DOES SCHOOL FINANCE REFORM REDUCE THE RACE GAP IN SCHOOL FUNDING?

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Abstract

This paper offers new evidence on the impacts of school finance reforms (SFRs) precipitated by school finance litigation, exploring the extent to which the impact of SFR differs by district racial composition. Using difference-in-differences and event study models with a series of district and year (or state-by-year) fixed effects, and a sixteen-year panel of over 10,000 school districts, my analyses exploit variation in funding across school districts, and timing of school finance court orders across states, to estimate the effect of SFR on the distribution of district funding by racial composition. Models include relevant control variables available in national data and results are robust to numerous alternative specifications, including estimating impacts on percent changes in resources (in addition to levels), restricting analyses to districts in SFR states, controlling for additional covariates available in only some years and some states, and adding controls for state-specific time trends. In addition, I estimate changes in New York State to assess whether and to what extent results are sensitive to additional controls for revenue-raising capacity and district costs. Results suggest that SFR can work to alleviate racial funding gaps, though impacts are moderate.

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1. INTRODUCTION

A persistent issue in U.S. public education is the enduring racial gap in academic performance. One potential contributing factor to the achievement gap is a disparity in resources. Historically, school district financial resources and share of students who are black are negatively correlated, though this has narrowed in recent decades (Card and Krueger 1996; Card and Rothstein 2007). School finance reform (SFR) may partially explain narrowing resource disparities. Court-ordered SFR is a court ruling that mandates a state to change its school funding system and provide fairer educational opportunities to students across the state.[1] Most often, SFRs explicitly work to break the link between district wealth and school spending. By this definition, twenty states had at least one SFR by 2010.[2] SFR may also weaken the link between race and education funding due to, for example, historical segregation that concentrates nonwhite students in districts with low property wealth (Ryan 1999; Rothstein 2017). Alternatively, SFR may not affect racial funding gaps, perhaps narrowing gaps in district funding between wealthy and poor districts without addressing gaps across racial groups. Thus, the questions remain: To what extent do the impacts of SFR on district funding vary by racial composition, and to what extent does SFR work to close racial funding gaps? This study aims to answer these questions, providing estimates on the extent to which the impacts of SFR are larger as district minority representation increases, and whether local revenue responses offset increases in state aid.

Previous work finds that total district funding is correlated with race (Card and Krueger 1996; Ryan 1999). Districts with greater white student compositions, on average, raise greater levels of local revenues than those with greater nonwhite compositions, perhaps because of fewer resource constraints (Card and Payne 2002; Baker, Sciarra, and Farrie 2010). Moreover, others document gaps in local revenues due to historical inequities in access to wealthier school districts (and higher property value communities) precipitated by segregational housing and zoning policies, which still remain insufficiently remedied today (Rothstein 2017). Perhaps surprisingly, then, the share of students who are white is also positively correlated with levels of *state aid*—intended to be an equalizer of resources—after controlling for revenue-raising capacity and district costs (Stiefel et al. 2005; Chellman 2008). One explanation of this phenomenon is that state funding formulas reflect implicit voting preferences, particularly if there is a mismatch of racial composition between the voting-age population and school-aged children (Poterba 1997; Ladd and Murray 2001; Figlio and Fletcher 2012).[3]

SFR provides a possible policy mechanism to close the race gap in school funding. Previous research finds that SFR reduces the funding gap between wealthy and poor districts (Murray, Evans, and Schwab 1998; Card and Payne 2002; Corcoran and Evans

1. Throughout this paper, SFR refers to court orders for reform, regardless of the timing of school finance legislation. That is, I use an inclusive definition of SFR, exploiting the first highest court order in each state, regardless of whether and when actual changes in state funding mechanisms occur or if other cases are brought forward.
2. Students in these twenty states constitute 69 percent of the total U.S. elementary and secondary public student population in 2010. In 2014, the South Carolina Supreme Court became the twenty-first state with a SFR ruling. Other states have rulings focused on capital expenditures or on a specific class of students (for example, English language learners). I follow Corcoran and Evans (2008, 2015) and do not include rulings focused on targeted funds or populations as SFRs.
3. It is important to note that no state has a funding formula that enumerates race as a determinant of the levels of state aid distributed.

2008, 2015; Jackson, Johnson, and Persico 2014, 2016). The same may hold for the race gap in funding if, for example, the share of students who are nonwhite is positively correlated with the share of students at-risk or in poverty. As another example, perhaps historical racial inequalities are embedded in extant state funding formulas, and SFR forces legislatures to revisit these laws, also decreasing racial funding gaps. In this paper, I estimate the extent to which SFR impacts are larger as nonwhite share increases, potentially alleviating racial funding gaps.

Using a sixteen-year panel spanning 1996–2011, my analyses exploit variation in funding across school districts and timing of SFR court orders across states to estimate the extent to which the size of SFR's impact increases with share of students who are nonwhite. Models include relevant control variables available in national data but, due to data limitations, do not include controls for time-varying district wealth, such as property tax base. Instead, I estimate difference-in-differences (or event study) specifications with a series of fixed effects to identify the impact of SFR, using interaction terms between SFR and a vector of variables capturing racial composition. As a robustness check, I conduct a detailed descriptive analysis of the changes in New York State (NYS) school finance since its SFR, using a thirteen-year panel spanning 2000–2012. This analysis includes measures of revenue-raising capacity and costs unavailable nationally to assess model sensitivity.

For state aid, on average, I find that the effect of SFR is increasing in the shares of students who are black, Hispanic, and American Indian.[4] Conversely, SFR leads to smaller increases in state aid as the share of students who are Asian increases. SFR also has a smaller, offsetting effect on the relationship between race and local revenue; SFR has smaller effects on local revenues as the shares of students who are black and American Indian increases, and larger effects on local revenues as the shares who are Asian increases. Effects on local revenues are small relative to effects on state aid. Thus, the impact of SFR on total revenues is similar to state aid—it increases with shares of students who are nonwhite, closing racial funding gaps.

Results are robust to a series of alternative specifications, including restricting the sample to "ever SFR states" (those that have a SFR at any point before 2012), assessing timing of impacts using an event study framework, controlling for state-specific time trends, and estimating effects in NYS using additional control variables unavailable nationally.[5] In addition, a placebo test indicates that the impact estimates are a result of SFR, not the threat of one. Changes following court rulings in favor of the status quo ("uphold") are small and insignificant.

The rest of the paper is organized as follows. I begin with an overview of the relevant literature, followed by a description of data and measures used and an outline of the empirical strategy. Results for national and NYS analyses, and conclusions follow.

4. The National Center for Education Statistics Common Core of Data Public Elementary/Secondary School Universe Survey identifies a category of students as "American Indian/Alaska Native." While some prefer the phrase "Native American," I follow the National Center for Education Statistics category names in this paper.
5. In addition, all results shown in this paper show impacts as the level change in dollars per pupil, but results are robust to assessing the impact on percent changes in resources (the natural logarithm of state aid, local revenues, and total revenues). These results are available from the author upon request.

2. THE LINKS BETWEEN SFR, DISTRICT RESOURCES, AND RACE

Although research on equity and efficiency of educational state aid distribution is rich (Bradbury et al. 1984; Downes and Pogue 1994; Duncombe and Yinger 1998; Odden and Picus 2008; Picus, Goertz, and Odden 2008, 2015), few assess the role of race in determining district resources. Those that do generally find that district racial composition matters (Stiefel et al. 2005; Chellman 2008; Baker and Green 2009). While Baker and Green (2009) suggest race can play a role in SFR, few studies have examined the extent to which the impacts of SFR differ by race. One exception, Sims (2011), finds little relationship between the size of SFR impacts and nonwhite share, but does not control for time-invariant district characteristics, statewide policy or economic changes over time, or disentangle the effects on state aid from those on local revenues.

Determinants of School District Financial Resources

Schools districts are funded by three levels of government—federal, state, and local—but historically, local and, specifically, local property taxes play the largest role. Thus, local revenues are unequally distributed across districts (Baker, Sciarra, and Farrie 2010). There is also a correlation between district racial composition and local revenues, perhaps due to (or partially due to) historical discrimination limiting access of nonwhites to districts with large property tax bases (Rothstein 2017). The share of revenue from state aid, however, has increased over the past few decades—due in part to SFRs—leading to more equal distributions of resources, at least between wealthy and poor districts (Corcoran and Evans 2008, 2015).

State aid generally serves two key purposes: (1) mitigate differences in revenue-raising capacity and (2) address differences in costs due to district characteristics and students' needs (Picus, Goertz, and Odden 2008, 2015). Revenue-raising capacity is often measured by the size of the property-tax base, sometimes complemented by income and wealth measures (Bradbury et al. 1984; Duncombe and Yinger 1998). Costs are often measured as the share of students requiring additional educational supports (e.g., with special education needs [SPED], English language learners [ELL], and eligible for free lunch [poor]). In addition, cost factors such as price of inputs (e.g., teacher salaries) and district size are sometimes considered (Bradbury et al. 1984; Duncombe and Yinger 1998).

Relationship Between District Funding and Racial Composition

Race may also be correlated with both costs and revenue-raising capacity (Stiefel et al. 2005; Chellman 2008; Baker and Green 2009; Rothstein 2017). For example, districts with a higher share of nonwhite students may have fewer resources, even after controlling for factors such as poverty. Why? There are at least four reasons. First, racial composition might proxy for unmeasured variables that drive either costs or revenue-raising capacity. For example, poverty measured as the share of students eligible for free lunch misses the depth of poverty among those so designated "poor" (the very poorest may cost more to educate) and the wealth among the "nonpoor" (if the families of the wealthiest students increase revenue-raising capacity).[6] State aid formulas may

6. As another example, SPED share ignores the level of accommodation students need or their likelihood for certain diagnoses, both of which may be correlated with race.

have a disparate racial impact due to poor measurement of costs and revenue-raising capacity.

Second, the demand for public education spending may respond to racial composition, affecting funding through voter bias. Funding for public education is lower in states, counties, and school districts with different racial compositions among the elderly and school-aged populations (Poterba 1997; Ladd and Murray 2001; Figlio and Fletcher 2012). More specifically, funding is lower in places with predominantly white elderly and predominantly black child populations than in places with high shares of whites in both age groups.[7]

Third, racial composition itself may affect the costs of education. Districts with large nonwhite populations may find teachers demand higher (compensating) wages, offer less advantageous peer groups, and teacher training is not well-designed for efficient instruction in these contexts. For example, Baker and Green (2009) find that districts with high shares of black students offer lower peer-group and teacher quality, which disadvantages these districts.

Fourth, historical, structural racism that isolates poor and minority groups in low property wealth districts may limit the ability of districts with high minority concentrations to raise local revenues. Policies, such as redlining, limiting access to borrowing, and discriminatory housing policies, segregate minorities into districts with slower economic and property value growth, which may reduce current revenue-raising capacity (Rothstein 2017).

In spite of the above (or perhaps related to the first two factors), previous research finds that nonwhite student share has a negative, significant, and independent effect on the level of *state aid* provided to districts (not just on local revenues), despite the fact that states do not explicitly account for race in their state aid funding formulas (Stiefel et al. 2005; Chellman 2008). The relationship between race and total resources might grow even stronger then, due to other inequalities outlined above, including costs of education, access to districts with larger tax bases, immigration patterns, and effects of structural segregation.

Court-Mandated School Finance Reform

Previous work finds SFR increases school spending overall and increases the share of funding that comes from state aid as opposed to local revenues (Corcoran and Evans 2008, 2015).[8] Further, when SFR increases state aid, increases are not fully offset by reductions in local revenues. Instead, spending gaps narrow between wealthy and poor (and high- and low-spending) districts, driven by spending increases in low-spending districts rather than reductions in high-spending districts (Murray, Evans, and Schwab 1998; Card and Payne 2002; Corcoran and Evans 2008, 2015; Jackson, Johnson, and

7. This is consistent with findings for other public expenditures, which include income redistribution, roads, libraries, and sanitation (Alesina, Baqir, and Easterly 1999; Luttmer 2001; Lind 2007).
8. The history of SFR is often described as having multiple waves, the first challenging aid formulas on equity concerns and the second pursuing challenges based on adequacy concerns (Thro 1994; Verstegen 1998). Plaintiffs pursue equity cases on the principle that all students in a state should attend schools that receive similar levels of educational funding. Plaintiffs pursue adequacy cases on the principle that all students in a state should have access to a minimally acceptable level of education. Note that both equity and adequacy SFRs are fundamentally about fairness in financing education. Most SFR cases since 1990 (a majority of the cases providing identification in this paper) are based upon adequacy concerns.

Persico 2014, 2016; Lafortune, Rothstein, and Schanzenbach 2018). These distributional effects appear to hold years after the SFR (Liscow 2018). Thus, SFR generates higher, more adequate, or more equitable funding, or all three. Further, equalization of state aid is greater in SFR states than those with rulings that uphold school finance formulas, suggesting that the threat of a SFR lawsuit is likely insufficient to elicit funding formula changes (Card and Payne 2002). Finally, some find SFR narrows achievement gaps between wealthy and poor districts (Card and Payne 2002; Jackson, Johnson, and Persico 2014, 2016; Johnson and Tanner 2018; Lafortune, Rothstein, and Schanzenbach 2018).

That said, few studies examine impacts of SFR on racial disparities. One notable exception, Sims (2011), finds little impact of SFR on the relationship between total district revenues and racial composition. Unfortunately, Sims does not include district fixed effects, so results may be biased by unobserved time-invariant characteristics. Further, Sims does not differentiate between state, local, and federal revenue sources or between the various nonwhite groups (i.e., black, Hispanic, Asian, and American Indian). Perhaps most importantly, none of the previous studies control for potential common state-year-specific shocks using state-by-year fixed effects. Thus, contemporaneous statewide changes in resource constraints, nonwhite share, and non-SFR policies are all potential confounders to previous estimates.

This paper builds on Sims (2011) and contributes to the literature by examining whether the impact of SFR on district funding (state aid, local revenue, and total revenue) differs by racial composition. Previous SFR research uses difference-in-differences models to exploit the staggered timing of SFR across states; this study introduces state-by-year fixed effects and a set of interaction terms to estimate the extent to which the SFR effect increases (or decreases) with nonwhite shares. Little previous work differentiates between the effects of SFR court orders and the threat of litigation, which I begin to disentangle by exploring the effects of court rulings that "uphold" state funding formulas. In addition, following Lafortune, Rothstein, and Schanzenbach (2018), I explore the effects of SFR over time using an event study framework.

3. DATA AND MEASURES

Data and Measures for National Analysis

The study merges three key datasets: (1) district revenues and enrollment from the United States Census Bureau's Annual Survey of Local Government Finances File (F33 File); (2) student composition from the National Center for Education Statistics Common Core of Data Public Elementary/Secondary School Universe Survey Data (School Universe Survey); and (3) a compiled, cumulative history of judicially-mandated SFRs (Card and Payne 2002; Corcoran and Evans 2008, 2015; Education Law Center 2014; SchoolFunding.Info 2016).

District funding is measured as per pupil state aid, local revenues, and total revenues. State aid per pupil is total state aid to a district (including formula assistance, special education, bilingual education, capital outlays, debt service, among others) divided by district enrollment. Local revenue per pupil is total local revenues (including property taxes, other taxes, fees, among others) divided by enrollment. Total revenue per pupil captures all local financial resources including per pupil state, local, and

federal revenues. These variables reflect the size of school districts' budgets and mixes of revenue sources. I adjust all dollar figures for inflation and report them in 2011 dollars using the Consumer Price Index.

District black, Hispanic, white, Asian, and American Indian student percentages capture district racial composition and district poverty as the percentage of students classified as eligible for free lunch (all aggregated from the School Universe Survey and weighted by enrollment).[9] District size is captured by district enrollment (in 1,000s). Other measures of district cost factors, such as share of students who receive SPED and ELL services, are unavailable nationwide in some years.[10]

As noted above, information on SFRs comes from a compiled, cumulative history of judicially mandated SFRs.[11] Cases strictly related to capital/facilities financing or strictly procedural rulings (that remand a case to a lower court) are excluded. I use an inclusive definition of SFR—the first court order from the highest court in each state—which is conservative because a district is "treated" even if changes in funding do not occur immediately (or at all) and even if other cases are brought forward at a later date. Table A.1 provides a full list of school finance court cases used here. I construct two vectors of variables to capture state SFR history. First, *SFR* is a binary variable that takes a value of one if a state has (at any time previously) an SFR court order and zero otherwise. Second, *SFRYr* is a vector of binary variables that reflect the number of years before and after a state's first SFR court order.

I limit the sample to unified school districts providing K–12 education to ensure differences in the grades served by different districts do not bias my estimates.[12] In addition, I restrict the sample to districts with both financial and demographic data and exclude districts in Hawaii and Washington, DC (since each has only one school district). The sample includes 10,000–11,000 school districts per year over the 16-year period between 1996 and 2011.[13] The sample represents forty-nine states, over 80 percent of districts, and over 90 percent of total enrollment.

Data and Measures for NYS Case Study and Robustness Check

Whereas national data lack consistent measures of revenue-raising capacity and costs, such as property values, NYS provides numerous measures of both cost factors and revenue-raising capacity over a thirteen-year period (2000–2012), including share of ELL and SPED students, effective local property tax rate, and district wealth, allowing a more nuanced analysis.

9. In some years and states additional racial categories are given, such as Pacific Islander. In these cases, I configure the categories in the same manner as if all states use a five-category system. Share Pacific Islander, for example, is added to the Asian share of students, as it would have been without the Pacific Islander designation.
10. SPED and ELL data are available in some states and in some years. I test the robustness of the main results to inclusion of controls for SPED and ELL for academic years 1999–2011 in the districts for which these data are available, finding consistent results displayed in table 5.
11. Sources include Card and Payne (2002); Corcoran and Evans (2008, 2015); Education Law Center (2014); SchoolFunding.Info (2016).
12. There are approximately 16,000 school districts in the United States. These districts vary in terms of size and grades served. Finding consistent measures of school district resources is difficult. Most importantly for this study, costs of operating primary and secondary schools vary greatly and states support these levels of education at disparate levels.
13. The sample for models that include SPED and ELL data include about 8,000–9,000 school districts per year over a thirteen-year period between 1999 and 2011.

Specifically, I use district revenue, enrollment, and demographic data on the almost 700 school districts for 2000–2012, merging district financial data from the NYS Education Department's (NYSED's) Fiscal Analysis and Research Unit, and demographic data from the NYSED's Information and Reporting Services, to the national dataset. The sample is a balanced panel of 672 districts that operate in all thirteen years.[14]

To be sure, NYS provides an attractive setting for this robustness check because it is demographically diverse, has substantial variation in racial composition across districts and over time, offers rich data on district costs and revenue-raising capacity, and is a SFR state. Further, it offers a mix of rural, urban, and suburban districts. As of 2011, NYS was the third largest state in the United States in terms of total population and public school student population.

Measures of per pupil state aid, local and total revenue, race, and poverty are the same as the national analyses.[15] Additional control variables fall into two major categories: (1) district revenue-raising capacity and (2) district costs. Measures of district revenue-raising capacity include district combined wealth ratio (CWR), the effective local tax rate, and share in poverty.[16] CWR is an index used by NYSED in their funding formulas that includes taxable real property value and adjusted gross income per pupil as measured against the state average, providing a good measure of district fiscal capacity.[17] Effective local tax rate measures the extent to which a district is already exhausting local taxable resources. District poverty is the same as in the national data. Measures of district costs include student attendance rate, enrollment (same as national data), and share of students who receive SPED and ELL services.

4. MODEL AND EMPIRICAL STRATEGY

The central questions of this study are simple: To what extent do the impacts of SFR on state aid increase as minority representation increases, and are changes in state aid offset by local revenue responses? I answer these exploiting the staggered timing of SFR across states using a modified difference-in-differences model (or an event study framework) with district and state-by-year fixed effects and controls for time-varying district characteristics.

A standard difference-in-differences model (used in previous research) provides estimates of SFR's impacts by comparing the average change among districts in SFR states to those in states without a SFR. I apply this model to replicate previous work on the main effect of SFR, using more recent data (Murray, Evans, and Schwab 1998; Card and Payne 2002; Corcoran and Evans 2008, 2015). I then add a vector of interactions between SFR and district racial composition to estimate the impacts of SFR by nonwhite share. In preferred models, which identify impacts by race, I include district fixed effects and state-by-year fixed effects, relaxing some of the key identification assumptions of traditional difference-in-differences models. In particular, preferred model estimates

14. The universe includes 680 districts operating in at least one year.
15. Shares of students who are American Indian and multi-racial are small in NYS districts (less than 1 percent of student population in 2012). For results presented, these groups are included in the share of students who are "Asian." Results are robust to grouping multi-racial and American Indian with share who are black and Hispanic as well.
16. Note that the percentage of students who are certified eligible for free or reduced-price lunch can also be characterized as a district cost factor because children from low income households cost more to educate.
17. New York State Education Department (2012).

are robust to time-invariant differences across districts, differences between states in every year, and differences across states that may be correlated with SFR timing.[18]

Difference-in-Differences Analyses

My central model is as follows:

$$Rev_{ist} = \beta_0 + NW'_{ist}\beta_1 + \beta_2 SFR_{st} + SFR * NW'_{ist}\beta_3 + \beta_4 Pov_{ist} + Enroll'_{ist}\beta_5 + \gamma_{is} + \delta_t + \varepsilon_{it}, \quad (1)$$

where Rev_{ist} is district funding (per pupil state aid, and later, per pupil local or total revenue) in district i in state s in time t; NW is a vector reflecting district i's nonwhite racial composition (percentage Black, Hispanic, Asian, and American Indian); SFR takes a value of one if state s has a SFR by year t and zero otherwise; Pov_{ist} controls for percentage of students certified eligible for free meals and $Enroll_{ist}$ controls for possible economies of scale (enrollment divided by 1,000 for scaling purposes, and its square);[19] γ_{is} and δ_t are district and year fixed effects, respectively; ϵ is an error term with the usual properties. Model 1 and all subsequent regressions are weighted by district enrollment using analytic weights (with robust standard errors clustered by district to address heteroscedasticity).[20] I capture common macroeconomic factors with year fixed effects.[21]

In preferred specifications, I include district and state-by-year fixed effects, γ_{is} and ζ_{st}, which control for the time-invariant conditions of districts and changes in statewide macro factors, including economic, demographic, and policy, among others.[22] In these models, coefficients are identified by differences within state-year, over time. The coefficient of interest, β_3, reflects changes in the impact of SFR on per pupil revenues (state, local, or total) as the share of students who are black, Hispanic, Asian, or American Indian increases by 1 percentage point, respectively.[23] Preferred model estimates assess the impact of SFR as identified by the interaction between the SFR and NW share, which are robust to time-varying conditions within each state (including macroeconomic and other changes in policy), district fixed characteristics (including urbanicity or fixed components of the tax base), and changes in district poverty rates and size.[24]

18. These models cannot be used to estimate the main effect of SFR or the historical relationship between race and district funding (due to collinearity with state-by-year and district fixed effects, respectively). SFR is one component of the macro conditions in a state in each year. That is, SFR is perfectly collinear with state-by-year fixed effects and the main SFR effect would "drop out."
19. In robustness checks, I add share ELL and SPED students as controls, for a sample of districts for which data are available.
20. About 20 percent of public school students in the sample are enrolled in about 1 percent of school districts.
21. I test the parallel trends assumption using an event study framework (outlined in model 2), and find that impacts occur concurrently with SFR. Preferred models, with state-by-year and district fixed effects, further relax parallel trends assumptions by comparing impacts within-state each year. Further, I assess the impact of SFR on racial composition, putting NW_{ist} on the left-hand side of model 1. SFR does not substantially change district racial composition; none of the four nonwhite groups changes as a share of district population by more than 0.6 percentage points. These results are shown in table A.2.
22. Models that include ζ_{st}, exclude year fixed effects, δ_t, and SFR_{st}, due to collinearity.
23. As an additional robustness check, impacts on the natural logarithm of per pupil state aid (percent change) are reported in table A.3 and do not vary greatly from the primary results.
24. And for a subset of districts with available data, changes in share of students who receive SPED and ELL services.

Note that even if a district's racial composition does not change over time, the impact is identified by the interaction between *NW* and SFR.[25]

Then, to further probe the mechanisms, I add an additional interaction term between Pov_{ist} and SFR_{st} to determine whether the relationship between race and district funding is mediated by share of students in poverty. That is, I test whether race is simply a proxy for poverty, with other estimates reflecting SFR impacts by poverty. I also assess whether the results are driven by changing demographics or by historical differences in racial composition. I fix district *NW* share to the composition in the first sample year (1996), identifying impacts using the interaction between baseline nonwhite student shares and SFR status.[26] A final alternative specification includes state-specific linear time-trends in lieu of state-by-year fixed effects.

Robustness and Placebo Tests: Comparing Impact on State Aid in Overturn and Uphold States

What if the threat of court intervention is sufficient to induce funding changes? In previous models, court decisions in favor of a state are included in the comparison group, because they do not precipitate a SFR. I use two models to assess the threat of SFR as a potential mechanism, using two different subsamples: (1) states with a SFR overturn and (2) states with an uphold ruling (in favor of the status quo). I reestimate the preferred models for these two subsamples, assessing the effects of overturn and uphold decisions, separately. The results from models including only overturn states provide a robustness test of the previous state aid results. The results from models including uphold states serve as a placebo test. If results are in the same directions and of similar magnitudes, then the impact of SFR may result from the threat of a lawsuit (among other possible mechanisms), rather than the SFR itself. Results that are insignificant, small, or in the opposite direction, suggest that SFR itself drives the paper's other findings.

Event Study Analyses

Delayed legislation, delayed implementation, court appeals, hold-harmless provisions, or some combination of all four may delay the full effect of SFR. In NYS, for example, the initial plaintiff victory occurred in 2003, but legislative action did not take place until 2007. Moreover, many SFRs have "hold-harmless" provisions that may disallow nominal reductions in state aid received.[27] In some states, therefore, districts that, according to a formula, are at risk for a reduction in state aid may only face real reductions in state aid at the rate of inflation.

An additional model specification (using an event study framework) includes a vector of interaction terms capturing time to and since SFR and district racial composition. The vector of interaction terms provides estimates of the number of years it takes for

25. In this peculiar case (racial composition does not vary within district over time), the interaction still allows for estimation of the coefficient β_3, even if *NW* is not identified because it is collinear with the district's fixed effect. In fact, results are nearly identical in models that fix racial composition to the first sample year, 1996 (column 1 of table 5). Thus, the variation used to estimate β_3 are changes in SFR status within districts over time, rather than changes in racial compositions within districts over time.
26. In these models, *NW* is not identified because baseline *NW* is perfectly collinear with the district fixed effects.
27. According to Baker and Corcoran (2012, p. 26) "hold-harmless provisions take numerous forms, but the general idea is that no district should receive either less state aid or less in total funding than it received in some baseline comparison year."

district funding to respond to SFR. The results from the event study, therefore, also test general consistency of the SFR effect over time (in terms of size, direction, or potential fade-out). Further, the event study is used to assess the parallel trends assumption that outcomes do not change prior to treatment. I restrict the sample to overturn states and estimate a nonparametric model.[28]

$$Rev_{ist} = \beta_0 + NW'_{ist}\beta_1 + SFRYr * NW'_{ist}\beta_2 + \beta_3 Pov_{ist} + \beta_4 Enroll_{ist} + \gamma_{is} + \zeta_{st} + \varepsilon_{it}, \quad (2)$$

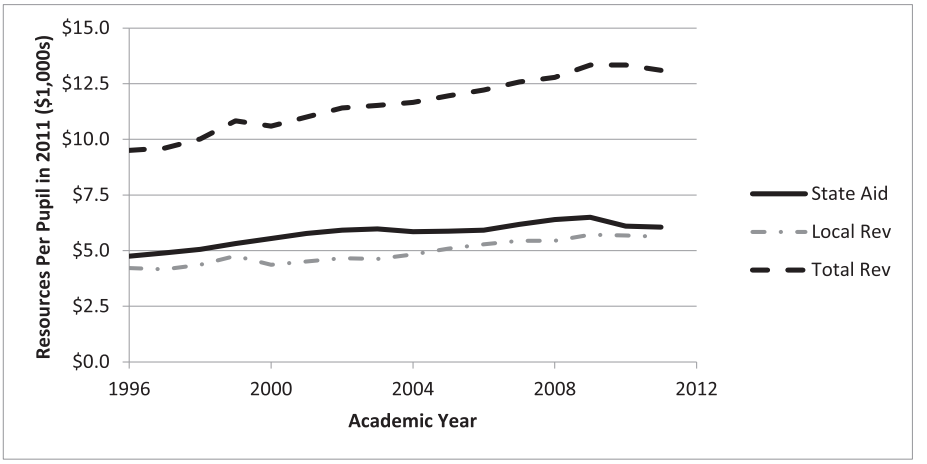
where *SFRYr* is a vector of variables indicating the number of years before or after a SFR in state *s*, such that *SFRYr_0* takes a value of one in the year immediately preceding a SFR and *SFRYr_1* takes a value of one in the first year of the SFR.[29,30] The interaction between *SFRYr* and *NW* identifies impacts of SFR over time by race. The parallel trends assumption is satisfied if the relationship is unchanged in every year until year 0 (coefficients are indistinguishable from zero until SFR). A SFR level effect occurs if there is then a discrete change in resources between year 0 and year 1. Changes in district funding each year thereafter indicate a slope effect. Results from the event study provide point estimates for three years before SFR ($SFRYr\_{-3} = 1$) to eight years after ($SFRYr\_8 = 1$). I omit observations more than three years before a SFR, which form the reference category. Like the difference-in-differences estimates, the event study yields causal estimates if SFR timing (the year of court orders) is exogenous within state and year.

Robustness Check: District Funding Changes Following SFR in NYS

I investigate the sensitivity of my results to the inclusion of additional control variables by using a panel of NYS districts to assess whether results from models that include additional measures of districts' costs and revenue-raising capacities vary from those that do not. The analyses using NYS data use the same model specifications outlined above, however, state-by-year (and state) fixed effects are not included (only NYS is in the sample). In addition to *Enroll* and *Pov*, the models also include district CWR, effective local tax rate, attendance rate, and share of students who receive SPED and ELL services. Again, I focus on the interaction of SFR and racial composition. For example, does the size of state aid increases post-SFR increase with the share of students who are black? What are local revenue responses? I then, again, turn to event study estimates.

As shown in table A.1, NYS had its first SFR decision in 2003 (*Campaign for Fiscal Equity, Inc. v. New York, 100 N.Y.2d 893, 801 N.E.2d 326, 769 N.Y.S.2d 106 [App. Div. 2003]*). After the NYS legislature failed to sufficiently address the adequacy concerns in the 2003 ruling, the Court ruled against the State again in 2006 and ordered legislative action (*Campaign for Fiscal Equity, Inc. v. New York, 29 A.D.3d 175, 814 N.Y.S.2d*

28. An alternative model specification keeps all districts, but only includes interactions between *SFRYr* and *NW* in the years following a SFR, with no post-period for other states. Estimates of the impacts in the years following SFRs are consistent in this model specification and are available upon request of the author.
29. For example, the finding in *Montoy v. Kansas, 278 Kan. 769, 102 P.3d 1160 (Sup. Ct. 2005)*, is in favor of the plaintiffs. The indicator for *SFRYr_1*=1 for all Kansas districts in 2005, *SFRYr_2*=1 in 2006, etc.
30. The secular trend computed by the vector $SFRYr_{st}$ is excluded in models with state-by-year fixed effects, ζ_{st}, due to collinearity.



Notes: All dollar figures are in constant 2011 dollars, adjusted using the Consumer Price Index.

Figure 1. District Funding Per Pupil, U.S. School Districts, 1996–2011

1 [App. Div. 2006]). In 2007, the NYS legislature passed the New York State Education Budget and Reform Act, providing additional funding to school districts across NYS. The legislation eliminated a number of categorical aid programs, shifted funds into a foundation aid formula, and provided greater weight in the formula for poor children. Then, in response to budget shortfalls due to the economic recession, NYS froze increases in foundation aid in 2010 and reduced foundation aid in 2011 and 2012. For consistency with the national analyses and because complicated SFR histories are not unique to NYS, I use the first overturn year, 2003, to identify the SFR effect. I then use the event study to explore the relationship between race and district funding following each of NYS's reform events (court orders in 2003 and 2006, legislation in 2007) and freezes in foundation aid. The event study illuminates the idiosyncrasies of the SFR in NYS (most SFR states have idiosyncratic SFR event histories).

5. RESULTS

Descriptive Results

Figure 1 presents mean resources per pupil in U.S. districts by year (1996–2011). Mean state aid increases over time from about $4,750 per pupil in 1996 to about $6,050 per pupil in 2011 (all figures in 2011 dollars). Mean local revenue (total revenue) increases from $4,221 ($9,507) to $5,624 ($13,096), as well. Figure 1 does not capture heterogeneity across districts. For example, the 10th percentile of districts in 2011 receives about $3,000 in state aid per pupil, whereas the 90th percentile receives nearly $9,000. In addition, variation across districts has grown over time and is greater for local revenues than state aid. The coefficient of variation for state, local, and total revenues grows from 0.42, 0.80, and 0.34 in 1996 to 0.51, 0.85, and 0.40 in 2011, respectively.

Panel A of table 1 presents summary statistics for district demographic and funding characteristics in the first and last year of the sample (1996 and 2011). In addition to revenue increases, the mean U.S. district also experiences increases in share of students who are black, Hispanic, Asian, and American Indian and free lunch eligible. Mean

Table 1. Mean District Characteristics

Panel A. United States Districts, 1996 and 2011			Panel B. New York State Districts, 2000 and 2012		
	1996	2011		2000	2012
Student characteristics (%)			Student Characteristics (%)		
Free or reduced-price lunch	22.1	38.8	Free or reduced-price lunch	30.2	35.9
White	81.6	72.7	White	88.6	82.2
Black	7.5	9.2	Black	5.1	5.3
Hispanic	6.2	12.6	Hispanic	3.8	7.8
Asian	1.2	2.4	Asian	2.4	4.6
American Indian	2.4	3.0	ELL	1.7	2.2
ELL[a]	N/A	3.11	SPED	12.1	12.3
SPED[b]	10.2	13.9	Financial characteristics		
Financial characteristics			State aid PP	6,376	7,995
State aid PP	4,752	6,056	Local revenue PP	8,443	12,487
Local revenue PP	4,221	5,624	Total revenue PP	15,967	22,775
Total revenue PP	9,507	13,096	Combined wealth ratio	1.2	1.2
Enrollment	3,869	4,171	Effective local tax rate	18.1	16.7
Districts	10,544	10,453	Attendance rate	95.0	94.9
			Enrollment	4,214	3,949
			Districts	672	672

Notes: Student descriptive statistics reported at the district level, weighted by enrollment. Sample includes districts that enroll both primary and secondary school students. All dollar figures in panel A are in constant 2011 dollars and panel B in constant 2012 dollars, adjusted using the Consumer Price Index. PP = per pupil.

[a]English language learner (ELL) data are unavailable before 1999 and coverage is poor in other years; ELL information is available in only 9,866 districts in 2011.

[b]Special education (SPED) data coverage is poor in 2004, 2005, 2008, and 2009 (available in only 9,100–9,500 districts); SPED information is available in only 10,272 districts in 2011.

district enrollment increases by about 300 students, while the number of districts is largely unchanged.[31]

Descriptively, districts with greater minority representation receive less state aid per pupil on average than those with lesser minority representation. Districts with student enrollments that are at least 10 percent black (top 19 percent of districts in 2011) receive $5,848 in state aid per pupil, which is $601 per pupil less than districts that are no more than 1 percent black (bottom 29 percent of districts receiving $6,549 per pupil).[32] In 2011, 29 percent of districts have student populations that are at least 10 percent Hispanic and receive, on average, $980 less per pupil than the 14 percent of districts with less than 1 percent of students who are Hispanic ($5,909 and $6,889, respectively). Few districts (3.7 percent) have student populations over 10 percent Asian in 2011, but they receive $1,300 less than those composed of less than 1 percent Asian students ($5,091 and $6,429, respectively).

Districts with high shares of students who are black (at least 10 percent) also raise less local revenue than those with low shares (less than 1 percent). Conversely, districts with high shares of students who are Hispanic or Asian raise more local revenue than

31. That is, there are a similar number of consolidating and splitting districts.
32. Not shown in table 1 are sample means by districts' racial compositions (available upon request).

Table 2. Regression Results, Impact of School Finance Reform (SFR) and Race on Per Pupil State Aid, U.S. Districts, 1996–2011

	Without National Controls			With National Controls		
	(1)	(2)	(3)	(4)	(5)	(6)
SFR	812.32***	621.13***		818.87***	625.52***	
	(14.321)	(20.515)		(14.455)	(20.460)	
SFR × %						
Black		6.65***	19.44***		8.36***	19.03***
		(0.552)	(0.592)		(0.550)	(0.590)
Hispanic		42.50***	5.24***		40.86***	5.77***
		(0.903)	(0.922)		(0.916)	(0.931)
Asian		−36.85***	−51.00***		−29.89***	−54.79***
		(2.875)	(2.770)		(2.893)	(2.796)
American Indian		79.29***	55.18***		78.48***	54.36***
		(2.004)	(1.929)		(1.992)	(1.923)
%						
Black		−4.01***	−11.07***		1.73*	−8.06***
		(1.041)	(0.907)		(1.050)	(0.932)
Hispanic		−50.03***	1.53		−38.12***	1.26
		(1.010)	(0.970)		(1.077)	(1.012)
Asian		−11.90***	−49.09***		−0.34	−36.58***
		(3.000)	(2.906)		(3.008)	(2.934)
American Indian		−16.37***	3.65		−15.76***	3.16
		(3.051)	(2.609)		(3.032)	(2.600)
District characteristics				Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
District FE	Y	Y	Y	Y	Y	Y
State-Year FE			Y			Y
Observations	161,815	161,815	161,815	161,815	161,815	161,815
Districts	11,157	11,157	11,157	11,157	11,157	11,157
R^2	0.843	0.845	0.897	0.845	0.847	0.898

Notes: Robust standard errors clustered by district in parentheses. All figures are in constant 2011 dollars, adjusted using the Consumer Price Index. Columns 1–3 rely on fixed effects alone; columns 4–6 include control variables for district characteristics, including share certified eligible for free lunch, and enrollment (1000s) and its square. Regression weighted by district enrollment. Reference category: Share of district students who are white. FE = fixed effects.

*$p < 0.10$; ***$p < 0.01$.

those with low shares. These descriptive results are consistent with previous work that makes regression adjustments for costs and revenue-raising capacity (Chellman 2008).

Impact Estimates: Effects of SFR by Race

Estimates of the main effect of SFR on state aid are shown in columns 1 and 4 of table 2. Consistent with previous work, SFR is associated with an increase in state aid per pupil. Impacts range from $812 for the model with district and year fixed effects but no national control variables (column 1) up to $819 in the model with national control variables (column 4).[33] Previous research finds that earlier SFRs induce similar increases in state aid. For example, once converting results reported in 1992 dollars to 2011 dollars,

33. Results from alternative specifications, which include only state fixed effects in lieu of district fixed effects, are similar and available from the author upon request.

Card and Payne (2002) find SFR states increase state aid by $796 more than uphold states and $958 more than states with no ruling (from 1977 to 1992).[34]

Columns 2, 3, 5, and 6 of table 2 show differences in SFR impact by nonwhite share.[35] Impact estimates (coefficients on the interactions between *SFR* and *NW*) in models with national controls (columns 5 and 6) do not differ greatly from models with only fixed effects (columns 2 and 3). Including state-by-year fixed effects (columns 3 and 6) changes the magnitudes (relative to columns 2 and 5), but not the directions, of the coefficients of interest.[36]

Preferred estimates, derived from the model with national control variables, state-by-year and district fixed effects, are shown in column 6. As the share of students who are black, Hispanic, and American Indian grows, so does the impact of SFR on state aid. For example, a 1-percentage point increase in the share of students who are black increases the impact of SFR by $19 per pupil. As the share of students who are Asian increases, however, the boost in state aid from SFR declines. A 1-percentage point increase in the share of students who are Asian dampens the effect of SFR on state aid by $55 per pupil.

These impacts are moderate for the average U.S. district, but quite large for districts with large nonwhite representation. As noted in table 1, the average U.S. district had a 1.7-percentage point increase in share of students who are black from 1996 to 2011 (7.5 percent to 9.2 percent). If a state had its first court-mandated SFR in 1997 (e.g., New Hampshire and Ohio), preferred estimates in column 6 of table 2 suggest that state aid increases by $32 more per pupil, on average, than if the share of students who are black did not increase. In many cases the effect is larger. For example, the Charlotte-Mecklenburg school district experienced large increases in share of students who are black during the sample period, from 40.6 percent to 45.4 percent. Charlotte-Mecklenburg's 4.8-percentage point increase in black share is associated with an additional state aid bump of $91 as a result of North Carolina's SFR (compared with a mean SFR effect of $819). Results also imply that if Charlotte-Mecklenburg had *no* black students in 2011, SFR's effect on state aid would be $864 smaller, commensurate in size to the main effect of SFR ($819).

Conversely, the share of students who are Asian is negatively correlated with the relative generosity of SFR. The average U.S. district has a 1.2-percentage point increase in the share of students who are Asian between 1996 and 2011, implying that the average SFR effect is $66 smaller than it would be with no growth in Asian representation. In New York City, the impact is much larger, because the share of students who are Asian rises from 9.5 percent in 1996 to 13.2 percent in 2011, which is associated with $203 fewer dollars in state aid per pupil than the main effect of SFR. The increase in New

34. Specifically, Card and Payne (2002) find the change in state revenue per pupil from 1977 to 1992 in SFR states is $1,276 in 1992 dollars ($2,035 in 2011 dollars), while in uphold and no court decision states the increase in spending is $777 and $675 in 1992 dollars ($1,239 and $1, 076 in 2011 dollars), respectively.

35. Impact estimates reported as elasticities are reported in table A.3.

36. Significance, magnitude, and direction of the coefficients on *NW* vary across models, but impact estimates from interaction of *NW* and *SFR* do not. *NW* is a control covariate in these models; estimates of the secular relationships between race and state aid are not well identified and are sensitive to the counterfactual (annual national means in models that include district and year fixed effects; annual statewide means in models that include district and state-by-year fixed effects).

Table 3. Regression Results, Impact of School Finance Reform (SFR) and Race on Per Pupil Local Revenue and Total Revenues, U.S. Districts, 1996–2011

	Local Revenues			Total Revenues		
	(1)	(2)	(3)	(4)	(5)	(6)
SFR	296.94***	148.83***		1,094.12***	598.03***	
	(14.502)	(20.532)		(20.611)	(29.223)	
SFR × %						
Black		1.76***	−1.55**		4.73***	21.51***
		(0.677)	(0.690)		(0.964)	(0.962)
Hispanic		−9.75***	7.04***		26.08***	13.76***
		(0.971)	(1.084)		(1.383)	(1.512)
Asian		68.23***	40.57***		31.07***	8.92**
		(3.171)	(3.245)		(4.513)	(4.527)
American Indian		−19.73***	−12.91***		50.71***	48.71***
		(2.148)	(2.255)		(3.057)	(3.146)
%						
Black		−29.94***	−26.25***		−29.58***	−37.17***
		(1.108)	(1.089)		(1.577)	(1.520)
Hispanic		−10.99***	−14.84***		−30.30***	0.50
		(1.085)	(1.180)		(1.545)	(1.646)
Asian		−3.91	23.62***		7.86*	−18.96***
		(3.201)	(3.406)		(4.556)	(4.752)
American Indian		−10.41***	−2.70		0.73	20.27***
		(3.188)	(3.023)		(4.538)	(4.217)
District characteristics	Y	Y	Y	Y	Y	Y
Year FE	Y	Y		Y	Y	
District FE	Y	Y	Y	Y	Y	Y
State-Year FE			Y			Y
Observations	161,815	161,815	161,815	161,815	161,815	161,815
Districts	11,157	11,157	11,157	11,157	11,157	11,157
R^2	0.915	0.916	0.933	0.845	0.847	0.882

Notes: Robust standard errors clustered by district in parentheses. All figures are in constant 2011 dollars, adjusted using the Consumer Price Index. All models include control variables for district characteristics, including share certified eligible for free lunch, and enrollment (1,000s) and its square. Regression weighted by district enrollment. Reference category: Share of district students who are white. FE = fixed effects.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

York City's Asian representation cost the city up to 24 percent of the benefits of SFR (compared with the main effect of $819). If New York City had *no* Asian students in 2011, then the implied SFR effect would be 88 percent ($723) greater. In sum, SFR increases state aid to districts, but the relative generosity of SFR depends greatly upon district racial composition.

Columns 1 through 3 of table 3 show that local revenue responses generally offset some of the impacts of SFR for American Indian and Asian representation. Preferred estimates from models with state-by-year fixed effects, column 3, show SFR decreases local revenue by $13 per pupil as the share of students who are American Indian increases (compared with a $54 increase in state aid). Conversely, SFR increases local revenue as the share of students who are Asian increases ($41 per pupil compared to a $55 decrease in state aid per pupil). Similarly, local revenue responses offset some of the positive effects of SFR on state aid for black representation (in the preferred model). The estimates for local revenue responses are less consistent across specifications than

the results for state aid, but are generally smaller in magnitude than the impacts for state aid.[37]

Column 4 of table 3 shows that SFR increases total revenues substantially (over $1,000 per pupil). Columns 5 and 6 suggest that total revenues increase at an even greater rate as share of students who are black, Hispanic, Asian, and American Indian increases. This result is consistent across both specifications, but the magnitudes differ. Despite local revenue responses, SFR has a greater positive effect on total revenues as nonwhite share increases.[38] Importantly, the source of increased funding for Asian share is local revenues, while the main source for the other three nonwhite groups is state aid.

Robustness and Placebo Tests: SFR Impact on State Aid in Overturn and Uphold States

Estimates in column 1 of table 4 show the main effect of SFR is robust to limiting the sample to overturned states only ($638 per pupil).[39] Column 2 shows that estimates by race are also robust to the alternative sample constraints and are statistically indistinguishable from those shown in table 2. Finally, an additional specification (in column 3) adds state-specific time trends to the model; again, the results are consistent.

Estimates in columns 4 through 6 of table 4 show that there is no statistically significant (at the 95 percent level) effect of failed SFR lawsuits (uphold rulings). Moreover, point estimates are small or in the opposite direction of the SFR effect, suggesting that the impacts of SFR operate through court orders and not characteristics of states with SFR challenges or the threat of one.

Probing the Results: Using Baseline Racial Composition and Including Additional Controls

Column 1 of table 5 shows the findings largely derive from historical differences in district racial composition, rather than changing demographics. For column 1, the values for share of students who are black, Hispanic, Asian, or American Indian are time-invariant measures assigned based on racial compositions in 1996. Thus, estimates reflect the impact of historical differences in racial composition only rather than both historical differences and changing demographics.[40] Point estimates are largely consistent and, perhaps, a little larger for the share of students who are black, Hispanic, and Asian than in the models that use contemporaneous measures of racial composition.[41]

Table 5 also displays consistent results from models with additional control covariates (samples used for these models are smaller than in tables 2 and 3 because measures

37. For local and total revenue results, it is important to note that districts in SFR states increase spending following SFR. At the same time, districts generally see increasing minority representation during this period. Models with state and year fixed effects only (as used previously in SFR research) might be biased by these trends, which is why preferred models control for common, annual, statewide macro factors using state-by-year fixed effects. Results from table 3, column 3, are preferred.
38. Table A.4 shows results from models that include an additional interaction term between *SFR* and *Pov*. The impacts of SFR by race are not a result of the correlation between race and poverty. Estimated impacts of SFR on state aid, local revenues, and total revenues remain unchanged in sign, magnitude, and significance for all races.
39. Results shown from preferred models with state-by-year and district fixed effects. Other results available from the author upon request.
40. There are somewhat fewer observations and districts in this sample because some districts do not operate in 1996.
41. Moreover, as noted previously, SFR does not change district racial composition greatly (see table A.2).

Table 4. Robustness and Placebo Tests, Impact of School Finance Reform (SFR) on State Aid in Overturn and Uphold States, U.S. Districts, 1996–2011

	SFR / Overturn			No SFR / Uphold		
	(1)	(2)	(3)	(4)	(5)	(6)
Post-ruling	637.97***			69.67		
	(89.890)			(74.190)		
Post-ruling × %						
Black		21.39***	15.25***		−12.26*	−4.91
		(5.019)	(4.527)		(6.935)	(6.463)
Hispanic		8.37**	9.34**		−2.44	6.55
		(3.580)	(4.279)		(4.445)	(4.270)
Asian		−66.21***	−63.90***		0.29	2.02
		(14.652)	(21.823)		(11.643)	(13.016)
American Indian		43.71***	61.33***		18.24*	−2.54
		(15.160)	(18.055)		(9.514)	(8.224)
%						
Black		−29.19***	−27.96***		28.21***	19.17**
		(11.022)	(10.728)		(8.827)	(8.502)
Hispanic		5.50	3.27		20.38***	12.20*
		(11.941)	(12.281)		(5.967)	(6.368)
Asian		21.49	11.98		−36.35**	−36.37**
		(22.315)	(27.171)		(16.533)	(17.158)
American Indian		20.06	−13.92		−12.79	12.21
		(24.289)	(32.722)		(12.350)	(11.016)
District characteristics	Y	Y	Y	Y	Y	Y
Year FE	Y			Y		
District FE	Y	Y	Y	Y	Y	Y
State-Year FE		Y			Y	
State Trend			Y			Y
Observations	73,351	73,351	73,351	123,101	123,101	123,101
Districts	5,014	5,014	5,014	8,464	8,464	8,464
R^2	0.845	0.881	0.866	0.843	0.903	0.884

Notes: Robust standard errors clustered by district in parentheses. Reference category: Share of district students who are white. All figures are in constant 2011 dollars, adjusted using the Consumer Price Index. Regression weighted by district enrollment. Columns 1–3 show estimated impact in states with an SFR/overturn. Columns 4–6 show estimated impact of court rulings in favor of a state in uphold states. FE = fixed effects.

$^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

are not available in all districts and years). Column 2 shows that estimates are of similar magnitudes and indistinguishable statistically with the inclusion of a control for SPED students.[42] Similarly, results (in column 3) are nearly identical after controlling for ELL share.

In sum, results from the difference-in-differences models are moderate and robust. As the share of students who are black increases by 1 percentage point, the impact of SFR on state aid increases by $15 to $23 per pupil. The same increase for Hispanic students increases the benefits of SFR by $5 to $15 per pupil (though it is insignificant in two specifications). For a 1-percentage point increase in share of students who are

42. Comparing column 2 in table 5 to column 6 in table 2, only the Hispanic result in the district fixed effects models has a change in significance; it goes from significant in column 6 of table 2 to insignificant in column 2 of table 5. The difference is statistically indistinguishable and point estimates are less than a $1 per pupil difference.

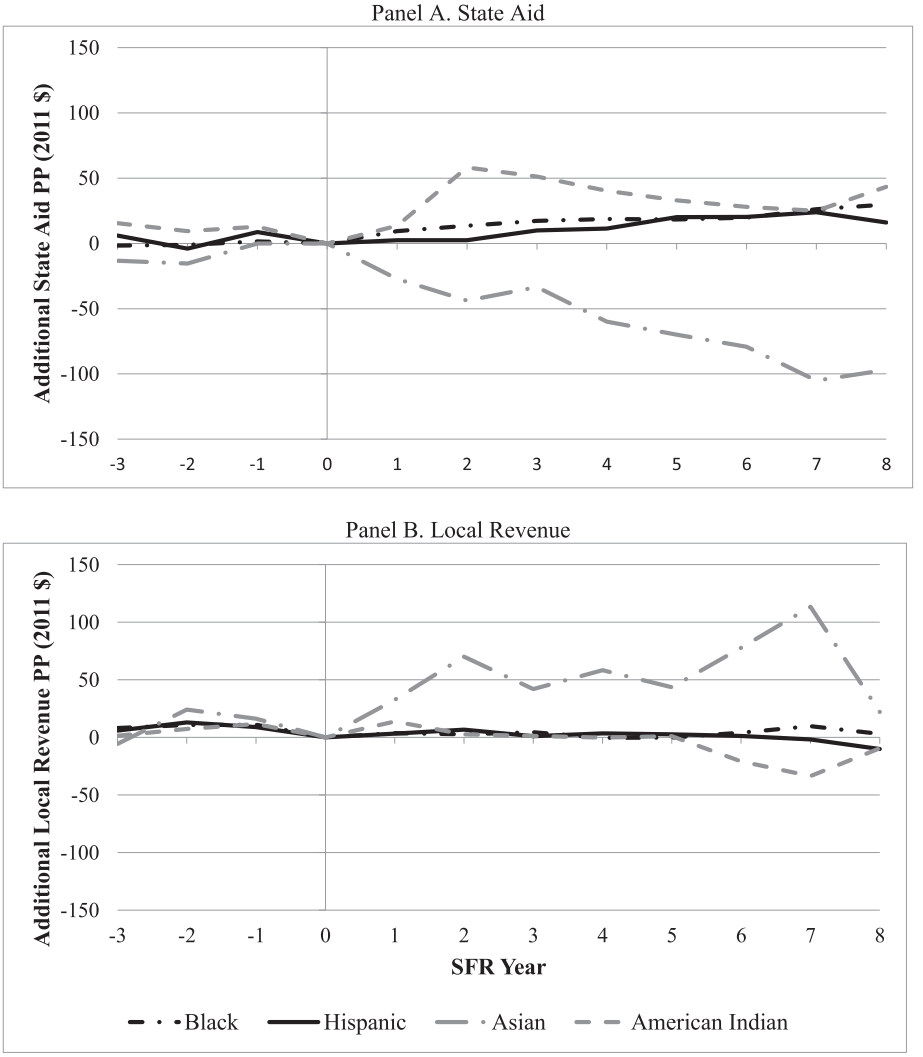
Table 5. Robustness Tests, Impact of School Finance Reform (SFR) and Race on Per Pupil State Aid Using Baseline Racial Composition and Additional Controls, U.S. Districts, 1996–2011

	Baseline Racial Composition	Additional Controls	
	(1)	(2)	(3)
SFR × %			
Black	22.61***	17.13***	16.56**
	(5.132)	(4.968)	(7.059)
Hispanic	14.73***	6.69	6.79
	(4.280)	(4.992)	(4.302)
Asian	−105.43***	−47.10***	−50.70***
	(20.727)	(12.123)	(12.238)
American Indian	36.91***	47.91***	40.51***
	(14.098)	(14.454)	(13.485)
%			
Black		−2.46	7.73
		(5.013)	(5.957)
Hispanic		7.28	11.80**
		(5.257)	(5.459)
Asian		−9.64	7.32
		(12.342)	(12.535)
American Indian		6.58	12.30*
		(6.283)	(6.799)
SPED		17.06**	12.26*
		(7.318)	(7.042)
ELL			0.88
			(4.426)
District characteristics	Y	Y	Y
District FE	Y	Y	Y
State-Year FE	Y	Y	Y
Observations	159,715	156,455	109,515
Districts	10,862	11,151	11,019
R^2	0.895	0.887	0.895

Notes: Robust standard errors clustered by district in parentheses. All figures are in constant 2011 dollars, adjusted using the Consumer Price Index. District characteristics include share certified eligible for free lunch, and enrollment (1,000s) and its square. Column 1 shows results from models holding racial composition constant at 1996 levels (thus, racial composition is in the rank space of the district fixed effects in column 1). Columns 2 and 3 show results from models that include additional control variables, share of students in SPED (special education) and ELL (English language learner) programs, in the years and states for which they are available. The number of observations varies across models based on the availability of data (districts in operation after 1996 only are omitted in the models for column 1; observations missing share of students in SPED or ELL programs are omitted in the models for columns 2 and 3). Regression weighted by district enrollment. Reference category: Share of district students who are white. FE = fixed effects.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

American Indian, the impact of SFR is $37 to $79 higher. Some of these effects are dampened by local revenue responses, but effects on total revenues remain fiscally meaningful for these three racial groups. Conversely, as Asian representation increases, SFR impact on state aid decreases (by between $40 and $100). Local revenue responses



Notes: Point estimates regression adjusted for district poverty (share students certified eligible for free lunch) and district size (enrollment/1,000 and the quadratic of enrollment/1,000), and state-by-year and district fixed effects. All figures are in constant 2011 dollars, adjusted using the Consumer Price Index. Regression weighted by district enrollment. Reference category: Share of district students who are white. Reference year: Four or more years before SFR.

Figure 2. Impact of School Finance Reform (SFR) and Race on Per Pupil (PP) State Aid Over Time, Event Study Framework, U.S. Districts in SFR States, 1996–2011

fully offset the impact on state aid for the share of students who are Asian, so the impact of SFR on total revenues also increases with Asian representation.

Event Study Results (Impact of SFR Over Time)

Figure 2 shows point estimates from the event study, tracing the link between race and district funding over time. First, the event study results in both panel A (state aid) and panel B (local revenue) indicate the relationship between race and district funding is stable in the years leading up to SFR; none of the point estimates prior to SFR are

statistically distinguishable from 0 (at the 95 percent level). That is, the groups have parallel funding trends prior to SFR.

Second, same as in table 2, panel A shows the impact of SFR on state aid increases as the share of students who are black, Hispanic, and American Indian increases. This relationship holds each year and for at least eight years post reform.[43] In addition to the level effect immediately following a SFR, the impact of SFR for black and Hispanic representation grows slowly over time, whereas the effect for American Indian representation grows sharply initially and then levels off. Conversely, same as in table 2, increases in share of students who are Asian dampens the SFR impact on state aid. This negative impact grows over time. Although only suggestive, these results are consistent with the slow roll-out of new funding formulas, hold-harmless provisions, delays in passage or enactment of legislation, court appeals, or some combination of all four.

Panel B of figure 2 shows changes in local revenues, which are generally small relative to effects on state aid (same as in table 3). Results are insignificant for share of students who are Hispanic or black in every year, and almost every year for American Indian share (slightly negative after six years). Conversely, the effect for share of students who are Asian is large, positive, and offsets the effect on state aid.

Robustness Check: District Funding Changes Following SFR in NYS

Panel B of table 1 shows that, like districts nationwide, NYS districts receive more revenues per pupil over time (from 2000 to 2010 state aid grows from $6,376 to $7,995, local revenues grow from $8,443 to $12,487, and total revenues grow from $15,967 to $22,775, all in real 2012 dollars). Again, funding varies across districts. The NYS district with the least state aid per pupil in 2012 receives $929, while the district with the maximum receives $22,399. Similarly, one district raises just $1,182 in local revenue per pupil in 2012, while another raises $134,280 per pupil. Table 1 also shows that nonwhite share grows over time, mirroring national trends; white share declines from 88.8 percent to 82.2 percent. Shares of students in poverty, ELL, and SPED also increase.

Columns 2 and 3 of table 6 show that there is not a statistical or substantive difference in estimates between models that include control variables available nationally and models that include the full set of control variables available in NYS.[44] Further, estimates in NYS are similar in direction to the average state nationally (though magnitudes are smaller and the effect on share of students who are Hispanic is insignificant).[45] Like the national results, coefficients for the average district are moderate, but meaningful. Table 1 shows that the average NYS district has a 2.2-percentage point increase between 2000 and 2012 in the share of students who are Asian. The results in column 3 of table 6 suggest that state aid in 2012 is $58 lower per pupil than it would have been if mean Asian representation did not increase from 2.4 percent to

43. Point estimates are statistically significant in every year and for every race/ethnicity group, with the exception of the Hispanic share in the second year of SFR.

44. As with previous models, all estimates come from models that include district fixed effects and the vector of racial composition variables. Therefore, estimates of control covariates' coefficients, including *CWR*, the effective local tax rate, attendance rate, ELL, SPED, *Enroll*, and *Pov*, are not linear approximations of NYS funding formulas.

45. Table A.5 shows estimates are not sensitive to excluding NYS's largest districts, the "Big 5" (New York City, Buffalo, Rochester, Syracuse, and Yonkers).

Table 6. Robustness Check, Impact of School Finance Reform (SFR) and Race on Per Pupil State Aid, New York State Districts, 2000–2012

	(1)	(2)	(3)
SFR × %			
Black	40.92***	9.83***	9.61***
	(1.178)	(1.207)	(1.205)
Hispanic	−7.98***	0.13	0.48
	(1.641)	(1.676)	(1.677)
Asian	−28.79***	−24.82***	−26.21***
	(4.138)	(3.891)	(3.873)
%			
Black	−92.29***	−29.88***	−27.32***
	(4.763)	(4.635)	(4.685)
Hispanic	−34.93***	14.01***	7.59
	(4.724)	(4.937)	(5.124)
Asian	13.66**	23.67***	28.43***
	(6.863)	(6.344)	(6.316)
% FRPL		−14.99***	−13.58***
		(1.835)	(1.849)
Enrollment		−561.09***	−542.37***
		(11.777)	(11.908)
Enroll^2		0.27***	0.26***
		(0.006)	(0.006)
Combined wealth ratio			−272.29***
			(40.134)
Local effect rate			10.29***
			(3.015)
Attendance rate			−1.72
			(3.780)
% ELL			44.87***
			(5.459)
% SPED			30.17***
			(5.168)
Observations	8,736	8,736	8,736
Districts	672	672	672
R^2	0.955	0.966	0.967

Notes: Robust standard errors clustered by district in parentheses. Regression adjusted for combined wealth ratio, effective local tax rate, percentage of students certified eligible for free or reduced-price lunch (FRPL), attendance rate, enrollment divided by 1,000 and the square of enrollment divided by 1,000, percentage of students receiving special education (SPED) and English language learner (ELL) services, and year and district fixed effects. Figures in constant 2012 dollars, adjusted using the Consumer Price Index. Regression results weighted by district enrollment. Reference category: Share of district students who are white.

$^{**}p < 0.05$; $^{***}p < 0.01$.

4.6 percent. Impacts are larger in places like the Syracuse City School District, where the share of students who are Asian rises by 8.3 percentage points, from 2.7 percent to 11.0 percent. In 2012, Syracuse receives $12,853 in state aid per pupil. According to model estimates, if the relationship between Asian representation and state aid did not change, then state aid to Syracuse would be $218 higher than it is in 2012—30 percent of the state aid increases associated with the average SFR nationally ($819).[46]

46. Figure A.1 shows estimates from the event study, which, like the national results, provide no evidence the parallel trends assumption is violated. Panel A shows a slight, statistically significant increase in the relative

Table 7. Robustness Check, Impact of School Finance Reform (SFR) and Race on Per Pupil Local and Total Revenue, New York State Districts, 2000–2012

	Local Revenue			Total Revenue		
	(1)	(2)	(3)	(4)	(5)	(6)
SFR × %						
Black	−21.89***	−16.51***	−16.57***	23.95***	−2.63	−3.24
	(1.707)	(1.989)	(1.869)	(2.046)	(2.273)	(2.169)
Hispanic	22.32***	5.45**	6.37**	20.31***	3.97	5.62*
	(2.379)	(2.762)	(2.601)	(2.851)	(3.156)	(3.019)
Asian	96.02***	67.56***	60.30***	82.65***	43.39***	34.41***
	(5.999)	(6.410)	(6.007)	(7.188)	(7.326)	(6.973)
%						
Black	−94.34***	−74.00***	−70.59***	−193.28***	−95.37***	−91.71***
	(6.904)	(7.637)	(7.268)	(8.272)	(8.727)	(8.436)
Hispanic	−54.94***	−10.94	3.74	−104.76***	15.93*	28.25***
	(6.847)	(8.134)	(7.949)	(8.204)	(9.296)	(9.227)
Asian	−66.57***	−26.92**	−19.69**	−89.21***	−17.38	−5.54
	(9.949)	(10.452)	(9.798)	(11.921)	(11.945)	(11.373)
% FRPL		4.99*	−0.73		−3.14	−8.26**
		(3.023)	(2.868)		(3.455)	(3.329)
Enrollment		104.84***	114.40***		−473.25***	−448.03***
		(19.405)	(18.471)		(22.176)	(21.441)
Enroll^2		−0.06***	−0.06***		0.21***	0.20***
		(0.009)	(0.009)		(0.011)	(0.010)
Combined wealth ratio			1,597.24***			1,284.60***
			(62.257)			(72.265)
Local effect rate			105.13***			118.23***
			(4.677)			(5.429)
Attendance rate			13.90**			6.99
			(5.864)			(6.807)
% ELL			−18.50**			13.54
			(8.468)			(9.829)
% SPED			88.64***			123.28***
			(8.017)			(9.305)
Observations	8,736	8,736	8,736	8,736	8,736	8,736
Districts	672	672	672	672	672	672
R^2	0.966	0.966	0.971	0.936	0.943	0.949

Notes: Robust standard errors clustered by district in parentheses. Regression adjusted for combined wealth ratio, effective local tax rate, percentage of students certified eligible for free or reduced-price lunch (FRPL), attendance rate, enrollment divided by 1,000 and the square of enrollment divided by 1,000, percentage of students receiving SPED (special education) and ELL (English language learner) services, and year and district fixed effects. Figures in constant 2012 dollars, adjusted using the Consumer Price Index. Regression results weighted by district enrollment. Reference category: Share of district students who are white.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

Local revenue responses in NYS, shown in columns 1–3 of table 7, fully offset changes in the relationship between race and state aid. Estimates in column 2 (and

generosity of state aid as black representation increases in year 1 of NYS's SFR (2003) that persists in each successive year and grows following the second overturn in 2006 and legislation in 2007 (SFR years 4 and 5, respectively). After the 2003 SFR, there is also a small bump in funding correlated with the share of students who are Hispanic, but it fades after the second court ruling. Finally, the relationship between Asian representation and state aid is negative after SFR; again, there is a level effect in year 1 and an additional inflection point following the 2006 court ruling and 2007 legislation. Unique to NYS, all three results level off by SFR years 8 to 10 (corresponding to 2010–2012), concurrent with the great recession, budget shortfalls, and NYS temporarily ending its commitment to the new foundation aid formula in 2011.

3) suggest that SFR in NYS leads to $17 ($17) less local revenue per pupil as black representation increases by 1 percentage point, $5 ($6) less as Hispanic representation increases by 1 percentage point, and $68 ($60) more as Asian representation increases by 1 percentage point. Estimates of changes in total revenue (columns 4–6) bear this out. The impact of SFR on total revenues is unchanged as Hispanic and black representation increases, though it does increase as Asian representation increases. Again, most importantly, estimates for local and total revenues are not sensitive to inclusion of the additional control variables available in NYS.[47]

6. CONCLUSIONS

Historically, public education in the United States is mostly funded with local revenues (largely local property taxes). In the past forty years, however, state funding has played an increasing role, growing from 39.9 percent in 1970 (Corcoran and Evans 2008, 2015) to 47.0 percent in 2011. This paper highlights the important role that courts can play in determining the distribution of that state aid, the extent to which racial composition matters, and whether local revenue responses offset changes in state aid distributions.

Taken together, evidence presented in this paper contributes to the public finance literature on the effects of SFR by exploring impacts by race. I first estimate impacts of SFR on levels of state aid received. I find that SFR increases state aid to school districts on average and that the impact is larger as black, Hispanic, and American Indian representation increases. Conversely, increases in Asian representation decrease the SFR effect on state aid. One explanation is that districts with lesser shares of white students have lower levels of political influence and benefit from court-ordered reforms designed to increase equity and ensure adequacy. Another is that SFR provides a break from continuation of historically discriminatory policies. If one of the goals of SFR is to address racial inequity in the distribution of district funding, then these results are encouraging. Still, the opposite impact occurs for the share of students who are Asian, working against equalization of funding.

At first, these per-pupil changes in state aid seem small, but are quite large when considering the concentration of nonwhite students in certain districts. As outlined previously, about 20 percent of districts have black student representation of at least 10 percent. Using the point estimates from column 6 of table 2, SFR increases state aid in these districts by at least $171 more per pupil than in districts with less than 1 percent black shares (the bottom 30 percent). Similarly, about 30 percent of districts are at least 10 percent Hispanic, leading to a $52 larger SFR impact on state aid than in districts that are less than 1 percent Hispanic (about 15 percent of districts). Conversely, the few districts with large shares of students who are Asian (3.7 percent of districts are at least 10 percent Asian) have an SFR effect that is $493 per pupil smaller than those with small shares (less than 1 percent).[48]

47. The event study in panel B of figure A.1 shows that local revenues per pupil increase at a faster rate after SFR as share of students who are Hispanic and Asian increases, and at a slower rate as the share who are black increases. The Asian and black effects grow over time, particularly following the second SFR ruling and SFR legislation (SFR years 4 and 5). Again, unlike national results, the local revenue responses to SFR in NYS are quite large relative to changes in state aid.

48. Presented differently, one can compare the size of the SFR effect for districts in 90th versus 10th percentile for shares of students who are black, Hispanic, Asian, and American Indian. The SFR impact is about $516,

I then find small, offsetting effects on local revenues, which are trumped by the changes in state aid. The overall effect on total revenues is moderate and in the same direction as the effects on state aid.

Results are robust to inclusion of state-by-year fixed effects and state-specific time trends. Results are also robust to restricting the sample to districts in states that ever have a SFR. A placebo test that examines the "impact" of court rulings upholding state aid formulas finds null effects and suggests the impacts of SFR result from court orders and not the threat of court action (alleviating concerns that estimates are biased by preemptive legislative action). Future work on SFR should conduct similar analyses to separate out which aspects of SFR effects are a result of court orders and which are a result of the threat of lawsuit. Then, using an event study framework, I find the sign of the estimates is consistent through the first eight years following SFR and evidence that the parallel trends assumption holds.

Finally, I conduct a case study of NYS to assess sensitivity to additional controls for cost and revenue-raising capacity. In NYS, results from model specifications with a fuller set of controls do not vary from the results from models with a more parsimonious set of controls available nationally. Results from the NYS event study suggest that the parallel trends assumption holds, additional changes occur after a second SFR, and effects level off during the recession.

One might believe that the only way to address racial inequity is to target resources based on race, focusing policies specifically on disadvantaged racial groups. Funding based on race, however, could potentially be challenged in court as providing disparate treatment on the basis of race. Instead, these results suggest that the average SFR from 1990 through 2010—court-mandated reforms initiated over adequacy concerns—does help remedy racial funding gaps. The results of this paper suggest that SFR has larger effects as nonwhite share increases and is, perhaps, an important policy lever to address racial inequality even when the court decisions are made on nonracial grounds. The otherwise moderate-looking effects are quite large in majority-minority districts and other districts with large minority student populations. Racial inequality, whether a result of historical de jure discrimination or current de facto segregation, can be partially remedied by court orders that target adequacy concerns.

SFRs precipitated by adequacy court rulings may serve to equalize funding by race, without exposing states to potential disparate treatment lawsuits. Although declines in local revenues offset some of the effects of increased state aid, local revenue responses are small relative to the gains from SFR. Therefore, despite previous concerns, the current waves of judicial mandates can affect education aid in multiple ways—they might guarantee access to a minimum threshold of education funding and can also address racial equity concerns.

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$216, and $179 higher for districts in the top decile of black, Hispanic, and American Indian representation, respectively, versus districts in the lowest decile. The SFR impact is $268 lower for districts in the top decile of Asian representation versus districts in the lowest decile.

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APPENDIX

Table A.1. First School Finance Reforms (Overturns) By State, Through 2010

State	Year	Equity	Adequacy	Total Number of Cases
Alaska	2007	1	1	2
Arizona				2
Arkansas	1983	1	0	3
California	1976	1	0	1
Colorado				2
Connecticut	1977	1	0	3
Florida				1
Georgia				2
Idaho	1997	0	1	1
Illinois				3
Kansas	2005	1	1	3
Kentucky	1989	0	1	2
Maine				1
Maryland				2
Massachusetts	1993	0	1	2
Michigan				1
Minnesota				1
Missouri				1
Montana	1989	0	1	2
Nebraska				3
New Hampshire	1997	0	1	6
New Jersey	1973	1	0	6
New York	2003	0	1	3
North Carolina	2004	0	1	2
North Dakota				2
Ohio	1997	0	1	5
Oklahoma				2
Oregon				2
Pennsylvania				3
Rhode Island				1
South Carolina				2

Table A.1. Continued.

State	Year	Equity	Adequacy	Total Number of Cases
Tennessee	1993	1	0	3
Texas	1989	1	0	5
Vermont	1997	1	0	2
Virginia				1
Washington	1978	0	1	2
West Virginia	1984	1	1	1
Wisconsin				2
Wyoming	1980	1	0	4

Notes: Court cases include final high court rulings that are not strictly procedural in nature. Does not include rulings related strictly to capital or facilities financing.

Sources: SchoolFunding.Info; Education Law Center; Murray, Evans, and Schwab (1998); Card and Payne (2002); Corcoran and Evans (2008).

Table A.2. Assessment of Potential Mechanisms, Changes in Racial Composition Following School Finance Reform (SFR), U.S. Districts, 1996–2011

	Black	Hispanic	Asian	American Indian
Variables	(1)	(2)	(3)	(4)
SFR	−0.41*	−0.60***	0.06	−0.02
	(0.221)	(0.217)	(0.102)	(0.041)
% Free Lunch	0.02**	0.04***	−0.00**	0.00**
	(0.011)	(0.006)	(0.002)	(0.001)
Enrollment	0.06**	0.15***	0.04***	−0.00***
	(0.027)	(0.021)	(0.006)	(0.001)
Enroll^2	−0.00**	−0.00***	−0.00***	0.00**
	(0.000)	(0.000)	(0.000)	(0.000)
District characteristics	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y
District fixed effects	Y	Y	Y	Y
Observations	161,815	161,815	161,815	161,815
Districts	11,157	11,157	11,157	11,157
R^2	0.989	0.986	0.980	0.982

Notes: Robust standard errors clustered by district in parentheses. All columns include control variables for district characteristics, including share certified eligible for free lunch, and enrollment (1,000s) and its square. Regression weighted by district enrollment.

$^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table A.3. Robustness Check, Impact of School Finance Reform (SFR) and Race on Per Pupil State Aid (%), U.S. Districts, 1996–2011

	(1)	(2)	(3)	(4)	(5)	(6)
SFR	0.1352***	0.1310***		0.1370***	0.1317***	
	(0.003)	(0.004)		(0.003)	(0.004)	
SFR × %						
Black		−0.0026***	0.0008***		−0.0024***	0.0008***
		(0.000)	(0.000)		(0.000)	(0.000)
Hispanic		0.0058***	0.0010***		0.0057***	0.0010***
		(0.000)	(0.000)		(0.000)	(0.000)
Asian		−0.0016***	0.0010**		−0.0006	0.0003
		(0.001)	(0.000)		(0.001)	(0.000)
American Indian		0.0019***	0.0022***		0.0018***	0.0021***
		(0.000)	(0.000)		(0.000)	(0.000)
%						
Black		0.0041***	0.0019***		0.0046***	0.0021***
		(0.000)	(0.000)		(0.000)	(0.000)
Hispanic		−0.0050***	0.0026***		−0.0038***	0.0024***
		(0.000)	(0.000)		(0.000)	(0.000)
Asian		0.0017***	−0.0038***		0.0030***	−0.0023***
		(0.001)	(0.001)		(0.001)	(0.001)
American Indian		−0.0006	0.0012**		−0.0007	0.0011**
		(0.001)	(0.000)		(0.001)	(0.000)
% Free Lunch				0.0109***	0.0303***	0.0711***
				(0.004)	(0.004)	(0.005)
Enrollment				−0.0030***	−0.0031***	−0.0010***
				(0.000)	(0.000)	(0.000)
Enroll^2				0.0000***	0.0000***	−0.0000
				(0.000)	(0.000)	(0.000)
District FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y		Y	Y	
State-Year FE			Y			Y
Constant	8.0915***	8.4326***	8.5910***	8.2250***	8.5089***	8.6144***
	(0.002)	(0.006)	(0.023)	(0.005)	(0.007)	(0.022)
N	161,815	161,815	161,815	161,815	161,815	161,815
Districts	11,157	11,157	11,157	11,157	11,157	11,157
R^2	0.876	0.878	0.931	0.877	0.879	0.931

Notes: Robust standard errors clustered by district in parentheses. All figures are percent change in state aid per pupil in constant 2011 dollars, adjusted using the Consumer Price Index. Regression weighted by district enrollment. Reference category: Share of district students who are white. Columns 1–3 rely on fixed effects (FE) alone; columns 4–6 include controls for district characteristics.

$^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table A.4. Assessment of Potential Mechanisms, Impact of School Finance Reform (SFR) by Race and Poverty on Per Pupil District Funding, U.S. Districts, 1996–2011

	State Aid	Local Revenues	Total Revenues
	(1)	(2)	(3)
SFR × %			
Black	18.26***	0.06	25.06***
	(4.426)	(4.129)	(4.626)
Hispanic	8.26*	8.90	17.85**
	(4.258)	(7.533)	(8.442)
Asian	−47.57***	36.52**	−0.02
	(10.734)	(16.474)	(18.267)
American Indian	47.88***	−11.40***	52.06***
	(13.740)	(3.580)	(19.116)
Free Lunch	−1.90	−3.53	−7.80**
	(2.803)	(2.959)	(3.472)
%			
Black	−3.84	−26.87***	−38.52***
	(5.128)	(5.783)	(7.134)
Hispanic	6.58	−15.42***	−0.79
	(5.398)	(5.657)	(7.760)
Asian	−12.08	26.66	−12.25
	(12.850)	(21.565)	(23.866)
American Indian	6.53	−2.84	19.94**
	(6.263)	(3.647)	(9.487)
Free Lunch	4.66**	−4.09*	3.99
	(1.853)	(2.166)	(2.595)
Enrollment	−8.92*	−10.58	−32.31***
	(4.689)	(7.860)	(10.089)
Enroll^2	0.00	0.00	0.01*
District FE	Y	Y	Y
Year FE	N	N	N
State-Year FE	Y	Y	Y
Constant	8.0915***	8.4326***	8.5910***
	(0.002)	(0.006)	(0.023)
Observations	161,815	161,815	161,815
Districts	11,157	11,157	11,157
R^2	0.898	0.933	0.882

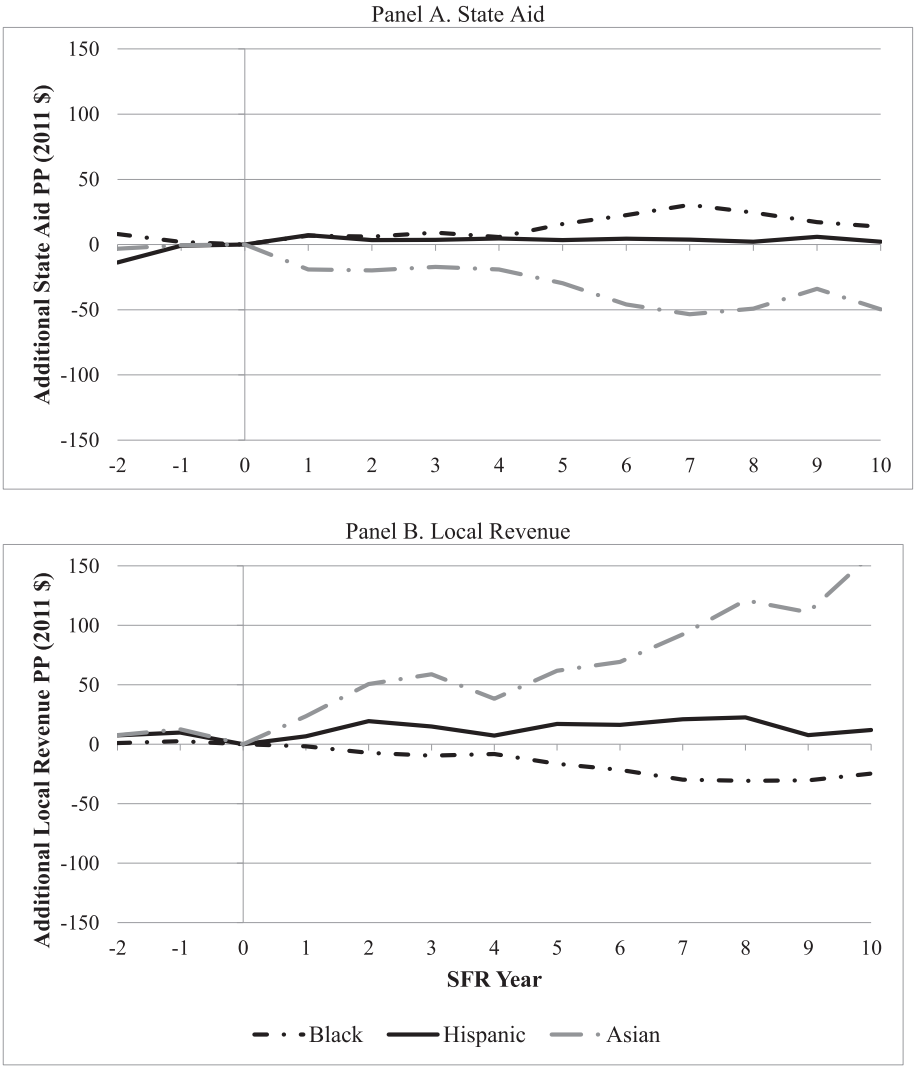
Notes: Robust standard errors clustered by district in parentheses. All figures are in constant 2011 dollars, adjusted using the Consumer Price Index. Regression weighted by district enrollment. Reference category: Share of district students who are white. FE = fixed effects.

$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A.5. Robustness Check, Impact of School Finance Reform and Race on Per Pupil State Aid, New York State Districts, Excluding the "Big 5," 2000–2012

	All Districts	No NYC	No Big 5
	(1)	(2)	(3)
%			
Black × post	9.61***	8.40***	9.89***
	(1.205)	(1.197)	(1.324)
Hispanic × post	0.48	−2.53	2.68
	(1.677)	(1.911)	(2.088)
Asian × post	−26.21***	−23.59***	−12.36***
	(3.873)	(4.054)	(3.875)
%			
Black	−27.32***	−29.63***	−37.32***
	(4.685)	(5.051)	(4.996)
Hispanic	7.59	2.89	2.24
	(5.124)	(5.585)	(5.598)
Asian	28.43***	27.98***	11.69*
	(6.316)	(6.538)	(6.246)
% FRPL	−13.58***	−16.96***	−12.04***
	(1.849)	(1.865)	(1.804)
Enrollment	−542.37***	−820.13***	−2,073.38***
	(11.908)	(39.716)	(75.066)
Enroll^2	0.26***	4.07***	78.60***
	(0.006)	(0.515)	(3.857)
Combined wealth ratio	−272.29***	−300.40***	−312.20***
	(40.134)	(39.801)	(37.668)
Local effect tax rate	10.29***	13.60***	16.53***
	(3.015)	(3.386)	(3.294)
Attendance rate	−1.72	3.29	9.74***
	(3.780)	(3.853)	(3.689)
% ELL	44.87***	89.08***	45.27***
	(5.459)	(6.863)	(7.310)
% SPED	30.17***	29.93***	26.11***
	(5.168)	(5.243)	(5.221)
Observations	8,736	8,698	8,646
Districts	672	671	667
R^2	0.967	0.966	0.960

Notes: Robust standard errors clustered by district in parentheses. Regression adjusted for combined wealth ratio, effective local tax rate, percentage of students certified eligible for free or reduced-price lunch (FRPL), attendance rate, enrollment divided by 1,000 and the square of enrollment divided by 1,000, percentage of students receiving SPED (special education) and ELL (English language learner) services, and year and district fixed effects. Figures in constant 2012 dollars, adjusted using the Consumer Price Index. Regression results weighted by district enrollment. No Big 5 excludes New York City, Buffalo, Rochester, Syracuse, and Yonkers school districts. Reference category: Share of district students who are white.



Notes: Point estimates regression adjusted for combined wealth ratio, effective local tax rate, percentage of students certified eligible for free or reduced-price lunch, attendance rate, enrollment and enrollment squared, percentage of students receiving special education and English language learner services, and year and district fixed effects. Reference category: Share of district students who are white. Reference year: four or more years before SFR. All figures are in constant 2012 dollars, adjusted using the Consumer Price Index. * $p < 0.10$; *** $p < 0.01$.

Figure A.1. Robustness Check, Impact of School Finance Reform (SFR) and Race on Per Pupil (PP) State Aid Over Time, Event Study Framework, New York State Districts, 2000–2012