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Declining Enrollment in California Schools

Fiscal Challenges and Opportunities in the Coming Decade

Technical Appendices

CONTENTS

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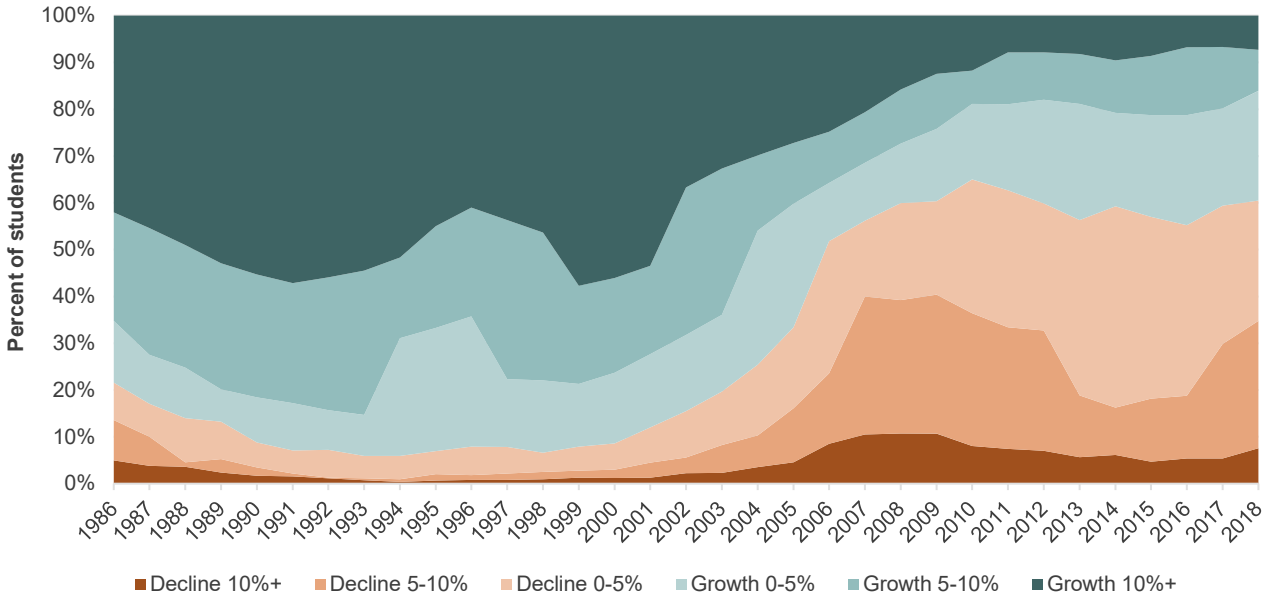
with research support from Radhika Mehlotra

Appendix A. District-level Declines: Additional Results

FIGURE A1

A majority of students are now in districts with declining enrollment (5-year enrollment changes shown)



SOURCE: California Department of Education and authors' calculations.

NOTE: Figure shows 5-year district enrollment changes, by fiscal year, weighted by student enrollment. Districts with fewer than 250 students are excluded.

Declining Districts Have Similar Demographics to Non-Declining Districts

Over the past five years, the districts experiencing declines have mostly similar demographics to those that are growing or have stable enrollment (Table A1). There are some small differences when looking at districts with different magnitudes of declines: districts with recent major declines (10 percent or greater) have a slightly higher share of high-need[1] students. High-need students make up 66 percent of the student body in districts with major declines, compared to 59 to 60 percent in districts with smaller or no declines (Table A1). Racial and ethnic shares are very similar. On the other hand, districts with major declines tend to be smaller on average (4,445 students).

[1] High-need students are low-income, English learners, homeless, or foster youth (as defined per the Local Control Funding Formula).

TABLE A1

Declining districts have similar demographics to non-declining districts (2012-12 to 2017-18)

	No decline	Small decline (0-5%)	Moderate decline (5-10%)	Major decline (10%+)
Average enrollment	7,129	9,650	14,653	4,445
Percent high-need	59%	60%	59%	66%
Percent FRPM	56%	56%	54%	62%
Percent Asian	7%	8%	7%	7%
Percent Hispanic/Latino	47%	51%	49%	51%
Percent Afr. American	3%	3%	4%	3%
Percent White	35%	30%	32%	32%
N districts	342	180	100	69

SOURCES: California Department of Education and authors' calculations.

NOTES: Averages of district-level demographic characteristics are reported in each cell. Small declines are defined as declines of 0-5% over the 2012-13 to 2017-18 school years. Moderate and major declines are declines of 5-10% or 10% or more over the same period, respectively. "No decline" districts have either stable or growing enrollment over this period. Districts with fewer than 250 students are excluded. "Percent FRPM" signifies the percent of "Free and Reduced Price Meal" eligible students in a district. "Percent High-Need" signifies the percent of students who are low-income, English Learners, foster youth, and/or homeless (categories in the Local Control Funding Formula).

Appendix B. District-level Declines: Econometric Evidence

Data sources and sample restrictions

This report uses a variety of public data sources provided by the California Department of Education (CDE) to examine changes in district enrollment and resources over time. There are three primary data sources: (1) district-level financial data; (2) staff-level demographic and assignment data; (3) school-level enrollment and demographic records, aggregated to the district-level. We describe each below:

District-level financial data: For 2003 onwards, financial data are reported at the district level through the Standardized Account Code Structure (SACS). The CDE maintains unaudited databases of district finances using this accounting system. These data allow for detailed accounting of revenue streams and spending categories. Prior to the SACS system, district-level financial data are available through the J-200 Unaudited Actual Financial Reports. As is the case in the SACS data, the J-200 data allow for detailed accounting of spending and revenues by district. Annual average daily attendance (ADA) totals for each district are also included in both the SACS and J-200 files, which are used to construct per pupil spending measures.

To construct measures of district-level per pupil expenditures we follow the conventions of Bruno (2018) in aggregating data. We exclude all district revenue sources, transfers between districts, and net pension liabilities. We also exclude charter schools filing independently of their affiliated district's general fund, as well as charter-specific funds that account for operations of charters filing through an affiliated district, but outside of its general fund. A small share of charter schools report financial information through an affiliated district's general fund; we therefore include ADA for these schools in the ADA of the affiliated district.[2]

[2] Charter school ADA is not available in the SACS data in 2008 an earlier. Fortunately, the charter share in the early 2000s was small, and most still reported financial information independently of the general fund of an affiliated district, meaning this limitation has a negligible impact on overall results.

We then aggregate to the district-year level to construct district-year total expenditures. Student spending is a subset of total expenditures that excludes pre-K and adult education, Public Employees' Retirement System (PERS) reductions, capital expenditures (minus equipment replacement), retiree benefits, non-agency spending, and debt service. Other expenditures subcategories are defined based on the relevant SACS or J-200 "object" codes.

Staff-level demographic and assignment data: The CDE also maintains databases of staff-level data. These data give characteristics of individual "certificated"[3] staff member in each year. These records contain school codes that make it possible to identify where a given staff member was assigned in a given year. However, it is not possible to link these data across time, meaning one cannot follow individual staff members longitudinally. For the 2012-2017 fiscal years, we merge staff records from the Staff FTE files, Staff Demographics files, and Staff Credentials files. For the years prior to 2012, we use the PAIF files, which contain roughly similar, but less comprehensive information. These are available back to 1997.

Together, these files contain data on the staff FTEs, school assignment(s), education, experience (both overall and within district), and credentials. Averages of staff qualifications are FTE-weighted. Total FTEs for each district are used to compute average pupil-staff ratios for each staff type (e.g. teacher, pupil support services, or administrator).

School-level enrollment and demographic records: CDE also maintains data on school and district enrollment and student socio-demographic characteristics. School-by-grade enrollment, both overall and broken down by race/ethnicity/gender, is available going back to 1982. We compute district enrollment totals by aggregating over all schools in a given district.

Estimation Framework

To provide context on the experiences of the average district in decline, it is useful to zoom in to the year around the time a district first began experiencing declines. Here, we consider a district's first decline to be the first time a district experiences three consecutive years of 1 percent or greater reductions in enrollment, following a two consecutive years with enrollment declines less than 1 percent (or enrollment growth). To document how enrollment, financial outcomes, or staffing variables evolve around declining enrollment spells we estimate a flexible, time-varying difference-in-differences regression, or "event study", taking the "event" to be the year in which a district first began declining. Specifically, we estimate equation (1) for outcomes of interest, $Y_{d,y}$:

$$(1) \qquad Y_{d,y} = \alpha_d + \gamma_y + \sum_{k=\underline{K}}^{\overline{K}} \beta_k \, 1(t = t_d^* + k) + \epsilon_{d,y}$$

Here $Y_{d,y}$ is an outcome for district d in year y. The model also includes fixed effects for district, α_d, and fixed effects for year, γ_y, meaning estimates net out any fixed differences across districts and years. For example, for an outcome such as school spending, this means that common effects across all districts in a given year are controlled for (e.g. the Great Recession), and that common effects across all years in a given district (e.g. a district has a unique but consistent spending composition are also controlled for). The coefficients β_k provide estimates of the change in the outcome k years before (or after) t_d^*, the first year a district begins experiencing a notable enrollment decline. Effects are measured relative to year k=0, which is excluded in estimation. In some analyses, we differentiate between districts with "short" vs "long" declines (Figure 6 in the main text). We define "short" declines as those for which the decline does not persist for a fourth consecutive year; "long" declines are all other declines that continue for four or more years. We estimate effects jointly via equation (2):

[3] Certificated staff include teachers, pupil support services (e.g., counselors, nurses, psychologists, social workers), and administrators.

$$(2) \qquad Y_{d,y} = \alpha_d + \gamma_y + \sum_{k=\underline{K}}^{\overline{K}} \left[\beta_k^S 1(t = t_d^* + k) * 1(Decline_d = short) + \beta_k^L 1(t = t_d^* + k) * 1(Decline_d = long) \right] + \epsilon_{d,y}$$

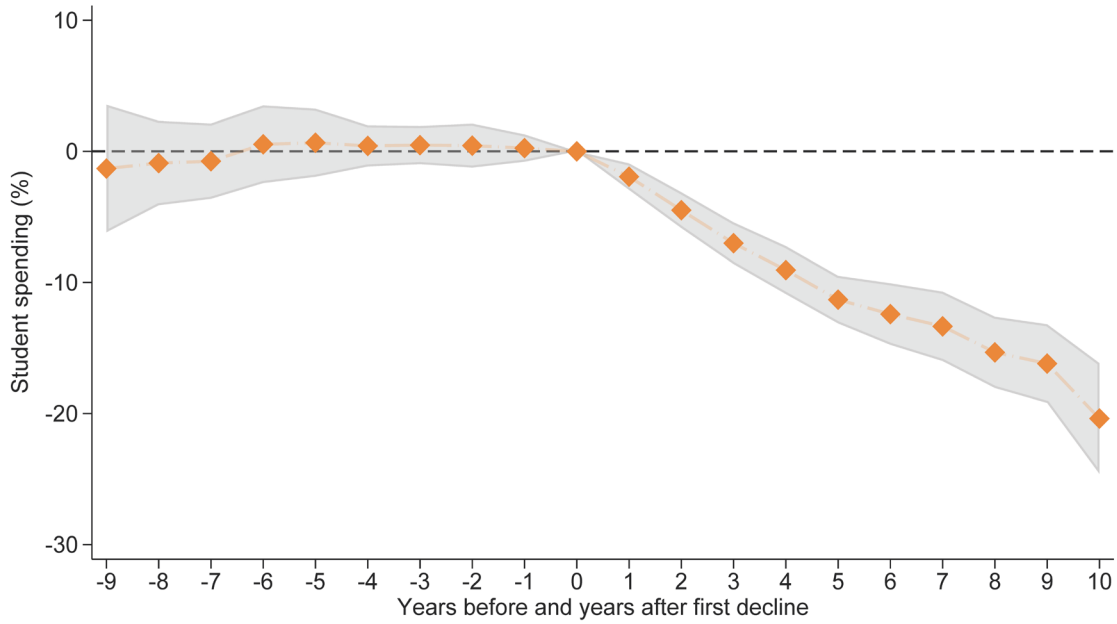
In (2), coefficient β_k^S estimate the change in outcome k years before (or after) the first year a district begin a decline (t_d^*), for those districts that experienced a "short" decline; β_k^L provides analogous estimates for "long" declines.

Endpoints are binned at $\underline{K} = -9$ and $\overline{K} = 10$, which represent the average of outcome $Y_{d,y}$ for a district 9 years before, or 10 years after the year in which the decline first began. Standard errors are two-way clustered by district and year, to account for any serial correlation over time in a district or across districts within a year. Notably, this design nests placebo tests that identify violations of parallel trends assumptions: for $k < 0$, nonzero coefficients would be an indication of pre-existing differences between districts soon to decline, and those that do not decline or have yet to. For most outcomes, we find little indication of pre-decline differences in outcomes, providing evidence that contemporaneous changes unrelated to enrollment declines are unlikely to drive estimated effects.

Selected Results

FIGURE B1

Declines in student spending following declining enrollment spell

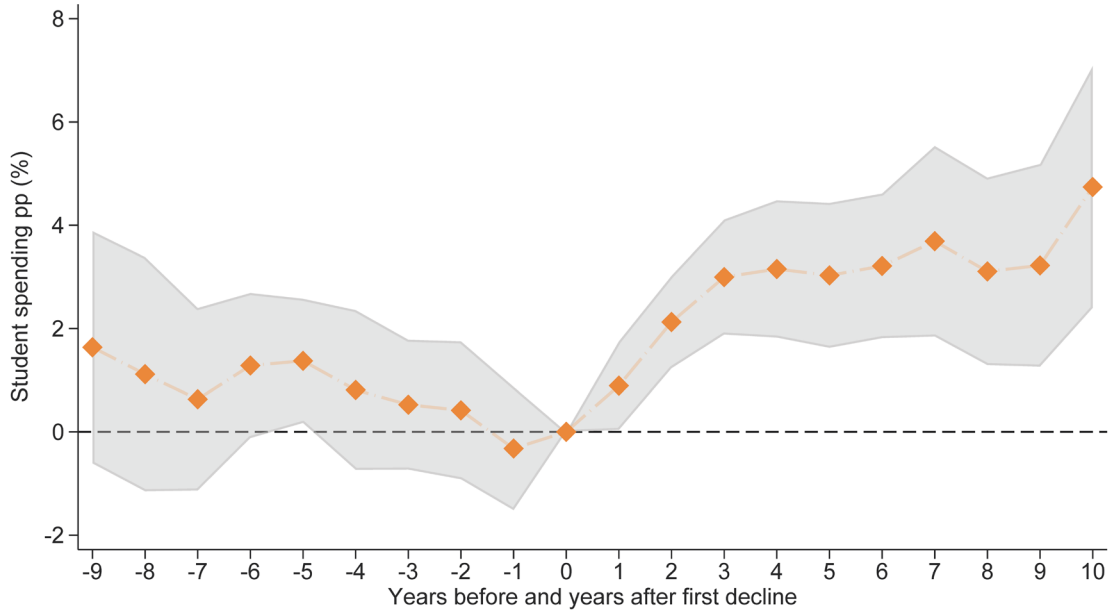


SOURCE: California Department of Education and authors' calculations.

NOTE: "0" is the year prior to a decline. Shaded areas show 95% confidence intervals of estimated effects. Estimates use district-level data from 1996-97 to 2017-2018. Coefficients are estimated according to equation (1) in Technical Appendix B. Districts with fewer than 250 students are excluded.

FIGURE B2

Small *increase* in per-pupil student spending following declining enrollment spell

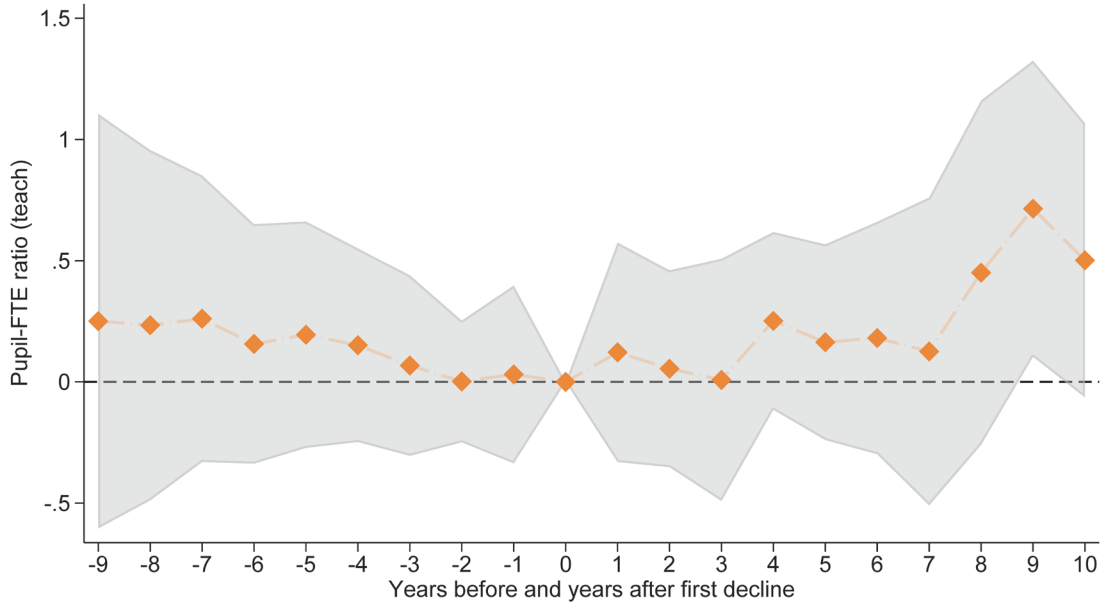


SOURCE: California Department of Education and authors' calculations.

NOTE: "0" is the year prior to a decline. Shaded areas show 95% confidence intervals of estimated effects. Estimates use district-level data from 1996-97 to 2017-2018. Coefficients are estimated according to equation (1) in Technical Appendix B. Districts with fewer than 250 students are excluded.

FIGURE B3

Teacher-pupil ratios stay nearly constant following declining enrollment spell

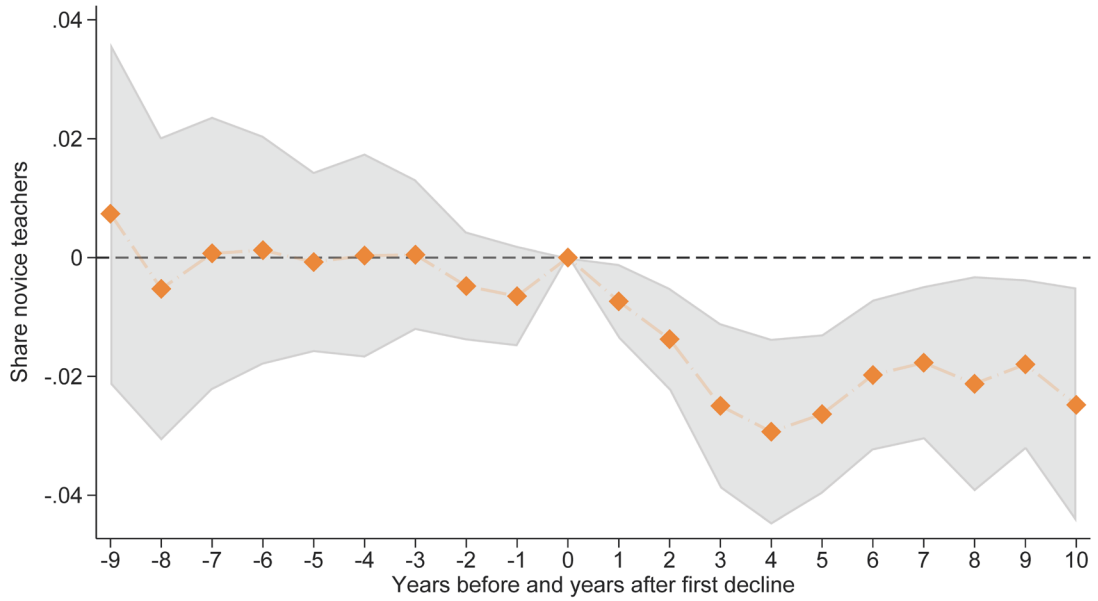


SOURCE: California Department of Education and authors' calculations.

NOTE: "0" is the year prior to a decline. Shaded areas show 95% confidence intervals of estimated effects. Estimates use district-level data from 1996-97 to 2017-2018. Coefficients are estimated according to equation (1) in Technical Appendix B. Districts with fewer than 250 students are excluded.

FIGURE B4

The share of novice teachers decreases following declining enrollment spell

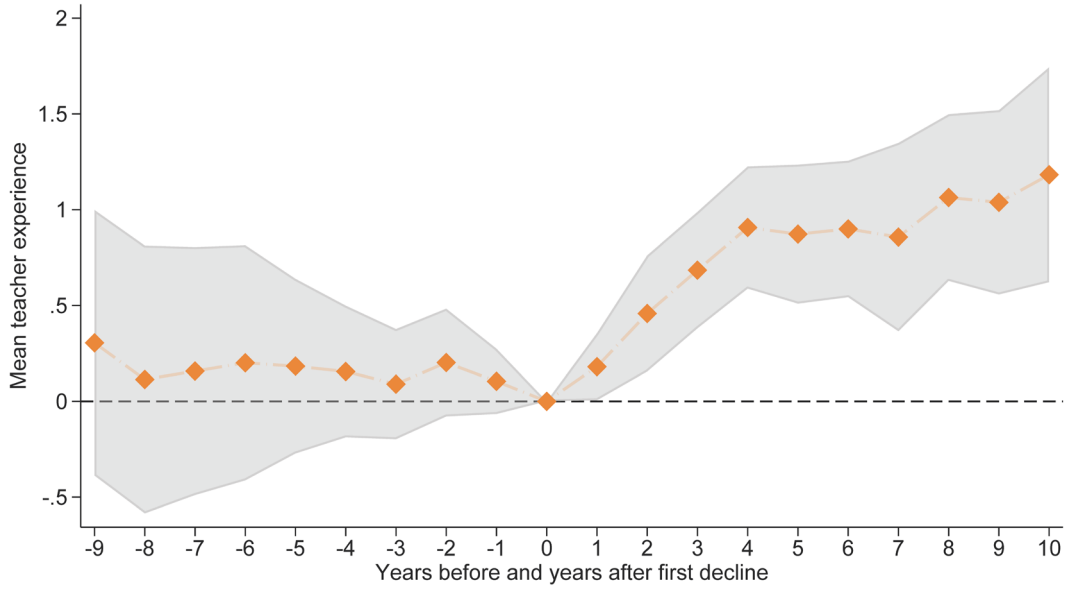


SOURCE: California Department of Education and authors' calculations.

NOTE: "0" is the year prior to a decline. Shaded areas show 95% confidence intervals of estimated effects. Estimates use district-level data from 1996-97 to 2017-2018. Coefficients are estimated according to equation (1) in Technical Appendix B. Districts with fewer than 250 students are excluded.

FIGURE B5

Mean teacher experience increases following declining enrollment spell

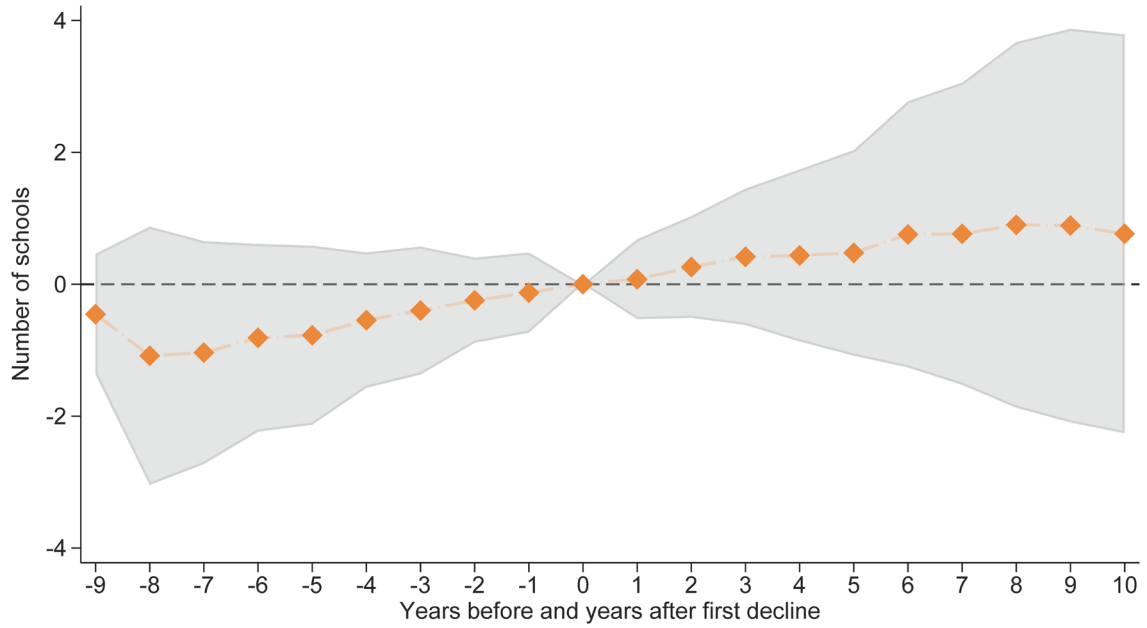


SOURCE: California Department of Education and authors' calculations.

NOTE: "0" is the year prior to a decline. Shaded areas show 95% confidence intervals of estimated effects. Estimates use district-level data from 1996-97 to 2017-2018. Coefficients are estimated according to equation (1) in Technical Appendix B. Districts with fewer than 250 students are excluded.

FIGURE B6

Little change in number of schools in a district following declining enrollment spell

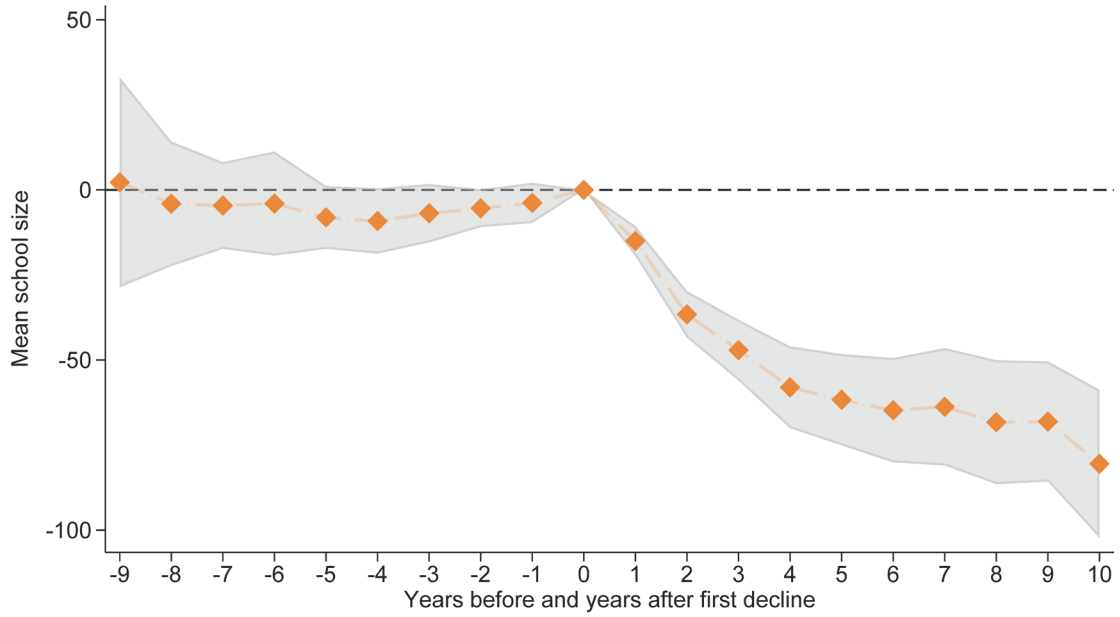


SOURCE: California Department of Education and authors' calculations.

NOTE: "0" is the year prior to a decline. areas show 95% confidence intervals of estimated effects. Estimates use district-level data from 1996-97 to 2017-2018. Coefficients are estimated according to equation (1) in Technical Appendix B. Districts with fewer than 250 students are excluded.

FIGURE B7

Decline in average school size following declining enrollment spell



SOURCE: California Department of Education and authors' calculations.

NOTE: "0" is the year prior to a decline. Shaded areas show 95% confidence intervals of estimated effects. Estimates use district-level data from 1996-97 to 2017-2018. Coefficients are estimated according to equation (1) in Technical Appendix B. Districts with fewer than 250 students are excluded.

Appendix C. Additional Information on Demographic Trends

Demographic patterns

FIGURE C1

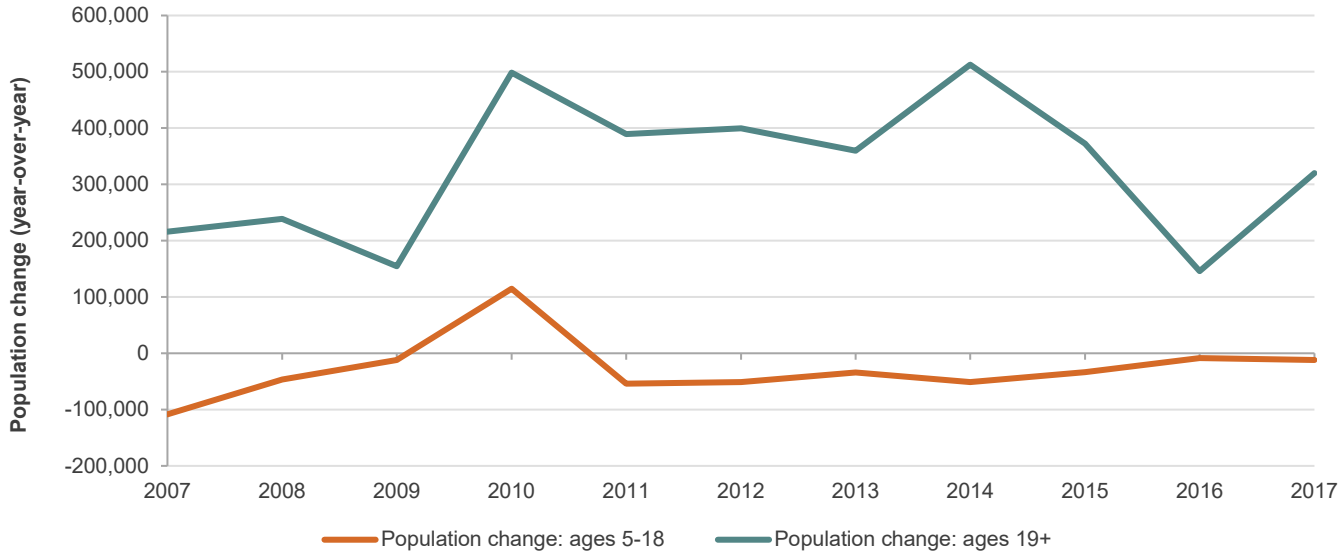
Net migration has fallen in recent years, and is now slightly negative

SOURCE: California Department of Finance.

NOTE: Totals include all age groups.

FIGURE C2

Population declines in most years in 5-18 year age group, despite increases in 19 and older group

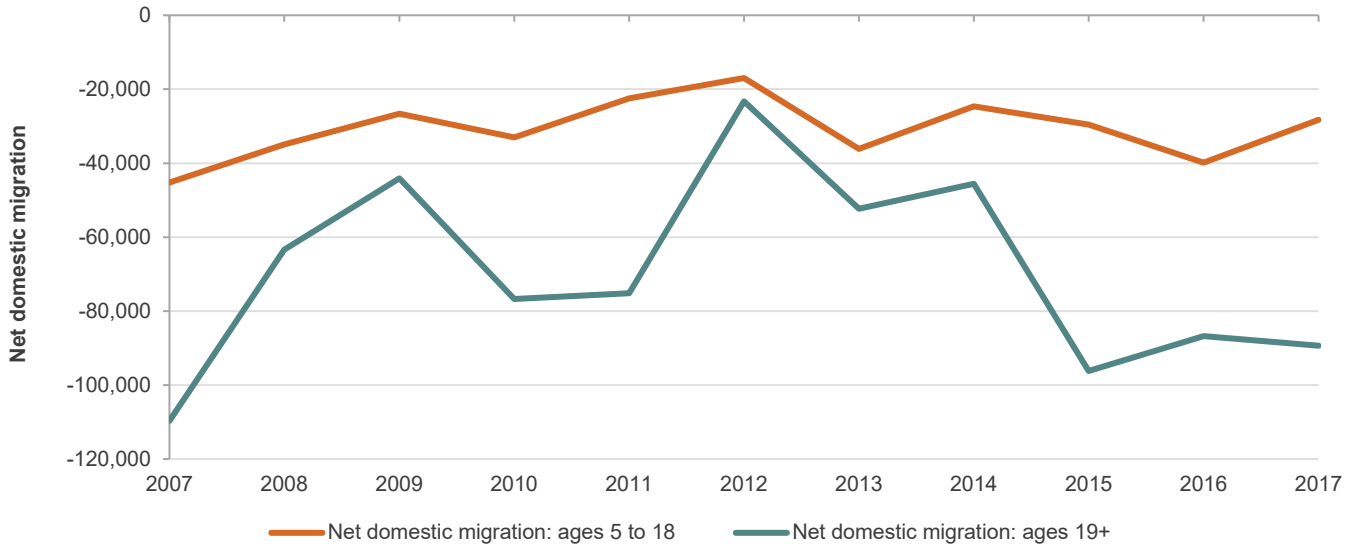


SOURCES: American Community Survey and authors' calculations.

NOTE: Figure reports annual population change, by age group.

FIGURE C3

Net domestic migration is negative for both age groups

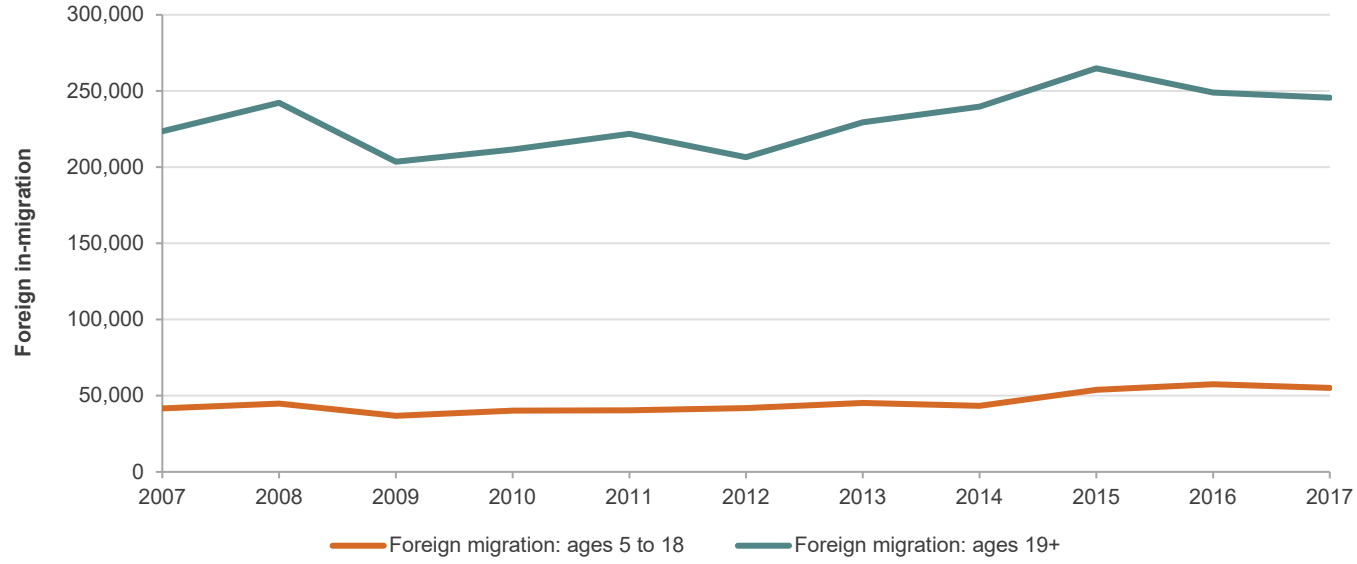


SOURCE: American Community Survey and authors' calculations.

NOTE: Figure reports annual net domestic migration, by age group.

FIGURE C4

Foreign in-migration large and roughly stable over past decades

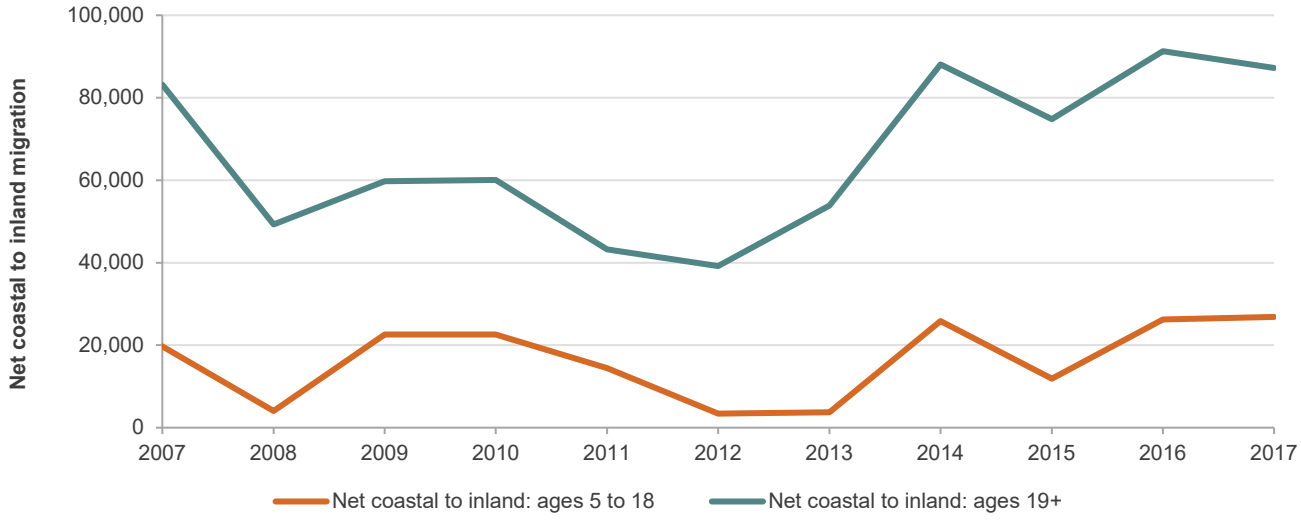


SOURCE: American Community Survey and authors' calculations.

NOTE: Figure reports total annual inflow of immigrants to California, by age group.

FIGURE C5

More people move from coastal to inland regions than vice versa



SOURCE: American Community Survey and authors' calculations.

NOTE: Figure reports annual net migration from coastal to inland regions (flow from coast to inland counties, minus flow from inland to coastal counties), by age group.

Appendix D: Proposition 98 and Declining Enrollment

As noted in the report, Proposition 98 will likely be set using Test 1 in the coming years as a result of declining enrollment (and attendance). Proposition 98 is the voter-approved initiative that sets the amount the state spends of K-12 schools and community colleges. Proposition 98 uses three tests to determine the amount from the state General Fund the state is required to spend in any one year.[4] The text box below describes the three tests.

[4] The legislature may override the requirements of Proposition 98 with the enactment of legislation that requires a 2/3s vote of each house and the governor's signature.

TABLE D1
How the Proposition 98 "Tests" Are Calculated

	Test 1	Test 2	Test 3
Revenue factor	38 percent of the General Fund	Change in per-capita personal income	Change in per-capita General Fund revenues
Attendance factor	None	Change in attendance	Change in attendance
Local property tax offset	Growth is added to the General Fund amount	Growth reduces the General Fund amount	Growth reduces the General Fund amount

Proposition 98 tests are based on specific budget and economic factors.

- Test 1 sets the General Fund portion of the minimum guarantee at 38 percent of General Fund revenues. Local property tax revenues for schools and community colleges are added to the General Fund amount to generate the minimum guarantee under Test 1. Test 1 is unaffected by the change in K-12 attendance.
- Test 2 sets the minimum guarantee by inflating the prior-year guarantee by two factors: the per-capita change in personal income in California and K-12 attendance. However, the increase in local property taxes is deducted from the General Fund increase for Proposition 98.
- Test 3 sets the minimum guarantee by inflating the prior-year guarantee by two factors: the per-capita change in General Fund revenues and K-12 attendance. As with Test 2, the increase in local property taxes is deducted from the General Fund increase for Proposition 98.

Proposition 98 also contains an odd set of rules for which test governs in a particular year. Test 1 applies when the minimum guarantee under Test 1 is greater than the lesser of either Test 2 or Test 3. If Test 1 is less than the two other tests, then the applicable test is either Test 2 or 3, whichever is higher.

When K-12 enrollment declines, Test 1 will almost always be greater than Test 3, because at least two of the three factors—General Fund growth rate and K-12 enrollment—are more advantageous under Test 1 than Test 3.

- General Fund revenues: Test 1 is more generous, providing the same increase for Proposition 98 as the overall General Fund revenue increase. Test 3 provides the *per-capita* increase in General Fund revenues (and the increase in state population reduces the increase in per-capital General Fund revenues).
- K-12 attendance. In a declining enrollment year, Test 1 is more generous. Test 3, by recognizing the reduction in attendance, would reduce the Proposition 98 minimum guarantee.
- Local property taxes: Which test is more generous depends on how fast property taxes are growing. Property taxes have outperformed state revenues in recent years.

Declining enrollment is the reason why Test 1 will be used to set Proposition 98 in the coming years. For most of its history, attendance was growing, and Proposition 98 consumed more than 38 percent of the General Fund. As attendance shrank, the minimum guarantee under Proposition 98 grew slowly, reducing the share of General Fund revenues needed to satisfy the minimum guarantee. As enrollment and attendance continue to fall in the future, therefore, Test 1 will continue to be the operative Proposition 98 test. This holds true under some circumstances when General Fund revenues decline, depending on the relative change in the three factors that drive the tests.

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