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THE EFFECT OF STATE EDUCATION FINANCE REFORM ON TOTAL LOCAL RESOURCES

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Abstract

Both the federal government and the states use intergovernmental grants to try to change the composition of local spending across different programs, as well as the distribution of resources across localities. Many states are now under court-order to use state education grants to reduce local disparities in education spending. While a substantial body of literature suggests that these court orders increase the level and progressivity of state education spending, there is little evidence on their broader effects on the total resources available not just for schools in low income districts, but for other programs across all localities. We find that states finance the required increase in education spending in part by reducing their aid to localities for other programs, particularly for wealthier districts. Thus, while court-ordered school finance equalizations do increase total state aid to localities for education, they do so at the expense of drawing state intergovernmental aid away from programs like public welfare, health, hospitals, and general services. These findings provide insight into the effectiveness of using earmarked funds to achieve redistribution.

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I. INTRODUCTION

Intergovernmental grants are used by federal and state governments both to redistribute spending across program areas and to redistribute resources across localities: the federal government matches state spending on Medicaid with federal funds, for example, and many state governments make education grants to localities, with increasing generosity for lower property wealth school districts. The effectiveness of such grants in achieving both types of redistribution may be limited, however, by offsetting responses from the many jurisdictions involved. The literature has documented a number of offsetting reactions from jurisdictions receiving grants. For example, states may be able to use federal Medicaid funds to supplant their own spending (Baicker and Staiger, 2005), and school districts with greater federal education grants may reduce their own revenue-raising efforts (Gordon, 2004). The effectiveness of intergovernmental grants could be further eroded by offsetting reactions within the granting government itself, particularly when the targeted redistribution is mandated by court order or ballot proposition. The net impact of any change in intergovernmental grants on the distribution of public spending, across programs and across geographic areas, thus depends on how both grantor and grantee jurisdictions readjust their budgets in response.

While responses of grantee jurisdictions have been studied extensively (see Hines and Thaler, 1995, for a review of literature on the flypaper effect), much less is known about how *grantor* jurisdictions react to mandated changes in their spending. In this paper, we explore this issue by identifying the extent to which court-ordered school finance equalizations prompt state governments to reallocate intergovernmental grants to localities for programs other than education, and thus the ultimate effect of the mandates on the level and mix of local resources.

Beginning with California's landmark *Serrano v. Priest* case in 1971, many states have moved voluntarily or under court order towards more redistributive intergovernmental state education grants. While a substantial body of research has documented that these state school

finance equalization measures have increased both state spending on education and school budgets in low-income districts (and sometimes also reduced budgets in high-income districts), little attention has been paid to the potential offsetting reactions of state governments in funding other programs, and in particular how other intergovernmental grants change along with changes in education grants for a given locality. In this paper we evaluate how state governments respond to mandated school finance equalizations. First, when a state is ordered to reform its school finance system, how much does it change the level and distribution of intergovernmental grants the state makes, for programs *other than* education? In other words, do school finance equalization measures increase the total resources available to low-income districts, or do they merely restrict the mix of grants they receive? Second, how do school finance equalizations affect local expenditures by program area? Given that localities on average receive thirty percent of their total revenues in the form of state intergovernmental grants, about sixty percent of which are earmarked for education, changes to this stream of funding are likely to have substantial effects on state and local budgets overall. This is thus a particularly fertile area through which to explore the broader issues of the effectiveness of redistribution through earmarked funds and intergovernmental spillovers in the provision of public goods.

Our empirical approach is straightforward. We begin by providing evidence that these court-ordered school finance equalizations (SFEs) can be viewed as exogenous to the state fiscal environment. We then estimate the effect of these equalizations on the level and distribution of local (county-area) resources, including state intergovernmental revenue both for education and for other programs. We also evaluate the impact of SFEs on local spending by program area. Last, we explore possible sources of heterogeneity of responses, including demographics, economic conditions, and political and legislative constraints.

Using data on school finance equalizations and state and local revenues and expenditures in the 1980s and 1990s, we find that mandated school finance equalizations do indeed increase

both the level and progressivity of state spending on education, but that states finance the required increase in education spending in large part by reducing their aid to localities for other programs. While localities on average do get more money ($48 per capita) from the state for education after a court-ordered school finance equalization, they lose an offsetting amount ($51 per person) in other state intergovernmental revenue such as for public health, welfare, and general services. There is some evidence of a commensurate shift in the composition of local spending away from spending on non-education programs.

Thus, while SFEs increase state intergovernmental grants for education, they do so at the expense of drawing resources away from spending on programs. Understanding these spillover effects is critical not only for understanding the full incidence of the mandated increases in state education aid, but also more broadly for evaluating the effectiveness of using earmarked funds to achieve overall redistribution, beyond just a change in the composition of spending. The effectiveness of court-mandated redistribution is limited by the offsetting reactions of state and local governments.

II. BACKGROUND ON SCHOOL SPENDING AND SCHOOL FINANCE EQUALIZATIONS

Our goal is to evaluate the effect of court-ordered changes in education finance on the distribution of state resources for both education and non-education programs across localities. This causal interpretation is best justified if the timing of the mandates is not correlated with other factors driving state intergovernmental funds for education and for other programs. In this section, we review the literature on this issue, as well as the broader literature on the effects of SFEs.

Exogeneity of Court-ordered School Finance Equalizations

While the literature on SFEs has centered far more on the effects of SFEs on education spending (discussed below) than on the circumstances which generate them, the existing evidence on whether pre-existing state conditions drive the timing of court orders suggests that court orders are largely independent of these conditions.[1] Card and Payne (2002) explore the relationship between the progressivity of state education aid in 1977 and subsequent court-ordered school finance equalization.[2] The progressivity of state education aid (measured by the effect of local income on state aid) looks strikingly similar for states that experienced (successful or unsuccessful) school finance litigation and those that did not: In states that ultimately received court orders between 1977 and 1992, school districts received $1.37 less (s.e. 0.21) in state aid per pupil for each additional $1000 of median family income in the district in 1977; in states where court decisions upheld existing school finance systems, districts received $1.28 less (s.e. 0.11); and in states where no court decisions were issued by 1992, districts received $1.08 less (s.e. 0.42). These results suggest that court-ordered SFEs did not result from systematically different pre-existing levels of progressivity in state aid.

Another piece of evidence supporting the exogenous nature of court-orders comes from the work of Figlio, Husted, and Kenny (2004). Their paper is an investigation of the contributors to within-state inequality in education revenue rather than an examination of what causes SFEs,

[1] Fischel (2001) notes that some governors are more sympathetic to lawsuits in their state than others. When the political cost of cutting other program spending is high, governors may actually prefer to be ordered to raise education spending. These governors have weaker incentives to raise taxes or cut other spending in order to increase education spending preemptively, in hopes of avoiding a lawsuit. To the extent that our sample of court-ordered equalizations disproportionately contains states with high political costs of cutting other programs , our subsequent estimates will *understate* the degree of state off-setting behavior. We are grateful to him for this insight.

[2] In Table 3 of their paper they estimate the effect of median family income in a school district on the state education aid it received. States distribute general education aid to school districts based largely on property wealth of the district, not income, and distribute aid for categorical programs based on eligible student counts by program area (for example, special education or bilingual education). The point of the Card and Payne approach is not to replicate the mechanism by which states distributed aid, but to characterize the ultimate incidence of that aid by district income level.

but they create a classification of state constitutional language that is useful for both purposes.[3] They classify state constitutions along two dimensions: the strength of language supporting equity in education and the strength of language supporting adequacy in education. Using the Figlio *et al.* state-level language categorization data to explore the predictability of SFEs, we estimate a state-year level regression of the presence of a court-ordered SFEs on the Figlio *et al.* measures of "constitutional language" (including constitutional provisions for adequacy and equity of education), and a vector of time-varying state demographic characteristics (including population, income, unemployment, and racial composition). The adjusted R^2 from this regression is 0.037, corroborating the findings of previous research that SFEs are largely unpredictable.[4]

Effects of School Finance Equalizations on Education Spending and Outcomes

School finance equalization measures have been adopted by many states voluntarily as well as under court order as a means to increase the resources available to students in poor school districts. There is a large body of research (that we touch on only briefly here) that explores how SFEs have met their main goals of changing the amount and distribution of education spending – and, ultimately, changing the distribution of student outcomes.[5] The primary finding from this literature is that SFEs do in fact change the amount of state aid to school districts sufficiently to alter both the distribution and mean level of local education spending. This results from changes in how states distribute aid, as well as in the amount states spend on education overall. Murray, Evans, and Schwab (1998) find that court-ordered SFE schemes reduced inequality in local education spending within states by up to one-third between

[3] Their classification has considerable but not complete overlap with that of McUsic (1991).

[4] Results from a Probit, rather than this linear probability model, predict the presence of SFEs equally badly, with a pseudo-R^2 of 0.058.

[5] There is much variation in the structure and details of different state SFEs, and empirical and theoretical work has shown that these different ways of redistributing state revenue to districts have significantly different effects on local responses and on school spending at the district level (see Downes and Shah (1996), Fernandez and Rogerson (1999), and Hoxby (2001)).

1972 and 1992. Card and Payne find that court-ordered SFEs increased the progressivity of state education aid to school districts from 1977 to 1992. In looking at a particularly severe SFE, Fischel (1989) finds that California's *Serrano* decision equalizing school spending led to the property tax limitation of Proposition 13 and subsequently to declines in spending on education.

Several recent papers (which, like ours, take SFEs as exogenous) explore the ultimate impact of these SFE-induced changes in school spending on student outcomes. Card and Payne find that SFEs narrow the distribution of education spending, and correspondingly narrow the distribution of SAT scores. Hoxby (2001) finds that some types of SFEs may reduce dropout rates for low-spending schools, while other types may increase private school attendance. Clark (2003) finds that while Kentucky's Education Reform Act did have a significant equalizing effect on school spending, it did not have an equalizing effect on student achievement. While our analysis focuses on the broader fiscal effects of changes in education financing, rather than on educational outcomes, our results inform the interpretation of those findings: if SFE-induced increases in school spending were offset by decreases in other spending, those offsetting reductions could undermine gains in achievement that might otherwise be seen.

Spillover Effects of SFEs

Little existing research has focused directly on the potential spillovers from SFEs to other parts of local budgets, although there is some indirect evidence. Several papers find that states act to offset court-ordered or federally-imposed financing constraints. Cullen and Loeb (2001) find that school districts in Michigan recategorized maintenance spending in order to circumvent newly-imposed SFE constraints. Gordon (2004) finds no significant total impact of federal compensatory education grants on instructional spending (the category of spending mandated by the grants) because of off-setting changes in local behavior. Baicker (2001) finds that states finance mandated increases in Medicaid spending primarily by cutting back on other public

welfare spending that serves the same low-income population. Together, this literature suggests that examining the effect of mandated changes in education financing on education budgets alone would paint an incomplete picture of their distributional consequences. We examine the broader effects of mandated changes in education financing on all of the resources available to local jurisdictions.

III. EMPIRICAL STRATEGY

We begin by estimating the effect of school finance equalizations on the grants that states make to localities for education, but also on the other grants that they make to localities.[6] We evaluate both the effect of SFEs on average spending and how that effect varies based on the income of different localities. Similarly, we then evaluate the effect of the equalizations on local spending on education and other programs. We then turn to several extensions and specification checks. While our primary analysis is at the local level, we also evaluate the aggregate effects of SFEs on state budgets, and explore alternate sources of heterogeneity of responses.

Effects of SFEs on Local Revenue and Expenditures

We begin with a straightforward analysis of the effect of SFEs on the revenues that localities receive from the state. We estimate several fixed effects regressions of the form:

$$F_{it} = \alpha_i + \beta_t + X_{it}\Gamma + \lambda_1 median\ fam\ income_{it} + \lambda_2 SFE_{st} + \varepsilon_{it} \quad (1)$$

where F represents one of several spending or revenue categories (such as intergovernmental grants from the state for education, or expenditures on highways), i indexes counties (including,

[6] While we do not build a formal model of voter and legislature behavior here, our implicit framework is straightforward and similar in flavor to that of Baron and Ferejohn (1987 and 1989). The legislature makes allocative decisions which reflect the preferences of voters in the represented districts and the strategic behavior of representatives seeking re-election, given agenda-setting rules governing the legislative body. When the court mandates a school finance equalization, the basic intuition is that the legislature is no longer free to distribute education resources as they wish (they are now constrained in how they do this by the judicial mandate), so the distribution of funds designated for other purposes may change as well in order to return the distribution of net resources to an equilibrium state. Additionally, the legislature's budget constraint is affected by any school finance equalization-induced changes in the level of state education spending

as discussed below, all sub-units of government contained within a county, such as school districts and towns), *t* indexes time, and *X* is a vector of time-varying county-level demographics (including population, employment and poverty rates, racial composition, and urbanicity). The indicator variable *SFE* indicates that state *i* has received a court-order to equalize school spending at any time before year *t*. (Because this policy varies by state, not locality, all standard errors are clustered at the state level.) λ_2 thus tells us the average effect of SFEs on different local budget categories.

We then turn to the distributional effects of SFEs to see whether they have different effects on poor localities than they do on richer ones. We adapt the methodology used by Card and Payne to estimate the effect of SFEs on the progressivity of state spending across localities. We include an interaction term of SFEs with local median family income:[7]

$$F_{it} = \alpha_i + \beta_t + X_{it}\Gamma + \delta_1 median\ fam\ income_{it} + \delta_2 SFE_{st} + \delta_3 SFE_{st} * relative\ fam\ income_i + \varepsilon_{it} \quad (2)$$

Note that while local median family income is time-varying, relative family income is measured in standard deviations from the state-year average in 1982 (and is therefore constant for a given county-area over time, to avoid the potential endogeneity of sorting responses to SFEs). This specification thus allows the effect of SFEs to vary by the locality's relative family income. When F_{it} is total state intergovernmental revenue, for example, δ_2 tells us the average effect of SFEs on revenue from the state, and δ_3 tells us the change in progressivity of state grants to localities under the post-SFE regime.

Extensions

We consider several extensions to this baseline empirical approach, exploring a two-stage approach, heterogeneous responses to SFEs, and state-level specifications. First, if the main

[7] Another avenue through which states might respond is changing the progressivity of non-intergovernmental spending and revenues – such as the progressivity of income taxes or the size of low-income assistance programs.

effect of SFEs operates through changes in state intergovernmental education spending directly, and changes in other budget categories reflect offsetting reactions to these changes in intergovernmental education expenditures, this would suggest a two-stage strategy in which the effect of the presence of an SFE on state intergovernmental aid for education is estimated in the first stage, and then the effect of changes in the predicted state intergovernmental education spending on other budget categories is estimated in the second stage. We estimate this system, and also consider other variations to the baseline specifications in equations (1) and (2) in which the dependent variable is specified in logs or as a share of total revenues or expenditures.

Next, we evaluate whether states and localities respond differently to SFEs based on factors such as income, demographics, or legal environment. For example, funds in dependent school districts that rely on a parent local jurisdiction for funding may be more susceptible to redirection.[8] We explore the possibility that the effect of mandated changes in state education revenues varies based on this and other factors by interacting them with the SFE indicator variable, as we did with income in equation (2).

Finally, because these interventions occur at the state level and in order to compare our findings more easily with previous research, we consider the effects on state-level budgets. It is, however, difficult to estimate precisely the effect on state budgets given the limited number of observations and the degree to which SFEs affect the progressivity of state spending, rather than just aggregate budgets.

[8] There may be bureaucratic constraints on localities' ability to transfer funds between programs, since different legislative and political entities often control spending on schools versus other programs within the county area. (See, for example, the substantial literature on the "flypaper effect" and "Leviathan" government.)

IV. DATA

Our analysis requires data on local revenue from different sources and expenditures on different categories, the presence of court-ordered SFEs, local demographic and economic conditions, and state political and economic institutions.

The County-area Unit of Observation

The unit of observation for our analysis is the "county-area" over time. The Census of Governments creates these county-area data by aggregating the revenues and expenditures of all local governments within a given county's borders. This typically includes the county government itself, all municipal and/or township governments located within the county, all school districts in the county, and any special districts in the county.[9]

School districts are distinct governmental units, and state education aid typically flows directly to them rather than through other local governments.[10] Because school districts by definition spend only on education, we must look to the local governments with which they are geographically coterminous if we wish to identify the spillover effects of SFEs on revenues and expenditures *not* related to education. The mapping of school districts to other local governments varies both across and within states: school districts may share full or partial boundaries with counties or municipalities. Some school districts contain multiple municipalities, and some cities contain multiple school districts. Additionally, the degree to which different types of local governments (for example, counties versus cities) take

[9] Connecticut and Rhode Island do not have county governments recognized by the Census of Governments. Because their non-county local government finances can still be aggregated up to the equivalent of the county level, they are included in our data. Special districts are districts formed for special purposes, independent of other local governments. The most common functions of special districts relate to natural resource management, fire protection, water supply, housing and community development, and sewerage.

[10] This is true for independent school districts, which comprise about 90 percent of the districts in the United States. Dependent school districts do not collect revenue themselves and instead rely on local parent governments for their financial support. Our county-area aggregation approach allows consistent treatment of both types of districts.

responsibility for non-education expenditures differs by state. Using county-areas, rather than school districts or counties alone, thus suits our needs by both linking school district finances to geographically coterminous other local government finances, and providing a unit of observation that is conceptually consistent across states despite state-level variation in the responsibilities of different levels of local governments.

The drawback of this aggregation approach is that we do not capture changes in the distribution of state aid *within* county areas. Most states have multiple school districts in a given county, so our approach captures only part of the redistribution induced by the SFE (i.e., if one school district in a county benefits from SFE while another suffers, we only observe the net effect at the county level). Even at this aggregated level we find strong effects of SFEs on the distribution of state education aid. For our purposes, this drawback of aggregation is clearly outweighed by the advantage of a consistent way to link changes in each area's education resources to changes in its other resources.

County-area Revenue and Expenditure Data

Information on state and local revenues and expenditures is available from the *Census of Government Finances*, collected by the Bureau of the Census. The *Census* is collected every 5 years, in years ending in 2 and 7, and represents most governmental units. We use the county-area files. All county-area revenue and expenditure dependent variables are expressed in per capita terms in real 1998 dollars, and are summarized in Table 1.[11] Our approach compares county-area budgets over time, so we control for county-area fixed effects as well as time-varying county-area demographics and economic conditions.[12]

[11] Unfortunately these data are notoriously noisy. We conservatively trim obvious miscodings (including, for example, an isolated jump in spending by a factor of 100 in one year), but results are not sensitive to this procedure.
[12] We do not currently model these demographics as endogenous to school finance reform, though some empirical evidence suggests that SFEs affect residential location decisions (see Aronson, 1999). Results excluding these demographics as controls are quite similar.

We analyze major revenue and expenditure categories, and for consistency we construct total revenue and direct expenditure by aggregating up spending and revenues from these categories.[13] The totals presented here are therefore smaller than actual totals reported in the Census of Governments data, and education spending as a share of our total spending measure is a larger ratio than education spending as a share of the reported Census of Governments total. Our totals are, however, consistently constructed over time to contain the largest sources of revenues and expenditures. We construct a consistent sample of county-areas reporting values for all dependent variables in our analyses.[14] Real county-area revenues per capita in our sample grew from $1,539 on average in 1982 to $2,257 in 1997. Mean real per capita direct expenditures (excluding intergovernmental expenditures) grew from $1,363 in 1982 to $1,995 in 1997. Most localities, unlike the federal government, have limited ability to run deficits so it is not surprising that revenues exceed expenditures on average. In 1997, elementary and secondary education expenditures comprised over 60 percent of our measure of total direct spending by local governments. Other major categories of expenditures include health and hospitals, highways, police and criminal justice, and public welfare. County-areas received just over 40 percent of their revenues as intergovernmental grants from the state, with three-quarters of those earmarked for education – so changes to this funding stream are likely to have a substantial impact on other aspects of state and local budgets.[15]

[13] Reporting of totals and netting out of intra-county-area transfers changed substantially between the 1980s and the 1990s, so we focus primarily on direct expenditures, which were reported consistently and comprise the bulk of all expenditures. We create "total expenditures" by aggregating all reported direct expenditure, to avoid double-counting the inconsistently reported indirect (intra-county) local expenditures.

[14] In our related NBER working paper (Baicker and Gordon, 2004) we did not impose this sample restriction; that paper therefore reports different summary statistics and numbers of observations than this paper.

[15] Note that the corresponding figures in the introduction refer to national averages published by the Census of Governments for 1997, rather than the sample described here.

Classification of School Finance Equalizations

We categorize SFEs following the work of Card and Payne (2002), updating information on SFEs after 1992 with information from Corcoran *et al.* (2003). In our analysis, we focus on SFEs in which state supreme courts ruled school financing systems unconstitutional and mandated reforms to the systems, consistent with Card and Payne's finding that such court-ordered SFEs have the strongest effects on the distribution of state education revenue. We exclude court cases in which school finance systems were *not* overturned and instances in which state legislatures undertook SFE reforms of their own initiative, without judicial intervention (as these are more likely to be endogenously driven).[16]

Table 2 summarizes these rulings. It reveals considerable useful variation in the timing of school finance equalizations: from 1982 to 1997, 14 states received court orders to reform their school finance systems.[17] From these data we create a dichotomous SFE variable indicating if the state has had its school finance regime ruled unconstitutional in the past or in that year.[18]

Covariates

We control for population, employment and poverty rates, racial composition, urbanicity and median family income at the county-year level in all specifications. We obtain these variables from the *Area Resource File* and the *Census Bureau.* Covariates available only in decennial Census years are linearly interpolated for the intervening years. We use two variables that capture the institutional environment: the presence of tax or expenditure limits in the state (from the *Advisory Commission on Intergovernmental Relations*), and the presence of any

[16] For lists of cases in which state supreme courts upheld school finance systems or in which reform was legislatively rather than judicially induced, see Card and Payne, Table 1.
[17] Before 1982, eight states had SFEs. Five of the states already under court order in 1982 experienced new court rulings requiring SFE between 1982 and 1997.
[18] The SFE variable turns from 0 to 1 when such a ruling occurs, and then stays at 1.

dependent school districts in the county (from the *Common Core of Data*). Each variable is coded as a dummy based on the value in 1982, the beginning of our sample.

V. RESULTS

Table 3 presents our main results. Panel A shows the effect of school finance equalizations on local revenues, while Panel B shows the effect on local spending. In each case, we estimate both average effects and the progressivity of changes based on local income.

Effects of SFEs on State Intergovernmental Grants and Other Revenues

First we evaluate the effects of SFEs on state intergovernmental revenue to localities, and how this varies by local income levels. The effect of SFEs on state education revenue is significantly positive. All variables are measured in real per capita dollars, so the coefficient on SFE in column 1 of Table 3a represents an average increase of $48 per capita in state education revenue to localities following a court-ordered SFE. (Note that all standard errors are clustered at the state level.) Column 2 includes an interaction of SFEs with local relative income, and shows that court-ordered SFEs redistribute education revenue from the state towards poorer counties, as evidenced by the negative and statistically significant coefficient (-59.55) on the *SFE*relative median family income* term.[19] The coefficient on the main *SFE* term remains positive and significant when the interaction is included. In interpreting these coefficients it is important to note that income both within and across districts is quite right-skewed: the average county-area has median income 0.76 standard deviations below the state's average income. A county-area with median income at the state mean will experience a $51 increase in per capita education revenue from the state, while a county-area with median income one standard deviation below the state mean would receive a supplemental effect of $60 per capita, yielding a

[19] These results are also consistent with Hoxby's finding that SFEs have differential effects on localities with different incomes.

total increase of $111. For a county-area with median income one standard deviation above the state mean, the redistributive aspect of the SFE completely offsets the increase in the average level of state intergovernmental revenue for education. The impact of SFEs on the level and progressivity of state intergovernmental grants for education is thus significant and in the expected direction.

We next consider results for the same specifications in which the dependent variables are other types of state revenue to localities. In column 3 of Table 3a, we see that SFEs generate average declines of $51 per capita in state intergovernmental grants for non-education programs. Thus, the increase in education grants received by the average locality is entirely offset by a decline in other intergovernmental grants. Column 4 reveals that, like the increase in education grants, this offsetting decline is progressive as well, although these changes are not as progressive as the changes in education aid. Thus, poorer counties do see a net increase in intergovernmental revenues, while richer counties see a decline. A county-area with median family income one standard deviation above the state mean will receive $77 less per capita in state non-education aid under SFE, while one a standard deviation below the state mean will receive $22 less per capita. On net, SFEs do not affect the level and do increase the progressivity of total state aid to localities.

Which programs do state cuts in response to SFEs? Of the $51 per capita decline in non-education state revenue to the average locality in response to an SFE, we estimate (in the odd columns) that $16 comes from declines in intergovernmental revenue dedicated to public welfare, health and hospitals, none from grants for highways, and $22 from grants for general services. The remaining $13 ("other") comes from all residual state intergovernmental grants to localities. Effects on all of these major categories of state grants to localities are negatively signed, and the effects for the welfare, health and hospital category and for general services are statistically significant. The coefficients on the levels are nearly identical when we allow the

effects to vary with county income level (in the even columns), and the coefficients on the interaction between SFE and relative family income suggest that the impact of SFEs on other state aid is progressive within each program category, with the exception of general services.

We also examine the effects of SFEs on the other components of local revenue: locally-raised ("own source") revenue[20] and federal intergovernmental revenue. We find that SFEs had no significant impact on the level or distribution of either of these other revenue streams (although estimates are imprecise). The impact of SFEs on total revenue is thus qualitatively the same as the impact on state intergovernmental revenue.

Effects of SFEs on Local Spending

These changes in state aid to localities might affect the level or composition of local spending. We estimate these effects in Table 3b. We find no statistically significant impact of SFEs on total county-area spending, regardless of whether or not we allow the effects to vary with local income. This is consistent with the lack of significance we found on total county-area revenue. There is only suggestive evidence of a change in the composition of local spending. The effect of SFEs on education expenditures is positive on average but statistically insignificant. Our results on the extent to which SFEs change the distribution of education spending are insignificant as well, but do have the expected negative sign on the interaction between SFE and relative family income. While our findings have the same sign as those of Card and Payne (2002), it is unsurprising that their results are stronger and significant because their unit of observation is the school district rather than the county-area.

The effect of spending on non-education programs is broadly negative, but usually not significant. The only spending category for which we find a statistically significant impact of

[20] Locally-generated revenue includes taxes (such as income, property, and sales taxes) and charges (such as hospital charges, tuition charges (primarily for higher education), sewerage, and highway and transportation charges). There is some heterogeneity between states in how revenues are labeled.

SFE is on highways, where spending is on average $15 lower per capita (off of an average base of $170) when an SFE is in place. The effects of SFEs on local highway spending also vary progressively with relative family income in the county. Our estimated effects on spending on public welfare, health and hospitals, and police and criminal justice, while only sometimes marginally significant, are all negative. This cumulative negative effect offsets the positive (insignificant) effect on education spending, leaving no significant net effect on total local spending.

Alternate Specifications

Our findings are robust to several other specifications. First, we estimate alternate functional forms with the dependent revenue and expenditure variables measured in logs or as shares of total budgets, and obtain similar results (not shown). Second, we estimate a two-stage model in which we first predict state education grants using the presence of an SFE as an instrument, and then estimate the effect of predicted education grants on other state grants to localities. If the primary direct effect of SFEs is on intergovernmental education grants, then these results tell us the causal effect of mandated increases in state intergovernmental education grants on other state aid to localities. We find that a mandated one dollar increase in state education grants causes an 11 cent decline in grants for health and welfare (s.e. .05) and a 50 cent decline in grants for general services (s.e. .08), along with a 68 cent decline in non-education spending (s.e. .35), primarily in spending on health, welfare, and highways.

We next consider several different potential sources of heterogeneity of local responses in addition to the effect of income. We estimate the effect of several different factors on responses to SFEs, including the dependent or independent organization of school districts, the presence of tax and expenditure limits, the racial composition or age distribution of the population, and the overall reliance on local finances versus state financing for public programs. We do not find that

any of these factors systematically drives heterogeneity in local responses – none produces consistently significant interaction effects.[21]

Last, we repeat our primary specification at the aggregate state level. We would like to find the effect of SFEs on total state spending in the aggregate. Unfortunately, our limited number of observations, coupled with the fact that much of the change in spending observed in Table 3 was seen as changes in the distribution of spending within states, yield few statistically significant results.[22] For example, we find that states spend $15 less per capita on intergovernmental grants to localities for public welfare, health and hospitals once they are under court-ordered SFE, but with a standard error of $11.

VI. CONCLUSION

School finance equalizations are increasingly being used as a policy tool to improve outcomes for poor children. The existing literature shows that these equalizations have had at least some success in redistributing state education dollars towards children in school districts with lower property wealth, but how redistributive these programs are and how they ultimately affect child outcomes depend critically on any resulting offsetting changes in other public expenditure programs. While it is difficult to design systems that prevent states from "undoing" *net* redistribution through changing other intergovernmental grants, understanding the magnitude and impact of such responses should inform policy design. We find that states did change their spending patterns in a way that partially offset the mandated increase in their education spending (although not in a way that eliminated their progressivity). Increases in local education spending

[21] For example, we might think that dependent school districts (which rely on their parent local governments for revenue), might respond differently from independent districts (which still share a tax base and resident population with their parent local government but can raise their own revenues). When we include the interaction of education grants with an indicator of "dependent school districts," we estimate an effect of the interaction term of -0.001 (se 0.030) on total state intergovernmental grants, 0.005 (se 0.071) on own-revenues, and -0.003 (se 0.042) on total expenditures. These districts thus do not seem to respond systematically differently.

[22] Murray, Evans, and Schwab (1998) examine effects of SFEs from 1972 to 1992. They find that in addition to reducing within-state inequality of local education spending, SFEs prompted higher overall state spending, which was funded by higher state taxes. Our sample difference (we look at 1982 to 1997) may account for this difference.

were offset by marginal declines in spending on health and hospitals, highways, and public welfare. Thus, while mandated changes to state education financing systems may have increased the level and progressivity of state spending on education, they did so at the expense of drawing resources away from spending on other programs. These effects were greater in higher-income counties.

Researchers need to incorporate the effect of these offsetting responses when they analyze the effects of mandated education spending changes on student outcomes, such as achievement test scores, high school dropout rates, and college attendance. Changes in these outcomes may be influenced not only by the changes in education spending, but also by changes in other resources which are inputs into those same student outcomes. If, for example, high school dropout rates are unchanged with increased spending from school finance equalizations, a naïve interpretation would suggest that "money doesn't matter" for education. If, in fact, students are simultaneously experiencing a decline in programs such as community policing, summer camps, and vaccination campaigns, both educational resources and other resources could have mattered for student outcomes very much indeed.

More broadly, these results have strong implications for redistribution policy in a federal system – both across programs and across localities. The effectiveness of redistribution through specific programs is limited by the ability of intervening levels of government to undo that redistribution and to redirect funds for other purposes. State governments may change both the composition of funding that each locality receives and the division of resources between localities in response to mandated changes in spending on certain programs or to certain jurisdictions. Policy-makers must decide whether their goal is to change the level, distribution, or composition of public spending, and then anticipate the potentially off-setting reactions of intervening levels of government.

These findings also prompt many new questions – both for education policy and for public spending more generally. While we have shown that school finance equalizations on average have important spillover effects on other revenues and expenditures, the details of those equalizations, the policy environments in which they occur (such as under different school accountability measures), and how states raise revenue likely matter significantly in determining the nature of state and local responses. Furthermore, while we have documented particular spillovers that result from policies aimed at redistribution through narrow programs, there are several other potential channels through which spillovers may occur. First, future work should couple analysis of the progressivity of state education spending with a parallel analysis of the progressivity of state and local raising-revenue – since changes in revenue patterns may change the net distribution of resources across residents of different localities. Second, changes in state education financing schemes or other changes to how local public goods are financed may affect local residential sorting and property values. Incorporating these broader spillover effects will further refine our understanding of the effectiveness not only of school finance equalization measures but of targeted redistribution policy in a federal system.

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Table 1: Summary Statistics

	All Years		1982		1997	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Revenues ($per cap)						
Total	1,941.46	801.53	1,539.43	588.29	2,256.66	855.13
Own Sources	1,059.77	651.55	840.93	492.29	1,221.24	703.62
Federal Intergov.	64.99	94.96	62.07	106.03	67.35	96.73
State Intergov.	816.70	362.06	636.43	284.41	968.07	372.91
State Intergov - Education	599.15	254.40	463.39	190.27	720.30	251.94
State Intergov - All Non-Education	217.55	208.72	173.04	166.43	247.78	229.98
State Intergov - Pub Welf, Hlth & Hosp	48.08	89.89	37.83	72.74	54.65	96.65
State Intergov - Highways	70.99	95.68	61.36	81.27	75.11	93.42
State Intergov - General Services	47.90	77.86	32.38	54.91	60.33	94.25
State Intergov - Other	50.58	72.49	41.47	52.89	57.70	89.14
Expenditures ($per cap)						
Total - Direct	1,719.69	699.56	1,363.49	517.72	1,995.03	758.67
Education	1,042.93	384.12	825.42	302.42	1,204.51	391.52
Public Welfare, Health & Hospitals	249.48	313.56	198.55	225.94	291.59	391.12
Highways	169.44	156.76	152.08	143.35	174.57	151.18
Police and Criminal Justice	124.34	99.88	73.64	44.63	156.86	102.05
Other[1]	114.87	95.36	87.44	74.06	138.28	104.74
Demographics and Covariates						
Median Family Income	37,731.96	9,513.72	########	8,140.60	40,615.72	9,461.90
Relative Median Fam Inc (# std dev cty is from state mean) (in 1982)	-0.76	0.97	-0.76	0.96	-0.75	0.98
Population	79,374	278,982	68,029	232,129	85,743	280,507
Percent Unemployed	6.76	3.31	7.89	3.51	5.61	2.96
Percent Black	8.59	14.28	8.78	14.56	8.9	14.5
Percent Hispanic	4.54	10.85	3.98	10.45	5.19	10.96
Percent Poor	12.2	6.5	12.54	6.61	11.11	5.83
Percent Urban	36.84	29.11	35.2	28.4	39.05	29.56
N	10,971		2,474		2,827	

Notes:

All revenue and expenditure variables are in per capita, real year 1999 dollars. Totals are calculated as the sum of observed components.

[1] Other state intergovernmental revenue is the sum of revenue earmarked for housing and development, libraries, parks and recreation, fire protection, and public buildings.

Sources:

U.S. Bureau of the Census, *Census of Governments* and *Area Resource File* , various years.

Table 2: Court Rulings of Unconstitutional School Finance Systems (through 1997)

State	Year(s) of Ruling(s)
Alabama	1993, 1997
Arizona	1994, 1997
Arkansas	1983
California	1971, 1977
Connecticut	1977, 1996
Kansas	1976
Kentucky	1989
Massachusetts	1993
Missouri	1996
Montana	1989
New Hampshire	1993, 1997
New Jersey	1973, 1976, 1990, 1994, 1997
North Carolina	1997
Ohio	1997
Rhode Island	1994
Tennessee	1993, 1995
Texas	1989, 1991
Vermont	1997
Washington	1978, 1991
West Virginia	1979, 1988
Wisconsin	1976
Wyoming	1980, 1995

Sources: Card and Payne (2002), Corcoran *et al.* (2003), and Hoxby (2000). Corcoran *et al.* cite Minorini and Sugarman (1999).

Note that there is disagreement among these three sources in several cases. We generally follow Card and Payne for rulings through 1992, using Corcoran et al. for rulings post-1992. Two exceptions are: Card and Payne list New Jersey rulings in 1989 and 1991; we follow Corcoran et al. in listing Abbott v. Burke II in 1990 (see Abbott v. Burke II, 119 N.J. 287, 575 A.2d 359 (1990)). Card and Payne list a West Virginia ruling in 1978, but we follow Corcoran et al. in listing Pauley v. Kelley (I) in 1979 (see Pauley v. Kelley, 162 W. Va. 672, 255 SE.2d 859 (1979)).

Table 3a: Reduced Form Effects of SFE on County-Area Revenues

	Revenue Category															
	Intergovernmental from State												Own Sources		Intergovernmental from Federal	
	Education		Non-Education		Public Welfare, Health & Hospitals		Highways		General Services		Other[1]					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
SFE	48.09	51.05	-50.93	-49.57	-15.95	-15.43	-0.37	-0.25	-22.09	-22.16	-12.52	-11.72	-43.03	-44.04	-6.62	-6.55
	(22.13)	(22.72)	(21.04)	(20.62)	(7.66)	(7.58)	(2.65)	(2.70)	(9.59)	(9.55)	(14.16)	(13.83)	(46.73)	(45.73)	(5.90)	(5.95)
SFE*median family income		-59.55		-27.36		-10.39		-2.39		1.51		-16.09		20.31		-1.49
		(25.35)		(10.54)		(3.62)		(1.10)		(3.10)		(8.04)		(23.03)		(4.11)
R-squared	0.87	0.87	0.96	0.96	0.96	0.96	0.89	0.89	0.89	0.89	0.83	0.83	0.92	0.92	0.79	0.79

Notes: Data represent annual county-area observations from 1982, 87, 92, and 97. SEs in parentheses, and are estimated clustering at the state level.
All revenue and expenditure variables are in per capita, real year 1999 dollars.
All regressions control for county-area and year fixed effects, and county-year level median family income, population, unemployment, poverty, urbanicity, and racial composition.
All regressions have 10,968 observations.
[1] Other state intergovernmental revenue includes all residual state intergovernmental revenue not included in the categories in this table.

Sources: U.S. Bureau of the Census, *Census of Governments* and *Area Resource File* , various years.

Table 3b: Reduced Form Effects of SFE on County-Area Expenditures

	Direct Expenditure Category									
	Education		Public Welfare, Health & Hospitals		Highways		Police & Criminal Justice		Other[1]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SFE	25.09	26.16	-29.00	-28.81	-15.43	-15.05	-15.99	-15.77	-29.10	-29.51
	(24.84)	(25.30)	(16.51)	(16.64)	(6.88)	(6.95)	(8.82)	(8.86)	(18.77)	(18.39)
SFE*median family income		-21.58		-3.84		-7.69		-4.45		8.17
		(12.47)		(6.77)		(2.16)		(7.67)		(9.65)
R-squared	0.91	0.91	0.90	0.90	0.86	0.86	0.94	0.94	0.93	0.93

Notes: Data represent annual county-area observations from 1982, 87, 92, and 97. SEs in parentheses, and are estimated clustering at the state level.
All revenue and expenditure variables are in per capita, real year 1999 dollars.
All regressions control for county-area and year fixed effects, and county-year level median family income, population, unemployment, poverty, urbanicity, and racial composition.
All regressions have 10,968 observations.
[1] Other expenditures are the sum of county-area spending on libraries, housing and community development, public buildings, parks and recreation, and fire protection.

Sources: U.S. Bureau of the Census, *Census of Governments* and *Area Resource File* , various years.