)	(0.049)	(0.055)	(0.055)
Δ % IEP (growing if spline)				0.530	0.401	1.227**	1.111**
				(0.223)	(0.228)	(0.273)	(0.275)
Δ % Asian (growing if spline)					1.287**		1.380**
					(0.357)		(0.396)
Δ % Black (growing if spline)					2.635**		2.551**
					(0.224)		(0.400)
Δ % Hispanic (growing if spline)					1.365**		1.460**
					(0.136)		(0.140)
Δ % FRL (declining)						-1.218**	-1.270**
						(0.273)	(0.268)
Δ % IEP (declining)						0.580	0.754
						(0.316)	(0.323)
Δ % Asian (declining)							-0.542
							(0.905)
Δ % Black (declining)							-2.840**
							(0.257)
Δ % Hispanic (declining)							0.792
							(1.542)
Constant	0.953**	0.956**	0.956**	0.866**	0.773**	0.858**	0.760**
	(0.018)	(0.018)	(0.018)	(0.020)	(0.023)	(0.022)	(0.025)
District obs.	10,891	10,721	10,719	10,721	10,721	10,721	10,721

Notes. Heteroskedasticity-robust standard errors reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A11. Effects of enrollment changes on total expenditures per pupil, 1-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.575**	-0.551**	-0.551**	-0.548**	-0.548**	-0.547**	-0.550**
	(0.011)	(0.013)	(0.013)	(0.013)	(0.013)	(0.014)	(0.014)
% Δ Enrollment (declining)	0.889**	0.885**	0.885**	0.883**	0.883**	0.884**	0.883**
	(0.011)	(0.012)	(0.012)	(0.012)	(0.012)	(0.013)	(0.013)
Δ % FRL (growing if spline)				-0.009	-0.009*	-0.017**	-0.018**
				(0.003)	(0.003)	(0.005)	(0.005)
Δ % IEP (growing if spline)				0.056**	0.056**	0.053	0.050
				(0.017)	(0.017)	(0.025)	(0.025)
Δ % LEP (growing if spline)				0.017	0.011	0.042	0.040
				(0.013)	(0.013)	(0.017)	(0.018)
Δ % Asian (growing if spline)					0.100		0.328**
					(0.068)		(0.090)
Δ % Black (growing if spline)					0.030		-0.028
					(0.019)		(0.046)
Δ % Hispanic (growing if spline)					0.005		0.008
					(0.022)		(0.030)
Δ % FRL (declining)						-0.003	-0.000
						(0.005)	(0.005)
Δ % IEP (declining)						-0.060	-0.062
						(0.025)	(0.025)
Δ % LEP (declining)						0.008	0.016
						(0.017)	(0.017)
Δ % Asian (declining)							0.174
							(0.081)
Δ % Black (declining)							-0.100*
							(0.038)
Δ % Hispanic (declining)							0.004
							(0.031)
Constant	0.040**	0.055**	0.055**	0.055**	0.055**	0.055**	0.054**
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Year x District obs.	219,817	169,594	169,594	169,594	169,594	169,594	169,594
District obs.	11,421	11,418	11,418	11,418	11,418	11,418	11,418

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A12. Effects of enrollment changes on total expenditures per pupil, 4-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.247**	-0.238**	-0.238**	-0.230**	-0.231**	-0.238**	-0.237**
	(0.011)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.014)
% Δ Enrollment (declining)	0.747**	0.721**	0.721**	0.713**	0.716**	0.699**	0.703**
	(0.012)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Δ % FRL (growing if spline)				0.009	0.006	-0.013	-0.014
				(0.005)	(0.005)	(0.007)	(0.007)
Δ % IEP (growing if spline)				0.184**	0.177**	0.415**	0.392**
				(0.020)	(0.021)	(0.033)	(0.039)
Δ % LEP (growing if spline)				0.076**	0.066**	0.092**	0.090*
				(0.016)	(0.017)	(0.024)	(0.028)
Δ % Asian (growing if spline)					0.372**		0.603*
					(0.082)		(0.195)
Δ % Black (growing if spline)					-0.006		-0.214**
					(0.043)		(0.040)
Δ % Hispanic (growing if spline)					0.020		0.060
					(0.023)		(0.027)
Δ % FRL (declining)						-0.041**	-0.033**
						(0.009)	(0.009)
Δ % IEP (declining)						0.038	0.041
						(0.032)	(0.032)
Δ % LEP (declining)						-0.070*	-0.065*
						(0.023)	(0.023)
Δ % Asian (declining)							0.001
							(0.086)
Δ % Black (declining)							-0.373**
							(0.056)
Δ % Hispanic (declining)							-0.037
							(0.033)
Constant	0.137**	0.150**	0.150**	0.147**	0.146**	0.144**	0.144**
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Year x District obs.	186,789	136,437	136,437	136,437	136,437	136,437	136,437
District obs.	11,420	11,416	11,416	11,416	11,416	11,416	11,416

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A13. Effects of enrollment changes on total expenditures per pupil, 20-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.096**	-0.099**	-0.099**	-0.090**	-0.111**	-0.092**	-0.114**
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
% Δ Enrollment (declining)	0.761**	0.740**	0.740**	0.708**	0.771**	0.690**	0.760**
	(0.034)	(0.033)	(0.033)	(0.034)	(0.035)	(0.033)	(0.034)
Δ % FRL (growing if spline)				0.056*	0.029	0.077**	0.075**
				(0.020)	(0.020)	(0.021)	(0.022)
Δ % IEP (growing if spline)				0.341*	0.340*	0.545**	0.505**
				(0.122)	(0.122)	(0.101)	(0.099)
Δ % Asian (growing if spline)					0.654**		1.355**
					(0.135)		(0.164)
Δ % Black (growing if spline)					0.138		-0.224
					(0.081)		(0.127)
Δ % Hispanic (growing if spline)					0.381**		0.364**
					(0.048)		(0.050)
Δ % FRL (declining)						0.188	0.217
						(0.085)	(0.084)
Δ % IEP (declining)						0.018	0.085
						(0.246)	(0.226)
Δ % Asian (declining)							2.732**
							(0.587)
Δ % Black (declining)							-0.533**
							(0.106)
Δ % Hispanic (declining)							-0.033
							(0.443)
Constant	0.433**	0.435**	0.435**	0.416**	0.382**	0.399**	0.353**
	(0.006)	(0.006)	(0.006)	(0.007)	(0.008)	(0.009)	(0.010)
District obs.	10,974	10,778	10,776	10,778	10,778	10,778	10,778

Notes. Heteroskedasticity-robust standard errors reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A14. Effects of enrollment changes on total current expenditures per pupil, 1-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.587**	-0.573**	-0.573**	-0.569**	-0.568**	-0.568**	-0.570**
	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
% Δ Enrollment (declining)	0.850**	0.847**	0.847**	0.842**	0.843**	0.843**	0.840**
	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Δ % FRL (growing if spline)				0.005*	0.005*	-0.002	-0.003
				(0.002)	(0.002)	(0.003)	(0.003)
Δ % IEP (growing if spline)				0.066**	0.066**	0.068**	0.064**
				(0.008)	(0.008)	(0.013)	(0.013)
Δ % LEP (growing if spline)				0.007	0.001	0.025	0.017
				(0.007)	(0.006)	(0.010)	(0.008)
Δ % Asian (growing if spline)					0.089		0.278**
					(0.041)		(0.058)
Δ % Black (growing if spline)					0.016		0.001
					(0.010)		(0.019)
Δ % Hispanic (growing if spline)					0.017		0.040**
					(0.011)		(0.012)
Δ % FRL (declining)						-0.014**	-0.014**
						(0.003)	(0.003)
Δ % IEP (declining)						-0.065**	-0.069**
						(0.014)	(0.014)
Δ % LEP (declining)						0.010	0.013
						(0.009)	(0.009)
Δ % Asian (declining)							0.123*
							(0.040)
Δ % Black (declining)							-0.059**
							(0.018)
Δ % Hispanic (declining)							0.011
							(0.016)
Constant	0.035**	0.045**	0.045**	0.045**	0.045**	0.045**	0.044**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Year x District obs.	221,747	170,934	170,934	170,934	170,934	170,934	170,934
District obs.	11,421	11,417	11,417	11,417	11,417	11,417	11,417

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A15. Effects of enrollment changes on total current expenditures per pupil, 4-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.346**	-0.325**	-0.325**	-0.316**	-0.317**	-0.321**	-0.320**
	(0.008)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
% Δ Enrollment (declining)	0.722**	0.700**	0.700**	0.691**	0.692**	0.684**	0.684**
	(0.008)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Δ % FRL (growing if spline)				0.030**	0.029**	0.027**	0.028**
				(0.003)	(0.003)	(0.004)	(0.004)
Δ % IEP (growing if spline)				0.183**	0.182**	0.351**	0.349**
				(0.011)	(0.011)	(0.020)	(0.021)
Δ % LEP (growing if spline)				-0.001	-0.003	0.001	0.010
				(0.010)	(0.010)	(0.015)	(0.016)
Δ % Asian (growing if spline)					0.250**		0.438**
					(0.043)		(0.089)
Δ % Black (growing if spline)					0.018		-0.084**
					(0.028)		(0.024)
Δ % Hispanic (growing if spline)					-0.014		-0.011
					(0.013)		(0.014)
Δ % FRL (declining)						-0.033**	-0.029**
						(0.005)	(0.005)
Δ % IEP (declining)						-0.020	-0.017
						(0.017)	(0.017)
Δ % LEP (declining)						-0.002	0.005
						(0.015)	(0.014)
Δ % Asian (declining)							-0.051
							(0.054)
Δ % Black (declining)							-0.222**
							(0.038)
Δ % Hispanic (declining)							-0.033
							(0.017)
Constant	0.137**	0.149**	0.149**	0.145**	0.145**	0.142**	0.142**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Year x District obs.	187,985	137,322	137,322	137,322	137,322	137,322	137,322
District obs.	11,420	11,408	11,408	11,408	11,408	11,408	11,408

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A16. Effects of enrollment changes on total current expenditures per pupil, 20-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.073**	-0.077**	-0.077**	-0.069**	-0.088**	-0.070**	-0.090**
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.012)
% Δ Enrollment (declining)	0.664**	0.650**	0.650**	0.619**	0.670**	0.612**	0.669**
	(0.024)	(0.024)	(0.024)	(0.026)	(0.026)	(0.024)	(0.025)
Δ % FRL (growing if spline)				0.038*	0.019	0.051**	0.052**
				(0.014)	(0.015)	(0.015)	(0.016)
Δ % IEP (growing if spline)				0.370*	0.366*	0.432**	0.386**
				(0.117)	(0.117)	(0.088)	(0.086)
Δ % Asian (growing if spline)					0.663**		1.244**
					(0.103)		(0.121)
Δ % Black (growing if spline)					0.105		-0.174
					(0.057)		(0.089)
Δ % Hispanic (growing if spline)					0.290**		0.286**
					(0.035)		(0.036)
Δ % FRL (declining)						0.102	0.119
						(0.056)	(0.056)
Δ % IEP (declining)						-0.256	-0.208
						(0.363)	(0.349)
Δ % Asian (declining)							2.086**
							(0.417)
Δ % Black (declining)							-0.420**
							(0.080)
Δ % Hispanic (declining)							0.420
							(0.362)
Constant	0.396**	0.399**	0.399**	0.383**	0.355**	0.376**	0.337**
	(0.004)	(0.004)	(0.004)	(0.005)	(0.006)	(0.008)	(0.009)
District obs.	11,003	10,805	10,803	10,805	10,805	10,805	10,805

Notes. Heteroskedasticity-robust standard errors reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A17. Effects of enrollment changes on salary and benefits per staff, 1-year % Δ (1% trimming

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	0.015	0.010	0.010	0.009	0.009	-0.001	-0.004
	(0.008)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
% Δ Enrollment (declining)	0.014	0.013	0.013	0.015	0.015	0.006	0.003
	(0.008)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Δ % FRL (growing if spline)				0.009**	0.009*	0.014*	0.014**
				(0.003)	(0.003)	(0.005)	(0.004)
Δ % IEP (growing if spline)				-0.045**	-0.045**	-0.015	-0.019
				(0.013)	(0.012)	(0.020)	(0.020)
Δ % LEP (growing if spline)				0.041**	0.043**	0.102**	0.105**
				(0.011)	(0.010)	(0.020)	(0.016)
Δ % Asian (growing if spline)					-0.015		0.029
					(0.043)		(0.059)
Δ % Black (growing if spline)					-0.056		-0.165**
					(0.027)		(0.037)
Δ % Hispanic (growing if spline)					0.007		0.063**
					(0.014)		(0.016)
Δ % FRL (declining)						-0.004	-0.001
						(0.005)	(0.004)
Δ % IEP (declining)						0.078**	0.071**
						(0.020)	(0.020)
Δ % LEP (declining)						0.026	0.021
						(0.013)	(0.013)
Δ % Asian (declining)							0.065
							(0.071)
Δ % Black (declining)							-0.041
							(0.039)
Δ % Hispanic (declining)							0.096*
							(0.034)
Constant	0.010**	0.018**	0.018**	0.018**	0.018**	0.017**	0.017**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Year x District obs.	214,874	167,052	167,052	167,052	167,052	167,052	167,052
District obs.	11,421	11,416	11,416	11,416	11,416	11,416	11,416

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A18. Effects of enrollment changes on salary and benefits per staff, 4-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.018	-0.000	-0.000	0.004	0.004	-0.003	-0.003
	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
% Δ Enrollment (declining)	-0.037**	-0.020	-0.020	-0.024	-0.023	-0.033**	-0.032*
	(0.009)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Δ % FRL (growing if spline)				0.022**	0.023**	0.038**	0.040**
				(0.004)	(0.004)	(0.005)	(0.005)
Δ % IEP (growing if spline)				0.067**	0.068**	0.178**	0.178**
				(0.015)	(0.015)	(0.024)	(0.024)
Δ % LEP (growing if spline)				0.016	0.013	0.070**	0.059*
				(0.013)	(0.013)	(0.020)	(0.021)
Δ % Asian (growing if spline)					0.136*		0.209*
					(0.048)		(0.073)
Δ % Black (growing if spline)					-0.087*		-0.228**
					(0.029)		(0.044)
Δ % Hispanic (growing if spline)					0.010		0.044
					(0.019)		(0.022)
Δ % FRL (declining)						0.005	0.005
						(0.006)	(0.006)
Δ % IEP (declining)						0.042	0.040
						(0.022)	(0.022)
Δ % LEP (declining)						0.028	0.022
						(0.018)	(0.018)
Δ % Asian (declining)							-0.075
							(0.068)
Δ % Black (declining)							-0.064
							(0.044)
Δ % Hispanic (declining)							0.094
							(0.045)
Constant	0.059**	0.075**	0.075**	0.073**	0.073**	0.068**	0.068**
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Year x District obs.	182,636	134,466	134,466	134,466	134,466	134,466	134,466
District obs.	11,420	11,410	11,410	11,410	11,410	11,410	11,410

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A19. Effects of enrollment changes on salary and benefits per staff, 20-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	0.039*	0.039*	0.039*	0.032*	0.019	0.035*	0.019
	(0.012)	(0.012)	(0.012)	(0.013)	(0.012)	(0.013)	(0.013)
% Δ Enrollment (declining)	-0.044	-0.033	-0.033	-0.008	0.045	-0.006	0.050
	(0.021)	(0.021)	(0.021)	(0.021)	(0.022)	(0.022)	(0.022)
Δ % FRL (growing if spline)				-0.078**	-0.098**	-0.036	-0.041*
				(0.013)	(0.014)	(0.014)	(0.015)
Δ % IEP (growing if spline)				-0.138**	-0.116*	-0.364**	-0.375**
				(0.040)	(0.040)	(0.056)	(0.056)
Δ % Asian (growing if spline)					0.359**		0.864**
					(0.096)		(0.110)
Δ % Black (growing if spline)					-0.155*		-0.391**
					(0.047)		(0.069)
Δ % Hispanic (growing if spline)					0.354**		0.345**
					(0.031)		(0.033)
Δ % FRL (declining)						0.476**	0.473**
						(0.067)	(0.068)
Δ % IEP (declining)						-0.210	-0.196
						(0.113)	(0.108)
Δ % Asian (declining)							2.283**
							(0.462)
Δ % Black (declining)							-0.100
							(0.074)
Δ % Hispanic (declining)							0.815*
							(0.302)
Constant	0.191**	0.191**	0.190**	0.210**	0.178**	0.209**	0.167**
	(0.004)	(0.004)	(0.004)	(0.005)	(0.006)	(0.006)	(0.006)
District obs.	10,820	10,608	10,606	10,608	10,608	10,608	10,608

Notes. Heteroskedasticity-robust standard errors reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A20. Effects of enrollment changes on total staff per 100 students, 1-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.611**	-0.601**	-0.601**	-0.594**	-0.594**	-0.591**	-0.590**
	(0.009)	(0.010)	(0.010)	(0.011)	(0.010)	(0.011)	(0.011)
% Δ Enrollment (declining)	0.859**	0.847**	0.847**	0.841**	0.842**	0.843**	0.846**
	(0.009)	(0.010)	(0.010)	(0.010)	(0.010)	(0.011)	(0.011)
Δ % FRL (growing if spline)				-0.007	-0.007	-0.014**	-0.013**
				(0.003)	(0.003)	(0.004)	(0.004)
Δ % IEP (growing if spline)				0.134**	0.134**	0.146**	0.149**
				(0.014)	(0.014)	(0.025)	(0.025)
Δ % LEP (growing if spline)				-0.006	-0.011	-0.034	-0.043*
				(0.012)	(0.011)	(0.020)	(0.016)
Δ % Asian (growing if spline)					0.144*		0.365**
					(0.052)		(0.067)
Δ % Black (growing if spline)					0.053		0.106*
					(0.021)		(0.035)
Δ % Hispanic (growing if spline)					0.034		-0.023
					(0.015)		(0.018)
Δ % FRL (declining)						-0.000	-0.002
						(0.006)	(0.004)
Δ % IEP (declining)						-0.121**	-0.116**
						(0.023)	(0.024)
Δ % LEP (declining)						-0.026	-0.023
						(0.014)	(0.014)
Δ % Asian (declining)							0.123
							(0.078)
Δ % Black (declining)							-0.031
							(0.044)
Δ % Hispanic (declining)							-0.144**
							(0.029)
Constant	0.033**	0.039**	0.039**	0.039**	0.038**	0.039**	0.039**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Year x District obs.	216,400	167,927	167,927	167,927	167,927	167,927	167,927
District obs.	11,422	11,417	11,417	11,417	11,417	11,417	11,417

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A21. Effects of enrollment changes on total staff per 100 students, 4-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.319**	-0.334**	-0.334**	-0.329**	-0.331**	-0.330**	-0.330**
	(0.009)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
% Δ Enrollment (declining)	0.726**	0.707**	0.707**	0.701**	0.701**	0.696**	0.697**
	(0.011)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Δ % FRL (growing if spline)				0.006	0.006	-0.015*	-0.014
				(0.004)	(0.004)	(0.006)	(0.006)
Δ % IEP (growing if spline)				0.122**	0.121**	0.247**	0.249**
				(0.018)	(0.018)	(0.029)	(0.029)
Δ % LEP (growing if spline)				0.009	0.009	0.007	0.015
				(0.014)	(0.015)	(0.023)	(0.023)
Δ % Asian (growing if spline)					0.317**		0.629**
					(0.060)		(0.091)
Δ % Black (growing if spline)					0.156**		0.097
					(0.037)		(0.057)
Δ % Hispanic (growing if spline)					0.006		-0.044
					(0.022)		(0.025)
Δ % FRL (declining)						-0.041**	-0.037**
						(0.007)	(0.007)
Δ % IEP (declining)						-0.006	-0.001
						(0.028)	(0.028)
Δ % LEP (declining)						-0.014	-0.006
						(0.020)	(0.019)
Δ % Asian (declining)							0.023
							(0.077)
Δ % Black (declining)							-0.210**
							(0.054)
Δ % Hispanic (declining)							-0.155**
							(0.043)
Constant	0.079**	0.080**	0.080**	0.078**	0.077**	0.078**	0.076**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Year x District obs.	183,673	134,937	134,937	134,937	134,937	134,937	134,937
District obs.	11,420	11,414	11,414	11,414	11,414	11,414	11,414

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A22. Effects of enrollment changes on total staff per 100 students, 20-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.108**	-0.111**	-0.111**	-0.095**	-0.096**	-0.096**	-0.091**
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
% Δ Enrollment (declining)	0.565**	0.545**	0.545**	0.487**	0.467**	0.484**	0.461**
	(0.029)	(0.030)	(0.030)	(0.032)	(0.032)	(0.031)	(0.031)
Δ % FRL (growing if spline)				0.151**	0.167**	0.144**	0.177**
				(0.019)	(0.020)	(0.021)	(0.022)
Δ % IEP (growing if spline)				0.407**	0.363*	0.501**	0.468**
				(0.115)	(0.111)	(0.096)	(0.091)
Δ % Asian (growing if spline)					0.419**		0.471**
					(0.117)		(0.131)
Δ % Black (growing if spline)					0.272**		0.033
					(0.073)		(0.115)
Δ % Hispanic (growing if spline)					-0.230**		-0.248**
					(0.041)		(0.042)
Δ % FRL (declining)						-0.210*	-0.152
						(0.072)	(0.073)
Δ % IEP (declining)						-0.255	-0.183
						(0.321)	(0.298)
Δ % Asian (declining)							-0.058
							(0.292)
Δ % Black (declining)							-0.539**
							(0.098)
Δ % Hispanic (declining)							-1.085**
							(0.263)
Constant	0.212**	0.214**	0.214**	0.174**	0.190**	0.171**	0.189**
	(0.005)	(0.005)	(0.005)	(0.006)	(0.007)	(0.009)	(0.009)
District obs.	10,853	10,652	10,650	10,652	10,652	10,652	10,652

Notes. Heteroskedasticity-robust standard errors reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A23. Effects of enrollment changes on total full-time equivalent faculty (FTEs) per 100 students, 1-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.578**	-0.566**	-0.566**	-0.563**	-0.563**	-0.559**	-0.560**
	(0.007)	(0.009)	(0.009)	(0.009)	(0.008)	(0.009)	(0.009)
% Δ Enrollment (declining)	0.833**	0.826**	0.826**	0.823**	0.823**	0.828**	0.827**
	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Δ % FRL (growing if spline)				0.000	0.001	-0.008	-0.008*
				(0.002)	(0.002)	(0.003)	(0.003)
Δ % IEP (growing if spline)				0.070**	0.070**	0.045*	0.044*
				(0.010)	(0.010)	(0.014)	(0.014)
Δ % LEP (growing if spline)				0.021*	0.017*	0.040*	0.032**
				(0.008)	(0.007)	(0.012)	(0.009)
Δ % Asian (growing if spline)					0.061		0.169*
					(0.037)		(0.063)
Δ % Black (growing if spline)					0.060**		0.069*
					(0.018)		(0.024)
Δ % Hispanic (growing if spline)					0.009		0.002
					(0.011)		(0.014)
Δ % FRL (declining)						-0.010*	-0.012**
						(0.004)	(0.003)
Δ % IEP (declining)						-0.098**	-0.097**
						(0.015)	(0.015)
Δ % LEP (declining)						-0.003	-0.003
						(0.009)	(0.009)
Δ % Asian (declining)							0.076
							(0.044)
Δ % Black (declining)							-0.056
							(0.033)
Δ % Hispanic (declining)							-0.015
							(0.021)
Constant	0.021**	0.023**	0.023**	0.023**	0.023**	0.023**	0.023**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Year x District obs.	214,384	166,297	166,297	166,297	166,297	166,297	166,297
District obs.	11,419	11,415	11,415	11,415	11,415	11,415	11,415

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A24. Effects of enrollment changes on total full-time equivalent faculty (FTEs) per 100 students, 4-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.287**	-0.276**	-0.276**	-0.271**	-0.272**	-0.271**	-0.271**
	(0.008)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
% Δ Enrollment (declining)	0.623**	0.610**	0.610**	0.604**	0.604**	0.602**	0.602**
	(0.009)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Δ % FRL (growing if spline)				0.010*	0.009*	-0.007	-0.007
				(0.003)	(0.003)	(0.004)	(0.004)
Δ % IEP (growing if spline)				0.127**	0.127**	0.179**	0.181**
				(0.012)	(0.012)	(0.020)	(0.019)
Δ % LEP (growing if spline)				0.035**	0.031*	0.039*	0.032
				(0.010)	(0.010)	(0.015)	(0.015)
Δ % Asian (growing if spline)					0.191**		0.318**
					(0.041)		(0.054)
Δ % Black (growing if spline)					0.074*		0.010
					(0.026)		(0.039)
Δ % Hispanic (growing if spline)					0.035		0.034
					(0.014)		(0.016)
Δ % FRL (declining)						-0.036**	-0.034**
						(0.005)	(0.005)
Δ % IEP (declining)						-0.082**	-0.080**
						(0.018)	(0.017)
Δ % LEP (declining)						-0.033	-0.031
						(0.014)	(0.014)
Δ % Asian (declining)							-0.043
							(0.052)
Δ % Black (declining)							-0.138**
							(0.039)
Δ % Hispanic (declining)							-0.053
							(0.033)
Constant	0.035**	0.032**	0.032**	0.030**	0.029**	0.030**	0.029**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Year x District obs.	181,725	133,279	133,279	133,279	133,279	133,279	133,279
District obs.	11,416	11,405	11,405	11,405	11,405	11,405	11,405

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A25. Effects of enrollment changes on total full-time equivalent faculty (FTEs) per 100 students, 20-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.066**	-0.067**	-0.067**	-0.058**	-0.059**	-0.060**	-0.058**
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
% Δ Enrollment (declining)	0.406**	0.409**	0.409**	0.373**	0.364**	0.370**	0.358**
	(0.016)	(0.016)	(0.016)	(0.017)	(0.017)	(0.017)	(0.017)
Δ % FRL (growing if spline)				0.038**	0.047**	0.035**	0.052**
				(0.009)	(0.009)	(0.010)	(0.010)
Δ % IEP (growing if spline)				0.421**	0.393**	0.530**	0.513**
				(0.034)	(0.034)	(0.048)	(0.047)
Δ % Asian (growing if spline)					0.295**		0.237**
					(0.053)		(0.054)
Δ % Black (growing if spline)					0.130**		0.001
					(0.036)		(0.055)
Δ % Hispanic (growing if spline)					-0.122**		-0.108**
					(0.021)		(0.022)
Δ % FRL (declining)						-0.058	-0.036
						(0.046)	(0.046)
Δ % IEP (declining)						-0.149	-0.108
						(0.085)	(0.085)
Δ % Asian (declining)							-0.640*
							(0.235)
Δ % Black (declining)							-0.285**
							(0.050)
Δ % Hispanic (declining)							-0.107
							(0.229)
Constant	0.055**	0.055**	0.055**	0.038**	0.046**	0.032**	0.042**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)
District obs.	10,856	10,657	10,655	10,657	10,657	10,657	10,657

Notes. Heteroskedasticity-robust standard errors reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A26. Effects of enrollment changes on total administrators per 100 students, 1-year % Δ (1% trimming

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.590**	-0.546**	-0.546**	-0.544**	-0.544**	-0.543**	-0.562**
	(0.019)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.023)
% Δ Enrollment (declining)	0.921**	0.941**	0.941**	0.940**	0.942**	0.943**	0.929**
	(0.019)	(0.023)	(0.023)	(0.023)	(0.023)	(0.024)	(0.024)
Δ % FRL (growing if spline)				-0.009	-0.009	-0.003	-0.006
				(0.007)	(0.007)	(0.009)	(0.009)
Δ % IEP (growing if spline)				0.025	0.026	-0.006	-0.025
				(0.032)	(0.032)	(0.049)	(0.049)
Δ % LEP (growing if spline)				0.086**	0.081*	0.092	0.066
				(0.025)	(0.025)	(0.036)	(0.036)
Δ % Asian (growing if spline)					0.014		0.378
					(0.112)		(0.158)
Δ % Black (growing if spline)					-0.080		0.008
					(0.066)		(0.091)
Δ % Hispanic (growing if spline)					0.119		0.230**
					(0.049)		(0.059)
Δ % FRL (declining)						0.016	0.015
						(0.010)	(0.010)
Δ % IEP (declining)						-0.060	-0.083
						(0.048)	(0.048)
Δ % LEP (declining)						-0.079	-0.093*
						(0.036)	(0.036)
Δ % Asian (declining)							0.551*
							(0.182)
Δ % Black (declining)							0.209
							(0.103)
Δ % Hispanic (declining)							0.112
							(0.079)
Constant	0.048**	0.047**	0.047**	0.047**	0.046**	0.047**	0.045**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
Year x District obs.	196,251	155,639	155,639	155,639	155,639	155,639	155,639
District obs.	11,374	11,325	11,325	11,325	11,325	11,325	11,325

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A27. Effects of enrollment changes on total administrators per 100 students, 4-year % Δ (1% trimming

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.406**	-0.361**	-0.361**	-0.361**	-0.362**	-0.364**	-0.368**
	(0.021)	(0.024)	(0.024)	(0.024)	(0.024)	(0.025)	(0.025)
% Δ Enrollment (declining)	0.802**	0.836**	0.836**	0.836**	0.840**	0.828**	0.831**
	(0.026)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)
Δ % FRL (growing if spline)				-0.031*	-0.036*	-0.003	-0.004
				(0.011)	(0.011)	(0.015)	(0.015)
Δ % IEP (growing if spline)				0.056	0.058	0.135	0.135
				(0.041)	(0.041)	(0.062)	(0.062)
Δ % LEP (growing if spline)				0.082	0.059	0.036	-0.015
				(0.033)	(0.034)	(0.052)	(0.056)
Δ % Asian (growing if spline)					0.028		0.621**
					(0.130)		(0.171)
Δ % Black (growing if spline)					0.002		-0.034
					(0.082)		(0.121)
Δ % Hispanic (growing if spline)					0.179**		0.173*
					(0.049)		(0.061)
Δ % FRL (declining)						0.073**	0.082**
						(0.022)	(0.020)
Δ % IEP (declining)						0.027	0.028
						(0.064)	(0.064)
Δ % LEP (declining)						-0.120	-0.112
						(0.047)	(0.047)
Δ % Asian (declining)							0.690
							(0.342)
Δ % Black (declining)							-0.011
							(0.125)
Δ % Hispanic (declining)							-0.249
							(0.123)
Constant	0.229**	0.280**	0.280**	0.281**	0.278**	0.278**	0.272**
	(0.005)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)
Year x District obs.	164,636	122,842	122,842	122,842	122,842	122,842	122,842
District obs.	11,327	11,247	11,247	11,247	11,247	11,247	11,247

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A28. Effects of enrollment changes on total administrators per 100 students, 20-year % Δ (1% trimming

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.130**	-0.134**	-0.135**	-0.139**	-0.178**	-0.136**	-0.180**
	(0.033)	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)
% Δ Enrollment (declining)	1.030**	1.020**	1.020**	1.032**	1.144**	1.039**	1.158**
	(0.063)	(0.063)	(0.063)	(0.064)	(0.066)	(0.064)	(0.066)
Δ % FRL (growing if spline)				0.018	-0.023	0.070	0.032
				(0.037)	(0.039)	(0.041)	(0.044)
Δ % IEP (growing if spline)				-0.258	-0.274	-0.654**	-0.730**
				(0.107)	(0.109)	(0.167)	(0.168)
Δ % Asian (growing if spline)					1.442**		2.108**
					(0.272)		(0.318)
Δ % Black (growing if spline)					0.339		0.556
					(0.144)		(0.217)
Δ % Hispanic (growing if spline)					0.601**		0.465**
					(0.091)		(0.094)
Δ % FRL (declining)						0.387	0.382
						(0.210)	(0.212)
Δ % IEP (declining)						-0.298	-0.240
						(0.283)	(0.252)
Δ % Asian (declining)							2.600*
							(0.862)
Δ % Black (declining)							-0.016
							(0.220)
Δ % Hispanic (declining)							-1.050
							(0.936)
Constant	0.524**	0.526**	0.526**	0.528**	0.469**	0.533**	0.462**
	(0.011)	(0.011)	(0.011)	(0.013)	(0.015)	(0.016)	(0.017)
District obs.	9,404	9,244	9,242	9,244	9,244	9,244	9,244

Notes. Heteroskedasticity-robust standard errors reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A29. Effects of enrollment changes on total other staff per 100 students, 1-year % Δ (1% trimming

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.540**	-0.548**	-0.548**	-0.535**	-0.535**	-0.558**	-0.559**
	(0.021)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.024)
% Δ Enrollment (declining)	0.912**	0.956**	0.956**	0.944**	0.943**	0.914**	0.913**
	(0.022)	(0.025)	(0.025)	(0.025)	(0.025)	(0.026)	(0.026)
Δ % FRL (growing if spline)				-0.028**	-0.027**	-0.033**	-0.033**
				(0.006)	(0.006)	(0.007)	(0.007)
Δ % IEP (growing if spline)				0.265**	0.263**	0.531**	0.525**
				(0.039)	(0.039)	(0.063)	(0.063)
Δ % LEP (growing if spline)				-0.019	-0.027	-0.054	-0.067
				(0.024)	(0.024)	(0.036)	(0.035)
Δ % Asian (growing if spline)					0.062		0.194
					(0.081)		(0.113)
Δ % Black (growing if spline)					0.043		0.045
					(0.049)		(0.073)
Δ % Hispanic (growing if spline)					0.062		0.032
					(0.030)		(0.039)
Δ % FRL (declining)						0.022	0.020
						(0.010)	(0.009)
Δ % IEP (declining)						0.025	0.023
						(0.060)	(0.060)
Δ % LEP (declining)						-0.020	-0.021
						(0.032)	(0.032)
Δ % Asian (declining)							0.260
							(0.183)
Δ % Black (declining)							0.019
							(0.086)
Δ % Hispanic (declining)							-0.081
							(0.056)
Constant	0.063**	0.087**	0.087**	0.086**	0.086**	0.085**	0.084**
	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Year x District obs.	195,426	155,958	155,958	155,958	155,958	155,958	155,958
District obs.	11,400	11,340	11,340	11,340	11,340	11,340	11,340

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A30. Effects of enrollment changes on total other staff per 100 students, 4-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.288**	-0.384**	-0.384**	-0.379**	-0.383**	-0.380**	-0.383**
	(0.033)	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)
% Δ Enrollment (declining)	0.997**	0.844**	0.844**	0.837**	0.840**	0.835**	0.841**
	(0.043)	(0.042)	(0.042)	(0.042)	(0.042)	(0.041)	(0.041)
Δ % FRL (growing if spline)				-0.004	-0.016	-0.040	-0.057**
				(0.013)	(0.012)	(0.017)	(0.017)
Δ % IEP (growing if spline)				0.178*	0.150	0.302*	0.212
				(0.059)	(0.061)	(0.094)	(0.098)
Δ % LEP (growing if spline)				0.178**	0.165**	0.260*	0.248*
				(0.052)	(0.050)	(0.097)	(0.095)
Δ % Asian (growing if spline)					0.529*		0.910*
					(0.191)		(0.319)
Δ % Black (growing if spline)					0.164		0.327
					(0.105)		(0.151)
Δ % Hispanic (growing if spline)					0.013		-0.123
					(0.080)		(0.091)
Δ % FRL (declining)						-0.054	-0.048
						(0.022)	(0.019)
Δ % IEP (declining)						-0.072	-0.097
						(0.095)	(0.095)
Δ % LEP (declining)						-0.112	-0.105
						(0.066)	(0.066)
Δ % Asian (declining)							0.066
							(0.256)
Δ % Black (declining)							0.082
							(0.217)
Δ % Hispanic (declining)							-0.229
							(0.105)
Constant	0.197**	0.224**	0.224**	0.221**	0.220**	0.220**	0.219**
	(0.006)	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)	(0.009)
Year x District obs.	163,738	122,796	122,796	122,796	122,796	122,796	122,796
District obs.	11,342	11,285	11,285	11,285	11,285	11,285	11,285

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A31. Effects of enrollment changes on total other staff per 100 students, 20-year % Δ (1% trimming

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.119	-0.115	-0.115	-0.122	-0.080	-0.102	-0.057
	(0.128)	(0.130)	(0.130)	(0.130)	(0.133)	(0.130)	(0.134)
% Δ Enrollment (declining)	1.352**	1.322**	1.322**	1.336**	1.157**	1.421**	1.241**
	(0.254)	(0.261)	(0.261)	(0.272)	(0.271)	(0.274)	(0.274)
Δ % FRL (growing if spline)				0.235	0.341	0.411	0.593*
				(0.173)	(0.172)	(0.195)	(0.197)
Δ % IEP (growing if spline)				-0.976	-1.185*	-3.257**	-3.597**
				(0.403)	(0.419)	(0.620)	(0.628)
Δ % Asian (growing if spline)					0.615		2.209
					(1.178)		(1.318)
Δ % Black (growing if spline)					0.817		0.575
					(0.618)		(0.960)
Δ % Hispanic (growing if spline)					-1.596**		-1.939**
					(0.318)		(0.334)
Δ % FRL (declining)						0.805	0.912
						(0.722)	(0.730)
Δ % IEP (declining)						-2.423	-2.093
						(1.406)	(1.273)
Δ % Asian (declining)							8.409
							(3.460)
Δ % Black (declining)							-0.791
							(0.879)
Δ % Hispanic (declining)							-1.594
							(1.851)
Constant	0.877**	0.886**	0.887**	0.862**	0.989**	0.931**	1.035**
	(0.046)	(0.047)	(0.047)	(0.051)	(0.061)	(0.060)	(0.069)
District obs.	9,471	9,286	9,284	9,286	9,286	9,286	9,286

Notes. Heteroskedasticity-robust standard errors reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A32. Effects of enrollment changes on total aides per 100 students, 1-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.354**	-0.375**	-0.375**	-0.357**	-0.358**	-0.376**	-0.387**
	(0.026)	(0.030)	(0.030)	(0.030)	(0.030)	(0.031)	(0.031)
% Δ Enrollment (declining)	0.800**	0.752**	0.752**	0.738**	0.739**	0.713**	0.705**
	(0.028)	(0.031)	(0.031)	(0.031)	(0.031)	(0.032)	(0.032)
Δ % FRL (growing if spline)				-0.019	-0.024*	-0.022	-0.025
				(0.008)	(0.008)	(0.010)	(0.010)
Δ % IEP (growing if spline)				0.336**	0.332**	0.540**	0.520**
				(0.049)	(0.049)	(0.072)	(0.072)
Δ % LEP (growing if spline)				0.097*	0.072	0.092	0.072
				(0.035)	(0.033)	(0.048)	(0.049)
Δ % Asian (growing if spline)					-0.142		0.374
					(0.173)		(0.219)
Δ % Black (growing if spline)					0.137		0.084
					(0.062)		(0.168)
Δ % Hispanic (growing if spline)					0.107*		0.225**
					(0.040)		(0.060)
Δ % FRL (declining)						0.014	0.021
						(0.013)	(0.012)
Δ % IEP (declining)						-0.122	-0.138
						(0.082)	(0.082)
Δ % LEP (declining)						-0.103	-0.077
						(0.046)	(0.037)
Δ % Asian (declining)							0.536
							(0.255)
Δ % Black (declining)							-0.292**
							(0.079)
Δ % Hispanic (declining)							0.010
							(0.064)
Constant	0.081**	0.090**	0.090**	0.089**	0.088**	0.087**	0.086**
	(0.003)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Year x District obs.	191,121	152,170	152,170	152,170	152,170	152,170	152,170
District obs.	11,265	11,076	11,076	11,076	11,076	11,076	11,076

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A33. Effects of enrollment changes on total aides per 100 students, 4-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.233**	-0.235**	-0.235**	-0.205**	-0.204**	-0.196**	-0.190**
	(0.030)	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)
% Δ Enrollment (declining)	0.448**	0.476**	0.476**	0.439**	0.436**	0.443**	0.442**
	(0.040)	(0.045)	(0.045)	(0.045)	(0.045)	(0.045)	(0.045)
Δ % FRL (growing if spline)				0.025	0.029	0.009	0.018
				(0.013)	(0.013)	(0.019)	(0.018)
Δ % IEP (growing if spline)				0.762**	0.770**	0.735**	0.777**
				(0.065)	(0.063)	(0.115)	(0.102)
Δ % LEP (growing if spline)				0.082	0.106	-0.148	-0.076
				(0.047)	(0.047)	(0.075)	(0.077)
Δ % Asian (growing if spline)					-0.244		-0.353
					(0.222)		(0.274)
Δ % Black (growing if spline)					0.067		-0.040
					(0.120)		(0.159)
Δ % Hispanic (growing if spline)					-0.119		-0.155
					(0.061)		(0.062)
Δ % FRL (declining)						-0.050	-0.043
						(0.020)	(0.021)
Δ % IEP (declining)						-0.787**	-0.756**
						(0.091)	(0.090)
Δ % LEP (declining)						-0.268**	-0.246**
						(0.056)	(0.058)
Δ % Asian (declining)							0.075
							(0.291)
Δ % Black (declining)							-0.392
							(0.181)
Δ % Hispanic (declining)							-0.119
							(0.143)
Constant	0.226**	0.204**	0.204**	0.198**	0.201**	0.204**	0.208**
	(0.007)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Year x District obs.	161,760	123,738	123,738	123,738	123,738	123,738	123,738
District obs.	11,236	11,015	11,015	11,015	11,015	11,015	11,015

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A34. Effects of enrollment changes on total aides per 100 students, 20-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.213*	-0.210*	-0.210*	-0.139	-0.150	-0.156	-0.135
	(0.066)	(0.067)	(0.067)	(0.066)	(0.066)	(0.066)	(0.066)
% Δ Enrollment (declining)	0.277	0.279	0.279	0.074	0.039	0.005	-0.040
	(0.121)	(0.121)	(0.121)	(0.134)	(0.135)	(0.124)	(0.126)
Δ % FRL (growing if spline)				-0.208	-0.175	-0.313**	-0.208
				(0.082)	(0.085)	(0.080)	(0.085)
Δ % IEP (growing if spline)				3.907**	3.740**	5.636**	5.539**
				(0.738)	(0.727)	(0.528)	(0.488)
Δ % Asian (growing if spline)					1.493*		1.501*
					(0.517)		(0.553)
Δ % Black (growing if spline)					1.044**		-0.378
					(0.284)		(0.449)
Δ % Hispanic (growing if spline)					-0.513*		-0.457*
					(0.169)		(0.171)
Δ % FRL (declining)						-0.339	-0.103
						(0.337)	(0.343)
Δ % IEP (declining)						-1.190	-0.910
						(1.092)	(1.010)
Δ % Asian (declining)							-0.898
							(1.306)
Δ % Black (declining)							-2.696**
							(0.369)
Δ % Hispanic (declining)							-3.132
							(1.921)
Constant	0.796**	0.785**	0.785**	0.734**	0.771**	0.672**	0.719**
	(0.023)	(0.023)	(0.023)	(0.027)	(0.031)	(0.035)	(0.038)
District obs.	9,349	9,190	9,188	9,190	9,190	9,190	9,190

Notes. Heteroskedasticity-robust standard errors reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A35. Effects of enrollment changes on total counselors per 100 students, 1-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.862**	-0.869**	-0.869**	-0.872**	-0.872**	-0.858**	-0.845**
	(0.031)	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)	(0.036)
% Δ Enrollment (declining)	0.666**	0.638**	0.638**	0.638**	0.638**	0.652**	0.662**
	(0.035)	(0.040)	(0.040)	(0.040)	(0.040)	(0.041)	(0.041)
Δ % FRL (growing if spline)				-0.050**	-0.050**	-0.066**	-0.064**
				(0.010)	(0.010)	(0.013)	(0.013)
Δ % IEP (growing if spline)				0.026	0.026	-0.164	-0.156
				(0.047)	(0.047)	(0.075)	(0.075)
Δ % LEP (growing if spline)				0.044	0.041	0.012	0.018
				(0.034)	(0.034)	(0.046)	(0.046)
Δ % Asian (growing if spline)					0.491		0.330
					(0.201)		(0.356)
Δ % Black (growing if spline)					0.109		0.108
					(0.121)		(0.207)
Δ % Hispanic (growing if spline)					0.037		-0.175
					(0.064)		(0.085)
Δ % FRL (declining)						0.032	0.034
						(0.014)	(0.014)
Δ % IEP (declining)						-0.242*	-0.227*
						(0.084)	(0.084)
Δ % LEP (declining)						-0.076	-0.060
						(0.053)	(0.050)
Δ % Asian (declining)							-0.646
							(0.259)
Δ % Black (declining)							-0.125
							(0.132)
Δ % Hispanic (declining)							-0.484**
							(0.115)
Constant	0.012**	0.014**	0.014**	0.014**	0.014**	0.017**	0.018**
	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Year x District obs.	181,779	143,892	143,892	143,892	143,892	143,892	143,892
District obs.	10,686	10,608	10,608	10,608	10,608	10,608	10,608

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A36. Effects of enrollment changes on total counselors per 100 students, 4-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.457**	-0.456**	-0.456**	-0.462**	-0.462**	-0.457**	-0.451**
	(0.028)	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)
% Δ Enrollment (declining)	0.538**	0.536**	0.536**	0.544**	0.545**	0.546**	0.549**
	(0.037)	(0.042)	(0.042)	(0.042)	(0.042)	(0.042)	(0.042)
Δ % FRL (growing if spline)				0.018	0.018	-0.000	0.005
				(0.013)	(0.013)	(0.019)	(0.019)
Δ % IEP (growing if spline)				-0.182**	-0.181**	-0.275*	-0.269*
				(0.053)	(0.053)	(0.087)	(0.087)
Δ % LEP (growing if spline)				0.068	0.065	-0.020	0.002
				(0.043)	(0.044)	(0.070)	(0.072)
Δ % Asian (growing if spline)					0.325		0.244
					(0.180)		(0.245)
Δ % Black (growing if spline)					-0.011		-0.115
					(0.099)		(0.155)
Δ % Hispanic (growing if spline)					0.010		-0.142
					(0.066)		(0.083)
Δ % FRL (declining)						-0.044	-0.035
						(0.020)	(0.020)
Δ % IEP (declining)						0.088	0.102
						(0.080)	(0.080)
Δ % LEP (declining)						-0.136	-0.117
						(0.062)	(0.063)
Δ % Asian (declining)							-0.333
							(0.283)
Δ % Black (declining)							-0.034
							(0.155)
Δ % Hispanic (declining)							-0.421
							(0.173)
Constant	0.055**	0.061**	0.061**	0.061**	0.060**	0.066**	0.069**
	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)
Year x District obs.	152,976	114,380	114,380	114,380	114,380	114,380	114,380
District obs.	10,614	10,498	10,498	10,498	10,498	10,498	10,498

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A37. Effects of enrollment changes on total counselors per 100 students, 20-year % Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-0.145**	-0.151**	-0.151**	-0.148**	-0.161**	-0.148**	-0.161**
	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)
% Δ Enrollment (declining)	0.151	0.173*	0.172*	0.169*	0.209*	0.207*	0.258**
	(0.063)	(0.064)	(0.064)	(0.064)	(0.067)	(0.064)	(0.067)
Δ % FRL (growing if spline)				-0.056	-0.055	-0.147**	-0.141*
				(0.036)	(0.038)	(0.041)	(0.044)
Δ % IEP (growing if spline)				0.286	0.275	0.011	-0.037
				(0.117)	(0.117)	(0.186)	(0.186)
Δ % Asian (growing if spline)					0.864**		1.102**
					(0.244)		(0.278)
Δ % Black (growing if spline)					-0.140		-0.172
					(0.116)		(0.155)
Δ % Hispanic (growing if spline)					0.144		0.127
					(0.092)		(0.096)
Δ % FRL (declining)						-0.989**	-0.968**
						(0.179)	(0.179)
Δ % IEP (declining)						-0.764	-0.728
						(0.403)	(0.377)
Δ % Asian (declining)							0.787
							(0.762)
Δ % Black (declining)							0.071
							(0.200)
Δ % Hispanic (declining)							-1.917
							(1.012)
Constant	0.197**	0.193**	0.194**	0.198**	0.178**	0.240**	0.215**
	(0.011)	(0.011)	(0.011)	(0.013)	(0.015)	(0.015)	(0.016)
District obs.	9,416	9,295	9,294	9,295	9,295	9,295	9,295

Notes. Heteroskedasticity-robust standard errors reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A38. Effects of enrollment changes on net funds per pupil, 1-year Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-1,516**	-1,323**	-1,323**	-1,306**	-1,309**	-1,379**	-1,415**
	(250)	(289)	(289)	(289)	(289)	(293)	(293)
% Δ Enrollment (declining)	4,443**	3,577**	3,577**	3,555**	3,565**	3,460**	3,440**
	(236)	(269)	(269)	(270)	(270)	(276)	(277)
Δ % FRL (growing if spline)				282**	259**	267*	219
				(63)	(68)	(93)	(91)
Δ % IEP (growing if spline)				219	201	1,053	992
				(380)	(380)	(567)	(566)
Δ % LEP (growing if spline)				-313	-433	-483	-661
				(226)	(221)	(323)	(292)
Δ % Asian (growing if spline)					-420		-486
					(749)		(1,395)
Δ % Black (growing if spline)					-313		-702
					(363)		(739)
Δ % Hispanic (growing if spline)					920*		1,572*
					(321)		(489)
Δ % FRL (declining)						-302*	-318*
						(115)	(103)
Δ % IEP (declining)						717	660
						(676)	(679)
Δ % LEP (declining)						137	135
						(322)	(348)
Δ % Asian (declining)							1,279
							(1,593)
Δ % Black (declining)							-291
							(724)
Δ % Hispanic (declining)							-47
							(598)
Constant	-181**	-173**	-173**	-173**	-177**	-179**	-185**
	(22)	(25)	(25)	(25)	(25)	(26)	(26)
Year x District obs.	208,468	159,770	159,770	159,770	159,770	159,770	159,770
District obs.	11,420	11,416	11,416	11,416	11,416	11,416	11,416

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A39. Effects of enrollment changes on net funds per pupil, 4-year Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-3,312**	-3,057**	-3,057**	-3,005**	-3,020**	-3,073**	-3,110**
	(319)	(366)	(366)	(366)	(366)	(367)	(368)
% Δ Enrollment (declining)	4,034**	3,318**	3,318**	3,295**	3,293**	3,199**	3,198**
	(329)	(379)	(379)	(380)	(380)	(382)	(383)
Δ % FRL (growing if spline)				831**	798**	758**	698**
				(137)	(144)	(176)	(177)
Δ % IEP (growing if spline)				-269	-303	1,885	1,635
				(510)	(509)	(775)	(783)
Δ % LEP (growing if spline)				-296	-414	-249	-628
				(402)	(388)	(736)	(682)
Δ % Asian (growing if spline)					193		3,566
					(1,749)		(2,032)
Δ % Black (growing if spline)					1,015		453
					(928)		(1,198)
Δ % Hispanic (growing if spline)					190		409
					(515)		(778)
Δ % FRL (declining)						-926**	-954**
						(240)	(238)
Δ % IEP (declining)						2,381*	2,266*
						(775)	(780)
Δ % LEP (declining)						272	146
						(569)	(575)
Δ % Asian (declining)							5,839
							(3,647)
Δ % Black (declining)							-1,290
							(1,860)
Δ % Hispanic (declining)							232
							(898)
Constant	-939**	-710**	-710**	-752**	-757**	-791**	-805**
	(50)	(59)	(59)	(60)	(60)	(62)	(62)
Year x District obs.	175,325	127,309	127,309	127,309	127,309	127,309	127,309
District obs.	11,412	11,394	11,394	11,394	11,394	11,394	11,394

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A40. Effects of enrollment changes on net funds per pupil, 20-year Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-2,126**	-2,244**	-2,244**	-2,216**	-2,177**	-2,279**	-2,193**
	(424)	(426)	(426)	(425)	(432)	(426)	(433)
% Δ Enrollment (declining)	7,171**	6,742**	6,737**	6,564**	6,270**	6,358**	6,068**
	(708)	(716)	(716)	(721)	(743)	(722)	(745)
Δ % FRL (growing if spline)				-943	-687	-328	207
				(401)	(420)	(432)	(454)
Δ % IEP (growing if spline)				5,373**	4,877**	6,326**	5,937*
				(1,426)	(1,432)	(1,838)	(1,868)
Δ % Asian (growing if spline)					4,282		8,171
					(3,761)		(4,292)
Δ % Black (growing if spline)					1,324		-2,748
					(1,785)		(2,629)
Δ % Hispanic (growing if spline)					-3,005*		-3,175*
					(1,041)		(1,079)
Δ % FRL (declining)						9,520**	10,174**
						(2,223)	(2,228)
Δ % IEP (declining)						-2,420	-736
						(4,068)	(4,012)
Δ % Asian (declining)							13,293
							(7,683)
Δ % Black (declining)							-6,525
							(2,842)
Δ % Hispanic (declining)							-9,330
							(9,066)
Constant	-841**	-872**	-871**	-786**	-582*	-1,040**	-882**
	(135)	(136)	(136)	(163)	(181)	(186)	(202)
District obs.	10,112	9,917	9,916	9,917	9,917	9,917	9,917

Notes. Heteroskedasticity-robust standard errors reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A41. Effects of enrollment changes on total capital outlay per pupil, 1-year Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-542**	-528**	-528**	-548**	-552**	-559**	-574**
	(125)	(151)	(151)	(151)	(151)	(155)	(156)
% Δ Enrollment (declining)	1,007**	1,010**	1,010**	1,032**	1,036**	1,027**	1,020**
	(114)	(136)	(136)	(137)	(137)	(142)	(143)
Δ % FRL (growing if spline)				-137**	-149**	-147*	-160*
				(41)	(41)	(55)	(55)
Δ % IEP (growing if spline)				-313	-326	-341	-373
				(193)	(193)	(265)	(265)
Δ % LEP (growing if spline)				90	15	323	259
				(137)	(144)	(189)	(197)
Δ % Asian (growing if spline)					200		719
					(604)		(720)
Δ % Black (growing if spline)					143		-47
					(241)		(368)
Δ % Hispanic (growing if spline)					327		400
					(195)		(283)
Δ % FRL (declining)						121	130
						(58)	(61)
Δ % IEP (declining)						274	265
						(297)	(299)
Δ % LEP (declining)						136	198
						(200)	(209)
Δ % Asian (declining)							850
							(857)
Δ % Black (declining)							-354
							(364)
Δ % Hispanic (declining)							-203
							(287)
Constant	38	123**	123**	123**	121**	122**	119**
	(15)	(19)	(19)	(19)	(19)	(19)	(19)
Year x District obs.	219,079	169,051	169,051	169,051	169,051	169,051	169,051
District obs.	11,420	11,417	11,417	11,417	11,417	11,417	11,417

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A42. Effects of enrollment changes on total capital outlay per pupil, 4-year Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	0	-72	-72	-83	-98	-57	-58
	(95)	(117)	(117)	(117)	(117)	(118)	(119)
% Δ Enrollment (declining)	735**	721**	721**	740**	752**	772**	801**
	(89)	(109)	(109)	(109)	(109)	(112)	(111)
Δ % FRL (growing if spline)				-104	-143*	-258*	-309**
				(50)	(50)	(80)	(65)
Δ % IEP (growing if spline)				-83	-154	-60	-218
				(174)	(175)	(294)	(255)
Δ % LEP (growing if spline)				543**	469*	458	322
				(146)	(156)	(192)	(224)
Δ % Asian (growing if spline)					952		1,201
					(468)		(590)
Δ % Black (growing if spline)					329		-246
					(334)		(413)
Δ % Hispanic (growing if spline)					147		395
					(159)		(273)
Δ % FRL (declining)						-187	-155
						(78)	(82)
Δ % IEP (declining)						2	18
						(258)	(255)
Δ % LEP (declining)						-610*	-577*
						(213)	(215)
Δ % Asian (declining)							-999
							(707)
Δ % Black (declining)							-1,713**
							(490)
Δ % Hispanic (declining)							-175
							(264)
Constant	26	44	44	46	43	60	62
	(22)	(27)	(27)	(27)	(27)	(28)	(27)
Year x District obs.	186,195	136,099	136,099	136,099	136,099	136,099	136,099
District obs.	11,420	11,415	11,415	11,415	11,415	11,415	11,415

Notes. All models include district fixed effects and year fixed effects. Standard errors clustered by district and reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.

Table A43. Effects of enrollment changes on total capital outlay per pupil, 20-year Δ (1% trimming)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Δ Enrollment (growing)	-90	-109	-110	-128	-159	-118	-132
	(118)	(120)	(120)	(120)	(120)	(120)	(121)
% Δ Enrollment (declining)	419	416	413	490*	585**	518*	609**
	(165)	(167)	(167)	(168)	(173)	(168)	(173)
Δ % FRL (growing if spline)				28	-38	92	108
				(97)	(99)	(108)	(114)
Δ % IEP (growing if spline)				-1,194**	-1,180**	-1,996**	-2,008**
				(277)	(277)	(403)	(403)
Δ % Asian (growing if spline)					118		1,031
					(810)		(957)
Δ % Black (growing if spline)					399		-1,104
					(392)		(592)
Δ % Hispanic (growing if spline)					724*		744*
					(255)		(269)
Δ % FRL (declining)						505	633
						(415)	(423)
Δ % IEP (declining)						-111	30
						(693)	(675)
Δ % Asian (declining)							4,125
							(1,817)
Δ % Black (declining)							-2,015**
							(575)
Δ % Hispanic (declining)							-1,701
							(2,771)
Constant	180**	182**	182**	201**	148**	223**	166**
	(34)	(34)	(34)	(39)	(45)	(44)	(50)
District obs.	10,947	10,751	10,749	10,751	10,751	10,751	10,751

Notes. Heteroskedasticity-robust standard errors reported in parentheses. Asterisks indicate level of significance, ** $p < 0.001$, * $p < 0.01$.