



Money and Freedom: The Impact of California's School Finance Reform

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Abstract

This study of California's recent major school finance reform, the Local Control Funding Formula, is among the first to provide evidence of LCFF's impacts on student outcomes. The study looked at per-pupil revenue, high school graduation rates, and student achievement for each grade and subject (mathematics and reading) for all public schools in California. The results show that LCFF-induced increases in district revenue led to a significant reduction in the average school-level student-to-teacher ratio and significant increases in average teacher salaries and instructional expenditures. LCFF-induced increases in school spending led to significant increases in high school graduation rates and academic achievement, particularly among children from low-income families. These improvements in high school academic achievement closely track the timing of LCFF implementation, school-age years of exposure, and the amount of district-specific LCFF-induced spending increase. In sum, the evidence suggests that money targeted to students' needs can make a significant difference in student outcomes and can narrow achievement gaps.

This brief can be found online at <https://learningpolicyinstitute.org/product/ca-school-finance-reform>.

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Introduction

One in eight students in the U.S. is educated in California's public school system, the largest state system in the country. Until recently, the state used an outdated school funding formula that had grown cumbersome—featuring dozens of categorical programs—and highly inequitable. Recognizing the urgency for a funding overhaul, Governor Jerry Brown proposed in 2012 what will likely be his flagship legislative achievement, the Local Control Funding Formula (LCFF), which allocates funds based on pupil needs and eliminates many limitations on the use of funds, allowing “local control” over spending decisions.

Historically, California has been a progressive forerunner in school finance. In 1971, the state had the nation's first successful court-ordered ruling on school finance in the landmark case *Serrano v. Priest*. Some 40 years later, in 2013, LCFF was enacted. It was the first major school finance reform in California since *Serrano* and one of the most progressive formulas in the nation. It attempts to address resource inequity by (1) reallocating school finances on the basis of student disadvantage (rather than district property wealth) and (2) removing many of the restrictions on how the revenue can be spent. The new funding formula reallocates district revenues based almost entirely on the proportion of unduplicated disadvantaged students in each district—those who qualify for free or reduced-price lunch, have limited English proficiency, or are in foster care. LCFF also aims to integrate and embed the accountability and student performance processes by requiring local communities to examine progress on a wide range of accountability indicators and to allocate funds to improve these outcomes.

The new, dramatically overhauled system of school finance mandates that each district devise a Local Control Accountability Plan (LCAP), which can be thought of as the recipe and ingredients it will use to prepare a nutritious, equitable learning “meal” for every student, beginning in preschool and continuing through 12th grade (high school graduation).

However, due to the minimal reporting requirements in LCAPs, some have expressed concerns that LCFF's granting of greater autonomy over which services and programs the new funding supports will result in a set of unintended consequences. Specifically, without sufficient accountability, the "no strings attached" provision could result in money not reaching the students in greatest need but could instead be allocated to more affluent students and schools. There is a long-standing debate about the advantages and disadvantages of a fiscally centralized funding system that accounts for heterogeneous local schools and student needs. This study informs that debate.

The impacts of the new policy are still reverberating, and the verdict is still out; however, given the magnitude of redistribution in the LCFF, the policy provides a test of how state policy and school resources can shape student achievement and reduce inequality. This study is among the first to provide evidence of LCFF's effects on student outcomes.

The Local Control Funding Formula

It has been argued that a "one size fits all" approach to school funding constrains local innovation and hampers the efficient use of resources to maximize student performance. K–12 school leaders have long advocated for fiscal sovereignty, rather than categorical restrictions, that allows the tailored use of resources to best meet local needs and improve student outcomes. High-need students—defined as those from low-income families, foster youth, or English learners—are the fastest growing group of children in California and across the country. Consider that:

- 58% of the state's public school students are from low-income families,¹
- 21% are English learners,²
- concentrated poverty and segregation are widespread, and
- there is a large achievement gap by race and class.

The architects of LCFF understood that addressing this rapid growth in the number of high-need students would require that districts have both more money *and* greater autonomy over how funding is distributed to meet those needs. To address the deleterious effects of concentrated poverty, the funding formula allocates concentration grants to school districts with more than 55% high-need students. The LCFF, which went into effect in the 2013–14 school year with a multiyear phase-in period, replaces the complex web of regulations and rules with a more transparent and progressive school funding system.

The way a school reform rolls out is an important aspect of the policy design. Traditionally, reforms roll out incrementally over time, allowing for the manifold adjustments—from personnel to curriculum—to be made at the local and district levels. However, although more immediate dispersal of funding is attractive, the constant uncertainty of available funding from year to year often precludes a district's ability to enact bold, transformative curricular reform that can span a decade. This is the case for many districts, but it is particularly common for urban and low-income districts. Such fiscal uncertainty in a district, which is similar to the instability experienced by families that live paycheck to paycheck, leads to suboptimal investments, rather than the sustained, high-quality investments that lead to continual improvement. LCFF aims to change all of this with an \$18 billion commitment in increased state support over 8 years.

How We Studied the LCFF

California's major shift in school finance reform replaced revenue limits with LCFF base funding differentiated by grade span, and it requires the student-to-teacher ratio in the early elementary grades (k-3) to not exceed 24:1 once LCFF is fully implemented. The three core components of the LCFF are (1) base grant, (2) supplemental grant, and (3) concentration grant. There is a guaranteed minimum equal to the amount received in 2012-13, adjusted for changes in average daily attendance (ADA) and local revenue. Roughly 100 "Basic Aid" districts have local per-pupil revenue in excess of LCFF targets and, therefore, receive nothing. For a few districts, there is also "economic recovery target" funding to restore pre-recession funding levels. Roughly 10% of state funding is outside the LCFF in the form of special education, Home-to-School Transportation and Targeted Instructional Improvement block grants, and school lunches.

The LCFF base grants establish a uniform grant that is based on ADA and varies by grade level. These grade-specific grants are adjusted for meeting k-3 class-size requirements (10.4%) and to support grades 9-12 college/career standards (2.6%) (see Figure 1).

Figure 1
2015-16 Base Grants per ADA (Including Adjustments)

Grades k-3	Grades 4-6	Grades 7-8	Grades 9-12
\$7,820	\$7,189	\$7,403	\$8,801

Source: California Department of Education. (29 March 2017). Funding Rates and Information, Fiscal Year 2015-16.
<http://www.cde.ca.gov/fg/aa/pa/pa1516rates.asp>.

The state's allocation of supplemental and concentration grants is the focal point of our use of the funding formula to isolate exogenous changes in district-level revenue caused by the state policy changes. As noted, LCFF defines high-need ("unduplicated") pupils as those who are eligible for free or reduced-price lunch, English learners, and foster youth. The supplemental grant is 20% of the base grant multiplied by the high-need share of enrollment. The concentration grant is 50% of the base grant multiplied by the high-need share of enrollment above 55%.

Concentration grants begin when a district is comprised of 55% or more high-need students. State regulations require these grants be used to "increase or improve" services for high-need pupils "as compared to services provided to all pupils." Districts serving 55% or more high-need students may spend these resources districtwide. If a school serves 40% or more high-need students, resources can be expended schoolwide. However, the district's LCAP must identify these services and how they are principally directed to high-need students.

The primary empirical challenge in estimating the effects of school spending on student outcomes is that spending and the quality of schools tend to be highly correlated with child family and neighborhood socioeconomic factors, due to the combination of parental choices and residential location constraints (e.g., zoning policies and availability of affordable housing) that sort more-advantaged children into better-quality schools. Compensatory spending reforms may understate the effects of increased funding on student outcomes if the pre-existing student disadvantage that funding is targeted toward is not fully taken into account.³

Our Methodology

Our research design employed a simulated instrumental variables approach to circumvent this challenge using the LCFF and timing of implementation to isolate what is akin to helicopter drops of money and promised availability of this funding from the state in future years as well. To ascertain the effects of LCFF, we examined the following: the baseline percentage of high-need students in the district, the district's base grant, and the formula that allocates additional funding based on pupil needs in a given district.⁴

Importantly, these reform-induced changes in district spending, which are credibly identified from the funding formula (and which serve as the instrumental variables), are unrelated to changes in child family and neighborhood characteristics. We refer to this reform-induced change in district per-pupil spending from the state as the “dosage,” which is district-specific. The dosage amount here refers to the LCFF fully funded amount. High-poverty districts are high dosage, and those with small proportions of disadvantaged students are low dosage, in accordance with the funding formula.

We refer to “exposure” as the number of school-age years a child was exposed to the LCFF policy, which is birth cohort-specific, recognizing there is a phase-in period of implementation toward the formula being fully funded. For example, in models of high school graduation rates, cohorts born before 1996 are “unexposed” cohorts because they had already reached age 18 prior to the enactment of LCFF.

LCFF established a multiyear phase-in timeline to incrementally close the gap between actual funding and new target levels of funding. The research design explicitly accounts for this through the estimation of fully non-parametric event study models that show the evolution of school inputs and student outcomes in both the years before and after the law's implementation, separately for high- and low-dosage districts.

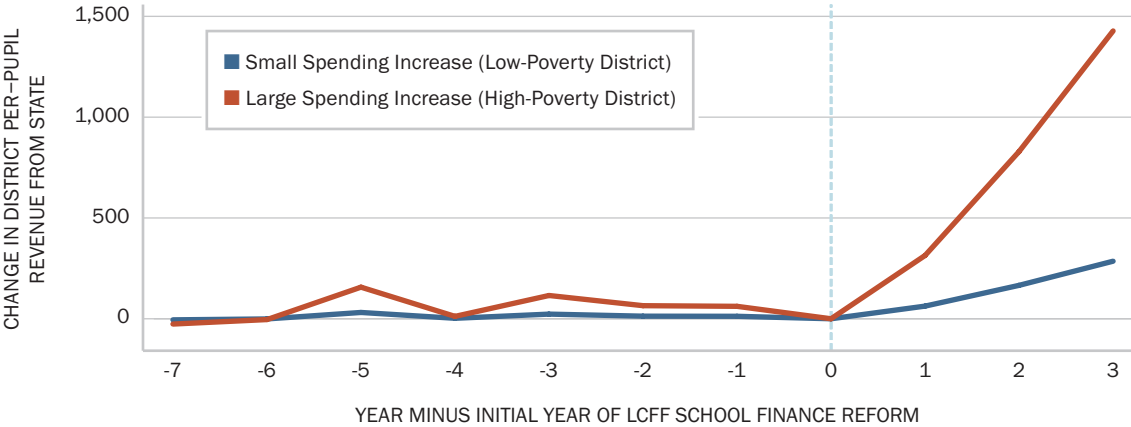
For this purpose, for cohorts born between 1990 and 2000, we constructed a school-by-cohort-level panel data set of school-age years of per-pupil revenue, high school graduation rates, and student achievement for each grade and subject (mathematics and reading), for all public schools in California. These data are matched with LCFF school-reform variables. This paper focuses on high school achievement using 11th-grade mathematics and reading standardized test scores (that are benchmarked to the equivalent National Assessment of Educational Progress scale—i.e., NAEP-norm adjusted),⁵ as well as high school graduation rates (the 4-year cohort rate, which has been consistently measured since 2009 for public schools in California). Our analysis excludes charter schools.

Our inclusion of school fixed effects accounts for all time-invariant school-level factors, and the inclusion of birth-year fixed effects accounts for statewide trends in outcomes. Thus, factors such as persistent differences in teacher quality across schools and statewide changes in economic conditions are not a potential source of bias. The empirical strategy effectively compares changes in average student outcomes across cohorts from the same school before and after LCFF-induced changes in district per-pupil revenue (that exist over and beyond year/cohort-specific average changes over time).

If school spending has causal effects on student outcomes, we would expect to find patterns of results that increase in both dosage (i.e., the amount of spending change) and the number of school-age years of exposure;⁶ this dose-response relationship is indeed the pattern of results we found. Importantly, we find no corresponding evidence of pre-existing time trends, which supports the validity of the research design to detect causal impacts. By 2016 (the most recent year for which data is presently available), the maximum number of school-age years of exposure is 4 years, since the first year of enactment is during the 2013–14 school year. Target levels approached fully funded status in the 2015–16 school year. So, for example, students who

graduated in 2016 would potentially have been exposed to LCFF throughout their high school years; similarly, student achievement in 11th grade during the 2016–17 school year corresponds with cohorts that potentially had been exposed to LCFF since the time they entered 8th grade (albeit at nearly fully funded levels in only the last two of those years). To account for other potential district-level changes not driven by LCFF, models also include, as an additional control variable, the predicted district per-pupil revenue from the state, based on prior funding and statewide California spending on non-k–12 expenditures (based on pre-LCFF district-specific relationship between prior funding variables and district revenue from the state). This is an estimate of the counterfactual district revenue from the state if LCFF had not occurred. The prediction closely matches the actual level of revenue in all years prior to LCFF; the significant departure of actual revenue from its prediction in the post-LCFF years (as expected) is plausibly attributable fully to the new LCFF formula.⁷ Figure 2 shows the evolution of district per-pupil revenue from the state before and after LCFF for high-poverty (large spending increase) and low-poverty (small spending increase) districts.⁸ This evidence that finds no pre-existing time trend also further supports the research design’s ability to uncover causal effects.

Figure 2
Effects of LCFF on District Revenue From the State



Because we have interest in estimating potential spending effects on average student achievement at the school level, as well as impacts on achievement gaps, we estimated models for all children and separately for children from low-income families (“children from low-income families” are defined in this brief as those who are eligible for free or reduced-price lunch) and by race/ethnicity. We also conducted a series of placebo (falsification) tests to ensure that the estimated effects are indeed due to the impacts of LCFF and not to other coincident policy changes.

Findings

The first part of our analysis focuses on how districts choose to spend their newly increased and unrestricted revenue. Through an analysis of LCFF, the study examined how simultaneous changes in the levels and restrictions of state funding impacted school-level inputs, the distribution of school district per-pupil spending, and the composition of district spending—including instructional expenditures, student-to-teacher ratios, average teacher salary, administrative salaries, capital expenditures, and public expenditures on early childhood education. In particular, using detailed annual district finance data,⁹ we tracked changes in spending patterns across a host of fine-grained categories such as teacher salaries, instructional materials, school

nutrition programs, and early childhood education expenditures (pre-k and transitional kindergarten). Given these changes in expenditures, we then evaluated the impact of LCFF's twin changes in finance on the quality and distribution of teachers, particularly teachers with better training and more experience.

We found that the LCFF-induced increases in district revenue led to a significant reduction in the average school-level student-to-teacher ratio and led to significant increases in per-pupil expenditures, average teacher salaries, and instructional expenditures. In particular, for every dollar increase in district revenue, we saw a 25-cent increase in instructional expenditure, holding constant the proportion of unrestricted district revenue. We saw that a 10.0% increase in district per-pupil revenue from the state led to a 2.7% increase in average teacher salary. Thus, we saw a significant portion of the increases in spending making it to the classroom. Higher teacher salaries may enable the school and district to attract and retain a higher quality teaching workforce.

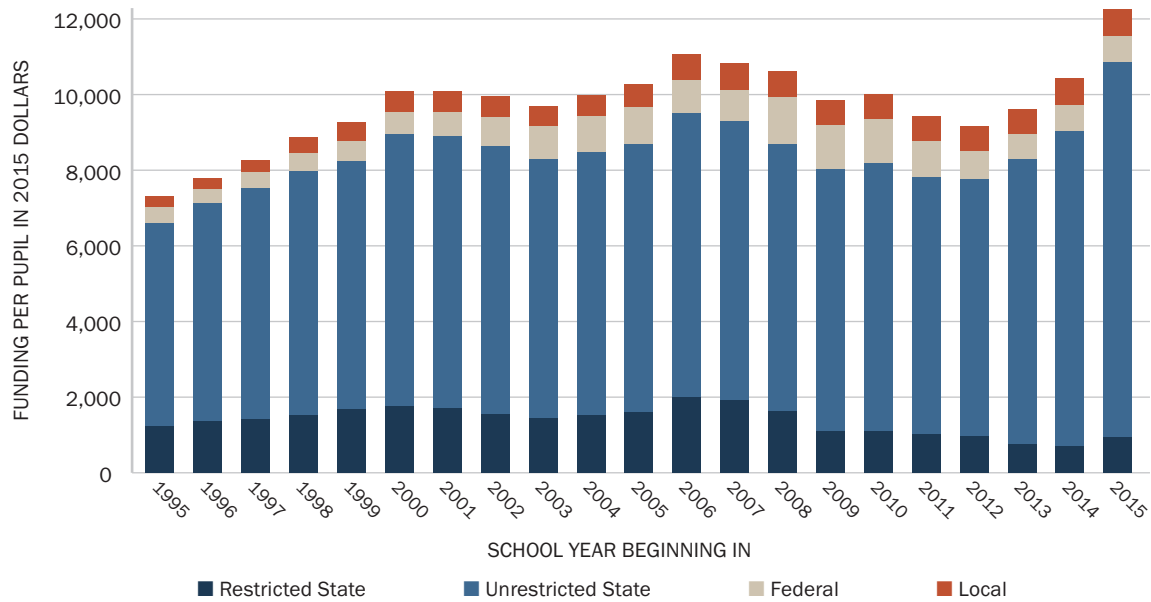
The overall composition of the broad categories of spending appears not to have shifted dramatically in these first 3 years of LCFF. We did not see evidence that the increase in district revenue disproportionately increased administration salaries. We did not detect any significant changes in the proportion of teachers with master's degrees at the school level, nor did we find significant changes in expenditures on teacher professional development. The overall levels of spending have increased roughly proportional to their pre-LCFF proportions.

We did see, however, that the increases in district per-pupil revenue led to significant increases in public pre-k spending per 4-year-old in the district. We also saw that the increased district revenue disproportionately increased the proportion of expenditures on special education.

State Funding Trends

Figure 3 shows the average annual per-pupil expenditures and the composition of district revenue across federal, state, and local sources over the period 1995–2015/16 (inflation-adjusted and expressed in 2015 real dollars). The descriptive figures are weighted by student enrollment so that the results can be interpreted as the relevant spending levels experienced by the average child in the state. We found significant increases in per-pupil expenditures, driven largely by increases in revenue from state sources over this period. We also saw significant cyclicalities in revenue that follows changes in economic conditions. The significant budgetary fallout in the aftermath of the Great Recession and home foreclosure crisis of 2008–09 led to significant funding reductions, teacher layoffs, and resultant increases in class size, particularly in lower-income districts that were hardest hit. LCFF's infusion of additional funding largely restored revenues to their 2007 pre-recession levels.

Figure 3
Funding Sources by Year



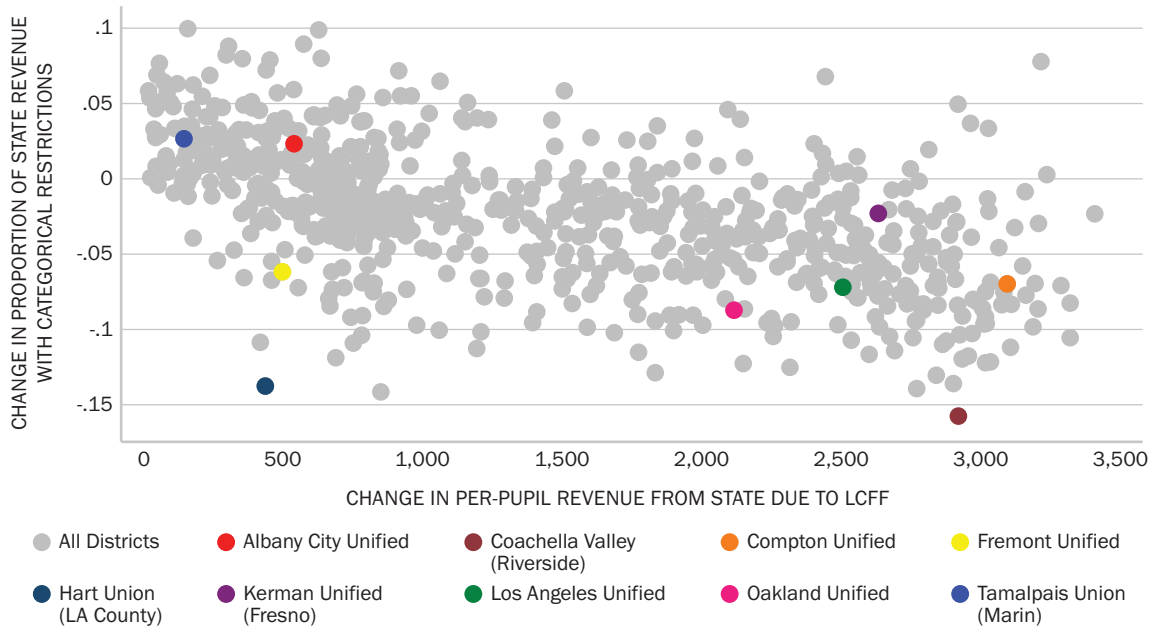
Also shown here are the significant increases in the proportion of state revenue without categorical restrictions that first occurred following the passage of the Categorical Funding Flexibility bill in 2009 that relaxed spending restrictions on more than 40 categorical programs through 2012–13. This law was designed during the recession era to improve districts’ ability to tailor spending to local students’ needs and to “keep the lights on” in the face of severe budget cuts. LCFF further expanded the provisions of this change to include even greater flexibility of district spending, which is to become a more permanent feature of California’s funding system.

Effects of LCFF on District Expenditures

The wide variation in districts’ student composition and historic reliance on categorical state funding programs led to substantial differences in how the new policy impacted district expenditures across the state. Figure 4 highlights the differences in the extent to which LCFF changed revenue levels and restrictions on spending for different districts. For example, we see that high-poverty districts, such as Compton Unified and Oakland Unified, experienced comparable reductions in restrictions on spending, but Compton’s increased revenue was noticeably more per pupil than Oakland’s. Meanwhile, more affluent districts, such as Fremont Unified and Albany City Unified, experienced similar (smaller) increases in revenues but very different levels of change in the extent of revenue that was restricted. These differences allow us to leverage the heterogeneous, abrupt changes in funding induced by LCFF in a two-stage least squares event-study framework. Our goal is to jointly test both the impact of levels of funding and the impact of easing restrictions on how it is spent.

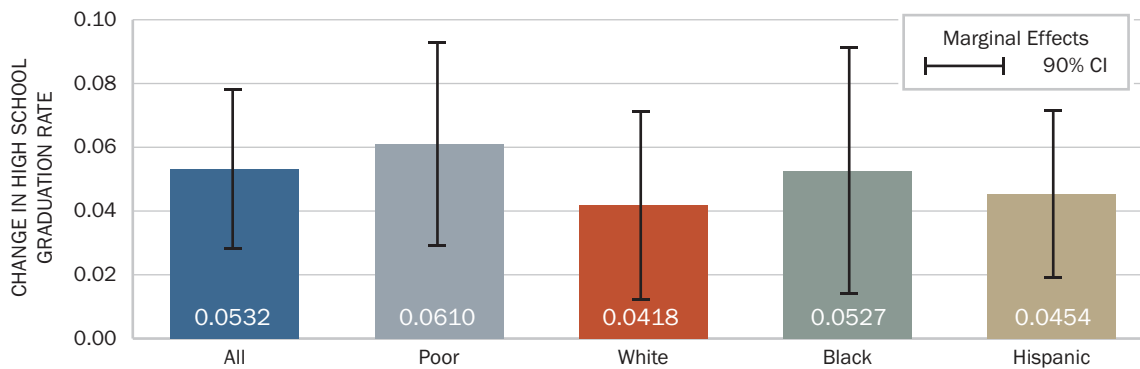
The study used publicly available annual school-level and district-level data, spanning 1995 through 2016, to identify the impacts of these simultaneous changes in levels of and restrictions on state funding on district expenditures, school inputs (student-to-teacher ratio and teacher quality), and student achievement.

Figure 4
Change in District Revenue & Restrictions Before & After LCFF (2012–15)



We employed three empirical strategies to isolate the effects of LCFF-induced changes in spending on student outcomes.¹⁰ We found a similar pattern of results across all three research designs, all of which provide strong evidence that LCFF-induced increases in school spending led to significant increases in high school graduation rates and academic achievement, particularly among poor children. Our discussion focuses on our preferred model results.¹¹

Figure 5
Effects of LCFF-Induced \$1,000 Increase in District Per-Pupil Revenue From State (Ages 15–17) on High School Graduation Rates



We found strongly significant impacts of LCFF-induced increases in district revenue on average high school graduation rates for all children, poor children, and all racial ethnic groups that experienced such changes (see Figure 5). A \$1,000 increase in district per-pupil revenue from the state experienced in grades 10–12 leads to a 5.3 percentage-point increase in high school graduation rates, on average, among all children. We found similar magnitudes for poor children and by race/ethnicity: a \$1,000 increase in per-pupil revenue from the state causes a 6.1 percentage-point increase for poor children, a 5.3 percentage-point increase for Black children, a 4.2 percentage-point increase for non-Hispanic White children, and a 4.5 percentage-point increase for Hispanic children. Furthermore, these changes closely track the staggered timing of LCFF implementation and LCFF’s district-specific spending dosage (see Figures 6, 7, and 8).

Figure 6
Effects of LCFF on District Revenue From the State

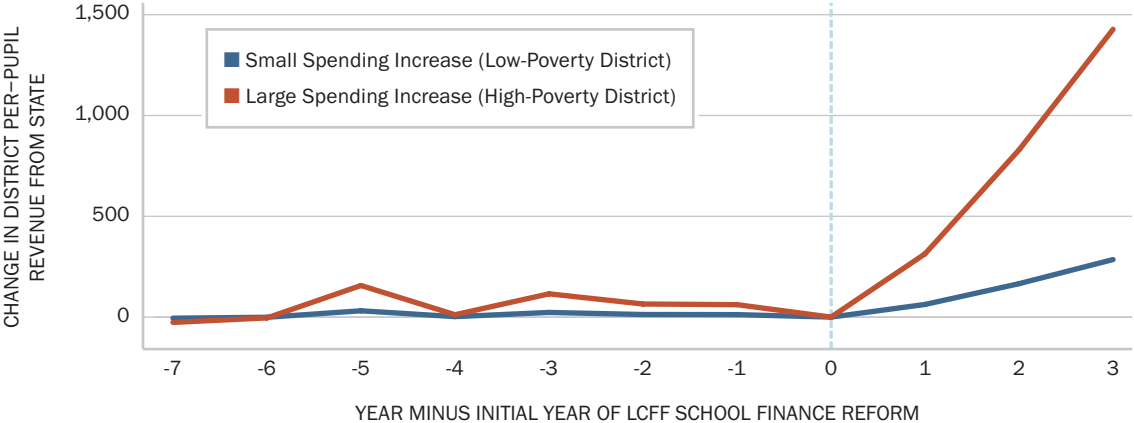


Figure 7
Effects of LCFF on High School Graduation Rate for Children From Low-Income Families

Large (vs. small) SFR-induced spending increase

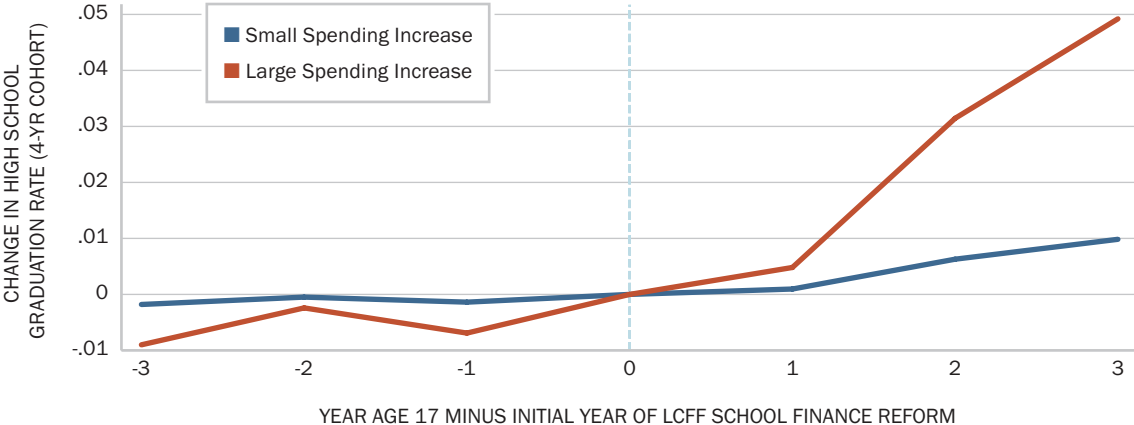
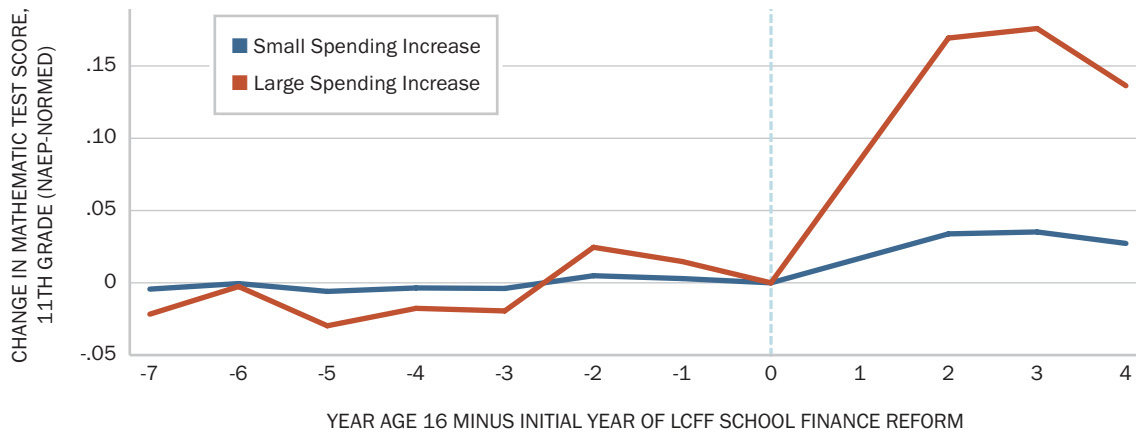


Figure 8
Effects of LCFF on High School Mathematics Achievement for Children
From Low-Income Families

Large (vs. small) SFR-induced spending increase

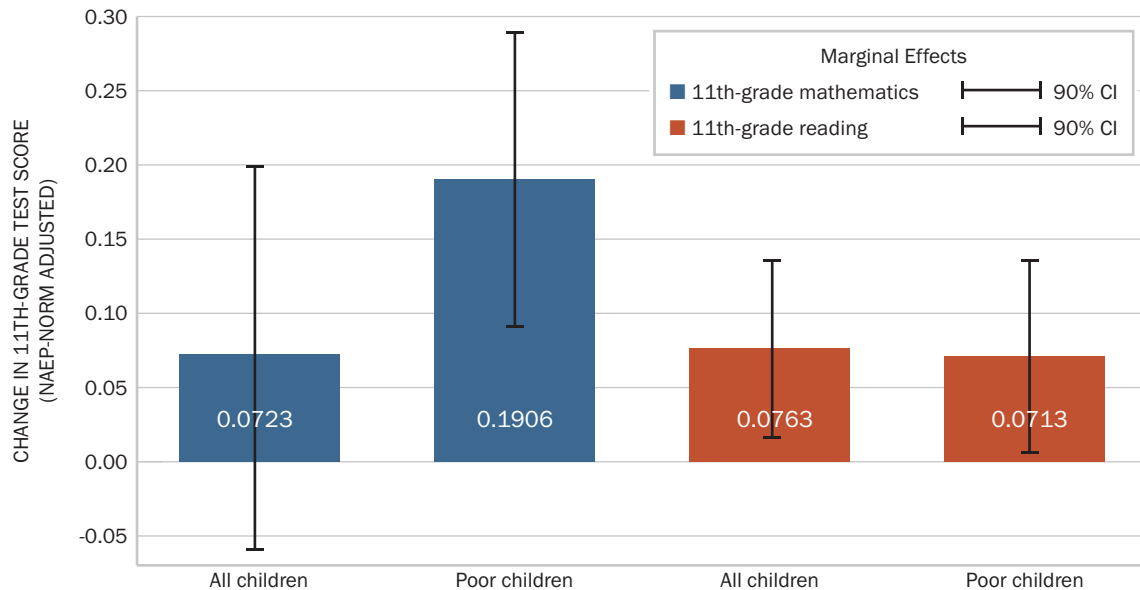


These results are strongly significant and robust with and without controlling for the proportion of revenue that is unrestricted as well as being robust to other specification checks. Because there have been recent concerns about graduation rate data from the Los Angeles Unified School District (LAUSD), we re-estimated these models without LAUSD and found similar results.

To examine 11th-grade student achievement, we normed test scores to the NAEP, as there was a change in standardized test measurement in 2012 (from the previous California Standards Tests to the new California Assessment of Student Performance and Progress). This norming enabled comparable measurement over time to analyze student performance and comparisons of that performance before and after LCFF changes in spending. We accounted for changes in the testing procedures that could otherwise lead to biases by including year fixed effects, which pick up average year-to-year trends in student performance that may be attributable to the changes in standardized test measurement.

The results show average gains in mathematics and, to a smaller extent, in reading for all children. These effects are larger for children from low-income families and are particularly strong for high school mathematics achievement for these students (see Figure 9). The results indicate that, on average among children from low-income families, holding constant the proportion of revenue that is unrestricted, a \$1,000 increase in district per-pupil revenue from the state experienced in grades 9–11 leads to a 0.19 standard-deviation increase in mathematics test scores and a .07 standard-deviation increase in reading test scores in 11th grade. As was true with graduation rates, these increases in test score performance closely follow both the staggered timing of LCFF implementation and the amount of district-specific LCFF-induced spending increases (see Figures 6, 7, and 8).

Figure 9
Effects of LCFF-induced \$1,000 Increase in District Per-Pupil Revenue From State (Ages 13–16) on High School Academic Achievement



Conclusion

Our findings are particularly noteworthy in light of the fact that LCFF is a recent reform and has been gradually rolled out to become fully funded and implemented in the past year. The country is watching as it is anticipated that, if successful, the new school finance measure may lead other states to adopt similar legislation. Time will tell. In the interim, this new research evidence suggests that money targeted to the needs of students, and allocated by local districts to meet those needs, can make a difference in student outcomes.

Endnotes

1. California Department of Education. Selected statewide data for the year 2016–17. Retrieved from <https://dq.cde.ca.gov/dataquest/Cbeds1.asp?FreeLunch=on&cChoice=StatProf1&cYear=2016-17&cLevel=State&cTopic=Profile&myTimeFrame=S&submit1=Submit>.
2. California Department of Education. (20 October 2017). Facts about English Learners in California. <https://www.cde.ca.gov/ds/sd/cb/cefelfacts.asp>.
3. This point has been illustrated by Johnson, R. C., & Jackson, C. K. (2017). *Reducing inequality through dynamic complementarity: Evidence from Head Start and public school spending*. (NBER working paper #23489). Cambridge, MA: National Bureau of Economic Research; and Jackson, C. K., Johnson, R. C., & Persico, C. (2016). The effects of school spending on educational and economic outcomes: Evidence from school finance reforms. *Quarterly Journal of Economics*, 131(1): 157-218.
4. Our simulated instrumental variables (IV) approach for supplemental/concentration grants uses these three parameters to construct our instrument (Z_d): Baseline % of high-need students in district (H_d); district's base grant (G_d); and the formula that allocates additional funding based on pupil needs in a given district. We model the analysis as:

$$Z_d = 0.2 \times G_d \times H_d^{2013} + 0.5 \times G_d \times [H_d^{2013} - 0.55]$$
5. NAEP adjustments follow procedures outlined in Reardon, S. F., Kalogrides, D., & Ho, A. (2017). *Linking U.S. school district test score distributions to a common scale*. (CEPA Working Paper No.16-09). Stanford, CA: Center for Education Policy Analysis. <http://cepa.stanford.edu/wp16-09>.

6. A similar research design and empirical setup to identify the causal effects of k–12 spending is used in Johnson, R. C., & Jackson, C. K. (2017). *Reducing inequality through dynamic complementarity: Evidence from Head Start and public school spending*. (NBER working paper #23489). Cambridge, MA: National Bureau of Economic Research; and Jackson, C. K., Johnson, R. C., & Persico, C. (2016). The effects of school spending on educational and economic outcomes: Evidence from school finance reforms. *Quarterly Journal of Economics*, 131(1): 157-218, which examine earlier-era court-ordered school finance reforms.
7. The results are similar with and without this additional control.
8. In the figures, a “high-poverty district” receives \$2,500 per-pupil revenue from the state when LCFF is fully funded, whereas a “low-poverty district” receives \$500 per-pupil revenue (in accordance with the funding formula).
9. California Department of Education. Annual Financial Data, 1995-2016. <https://www.cde.ca.gov/ds/fd/fd/>.
10. The three strategies include: (1) event study difference-in-difference models; (2) 2SLS-IV models that use the funding formula components as instruments; and (3) 2SLS-RKD-IV (two-stage least squares regression kink design) that exploits the fact that the formula involved concentration grants for districts that have more than 55% of their enrollment composed of disadvantaged students (limited English proficiency, foster children, free or reduced-price lunch recipients).
11. The preferred model is the 2SLS-IV approach. We estimate the following system of equations by 2SLS where s indexes school, d indexes district, b indexes birth year, and g indexes group (all children, children from low-income families, or racial/ethnic group):
 - $Y_{gsab} = \beta_1 \cdot \widehat{revst}_{ab}^{15-17} + \beta_2 \cdot \widehat{unrs}_{ab}^{15-17} + \gamma \cdot C_{ab} + \theta_s + \tau_b + \varepsilon_{gsab}$
 - $\widehat{revst}_{ab}^{15-17} = \pi_1(SFRExp_{ab} \times \widehat{dose}_d) + \pi_2(SFRExp_{ab} \times \widehat{unrs12}_d) + \gamma_1 \cdot C_{ab} + \theta_{d1} + \tau_{b,1}$
 - $\widehat{unrs}_{ab}^{15-17} = \pi_3(SFRExp_{ab} \times \widehat{unrs12}_d) + \pi_4(SFRExp_{ab} \times \widehat{dose}_d) + \gamma_2 \cdot C_{ab} + \theta_{d2} + \tau_{b,2}$.
 - $\widehat{revst}_{ab}^{15-17}$ is the average per-pupil revenue from the state (in real 2015 dollars) during expected school-age years (ages 15 through 17) in an individual’s childhood school district.
 - $\widehat{unrs}_{ab}^{15-17}$ is the average proportion of revenue from the state that is unrestricted during expected school-age years (ages 15 through 17) in an individual’s childhood school district
 - $SFRExp_{ab}$ is the number of school-age years that occurred after LCFF was first implemented (0 = 17 years old, 4 = 13 years old, etc.); each year entered as dummy indicator (fully non-parametric specification).
 - \widehat{dose}_d is the decile of the LCFF concentration/supplement grant*spline (based on funding formula).
 - $\widehat{unrs12}_d$ is the 2012 (pre-LCFF) proportion of revenue from the state that was unrestricted.
 - C_{ab} is the district-specific predicted k–12 spending at age 15–17 based on pre-LCFF relationship between district spending and statewide spending (excluding k–12 spending)—estimated counterfactual spending in absence of SFR.
 - θ_s is the vector of school fixed effects; τ_b is the vector of birth year fixed effects.

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Sean Tanner is a Senior Researcher on the Early Childhood Learning and Equitable Resources and Access teams at LPI. His research focuses on the impact of pre-k through 12 policies (i.e., accountability and school finance reform) on educational and socioeconomic inequality, particularly for educationally disadvantaged students.