Inequality and Redistribution: Evidence from the U.S. School Districts

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Abstract

In the face of persistently rising income inequality, the capacity to redistribute becomes essential, especially when involving human capital production. Using the case of public education funding across US school districts between 2005 and 2019, we document a negative response of local funding to higher inequality. We then show that this negative response is driven by lower redistribution in poorer districts whereas in rich districts the tax base positive effect dominates. Our results, in line with recent theoretical work, emphasize a new inequality amplification mechanism.

JEL Codes: D72, H42, I21, I22.
Keywords: Education funding, Inequality, Political Economy.

1 Introduction

Income inequality has been steadily rising throughout most parts of the world. This trend raises legitimate questions about the capacity to redistribute as well as the mechanisms that are deployed to this end. Such questions become even more important when redistribution is aimed at building productive resources that could potentially mitigate the original widening in the income distribution. In view of the essential role played by initial human capital for building further skills and stable lifelong earnings, public provision of basic education constitutes a critical area to understand. Moreover, it serves as one of the most significant forms of redistribution in society.

In this paper we study public education provision across US school districts to shed light on the response of productive redistribution in the face of ever higher income inequality. Panel (a) in Figure 1 shows the evolution of public education funding in the

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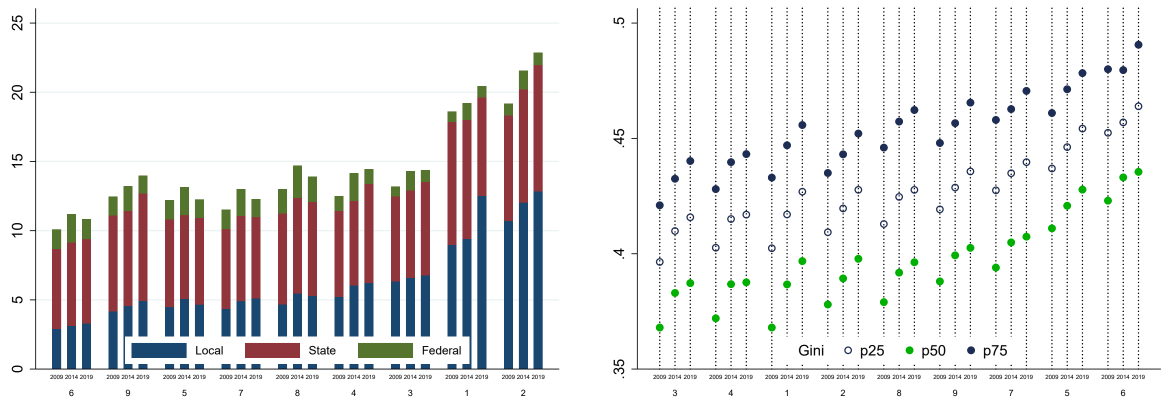
United States by region, separated by source of funding. Public education provision is highly heterogeneous, with local and state spending accounting for large shares. For instance, during the period 2014-2019, the share of local sources[1] in total primary and secondary school funding varies between 0.39% and 97.63% across school districts, with a mean of 43.3%.

On the other hand, income inequality is high relative to other developed economies and rising in all regions between 2009 and 2019 (panel (b) in Figure 1). Together, these features make the universe of American school districts an appropriate setting to identify causal effects of inequality on redistribution and to shed light on the political economy mechanisms that underlie such effects.

Figure 1: Public education funding and income inequality



(a) (b)

Panel (a) Public education funding (in thoudans of dollars), by region. Source: Annual Survey of School System Finances. Panel (b) School district Gini coefficients, by region. Source: ACS. US Census regions are from 1 to 9: New England, Middle Atlantic, East North Central, West North Central, South Atlantic, East South Central, West South Central, Mountain and Pacific.

Existing theoretical work suggest opposing forces are at work. On the one hand, median voter models pioneered by Meltzer and Richard (1981) highlight the positive effect on inequality on redistribution. On the other hand, seminal political economy models in Bénabou (1996, 2000) suggest more heterogeneous societies may reduce agreement between voters on which public goods to provide and how to fund them. As in many cases private alternatives are within the reach of rich households, their opting out may dovetail with poor households aversion to higher tax burdens, thus giving rise to "ends against the middle" equilibria described, for example, in Epple and Romano (1996). These general arguments are further complicated in the case of public education provision by quantity-quality trade-offs, first studied by de la Croix and Doepke (2009) in a framework with

[1]The largest portion of local funding for public schools comes from property taxes. Each school district has the authority to levy taxes on properties within its boundaries. Tax rates are set by the local government or school board.

endogenous fertility and opting out of public education. Building on the latter, Arcalean and Schiopu (2016) show that keeping the tax base constant, an increase in the spread of the income distribution has non-monotonic effects, depending on the mean income per capita. A mean preserving spread in income increases the mass in the tails of the distribution. Rich families are more likely to opt out of the public education system, thus contributing to a higher spending per pupil in public schools. On the other had, poor households have higher fertility, so an increase in the mass of households of this type decreases the amount of resources available per student. Thus, in rich economies the opting out effects dominates, so public spending per pupil goes up when income inequality increases. The opposite happens in poor economies, where there is an associated increase in public school enrollment that lowers spending per pupil. Similar non-monotonicities arise in Benzidia et al. (2024) for measures of income polarization/kurtosis.

The empirical literature provides a similarly mixed picture. For example, Lindert (1996) finds a negative relationship between inequality and public education spending in a sample of OECD countries. Using U.S. state level data, de la Croix and Doepke (2009) find that higher inequality is positively associated with public spending per student and negatively correlated with public spending per capita. Boustan et al. (2013) and Corcoran and Evans (2009) find that rising inequality within U.S. school districts is associated with higher local revenues per pupil.

Identifying causal effects of changes in the income inequality on redistribution is fraught with difficulties. Some are empirical in nature and range from omitted variable bias in country level data to endogenous sorting across smaller units, such as states or districts. Others, not less important, stem from the reduced-form nature of these attempts that exposes them to model misspecification.

A particular source of concern when studying shifts in income distributions is the distinction between changes in its shape from those in its location. Whereas the former can be traced to various inequality statistics, such as the Gini coefficient, the 90/50 or the 10/50 ratios, the latter are typically identified by including the median or mean income in the estimating regression.

Focusing on the effects of inequality on redistribution, most of the existing empirical work, for example Boustan et al. (2013) and Corcoran and Evans (2009), has focused on the median income per capita as a proxy for the preferences of the decisive voter. However, recent evidence on political participation casts doubts on the validity of this choice, at least in the context of U.S. politics which is relevant for our exercise. Indeed, at both national and local level, political participation indicators such as voter registration and turnout are positively correlated with income but also with socioeconomic status. (Verba et al. (1995), Rosenstone and Hansen (1993), Morlan (1984), Hajnal and Lewis (2003))

From an empirical perspective, these findings imply the voter with the median income is less likely to be decisive. Furthermore, they seem to suggest different theoretical approaches may be needed to describe the complex determination of political equilibria.

Focusing on the political economy of public education provision, probabilistic voting models have been used to shed light on such complexities, from fertility differences and opting out (de la Croix and Doepke (2009)), residential choice (Melindi-Ghidi (2018)) or indeed political power (Arcalean and Schiopu (2016)). In these models, the political economy equilibrium that emerges depends on the mean income per capita, reflecting the tax base, and on some measure of income dispersion owing to the different types of heterogeneity involved. Within this literature, Arcalean and Schiopu (2016) use a model of endogenous fertility and school choice to show that both tax base and inequality changes may have different effects, depending on the mean income per capita in the economy.

Last but not least, in a distribution that is typically positively skewed, as it is the case with the income distribution, the median income is necessarily correlated with any inequality measure. Thus, any change in inequality will also be reflected in the median income while the mean income tracks only changes in total income, which in our context translates as a change in the tax base.

Based on these empirical and theoretical arguments, we conclude that the relevant statistic for the location of the income distribution is the tax base, proxied by the mean income per capita in the economy.

Our findings confirm that controlling for the tax base of the school district is critical in identifying the effect of inequality on redistribution. Different from most recent literature, we first show that, on average, higher income heterogeneity lowers local revenues per student. Results are robust to a variety of specifications and alternative inequality measures. In particular, we show that the decline of local revenues per pupil in the face of higher income dispersion is mirrored by a similar, albeit smaller decline of total current expenditure per per pupil. This suggests that despite the rising importance of state and federal level outlays, local redistribution matters for the funding of public education.

Providing a comprehensive analysis of the mechanisms that could be behind our results is beyond the purpose of this paper. We note, however, that they are consistent with predictions from the endogenous fertility and school choice models deployed in Arcalean and Schiopu (2016) who build on de la Croix and Doepke (2009) to demonstrate heterogeneous effects of inequality on redistribution depending on the average income per capita.

In light of these findings, we study empirically how poor and rich districts respond to higher income inequality. We find that the negative overall response in redistribution is driven by the strong decline within poor districts whereas rich districts display statistically insignificant responses. When we redefine the poverty definition to districts in the lowest quartile, the negative coefficient on inequality roughly doubles in size, in absolute value.

In the following we describe our data and methodology. Next we show the results from the pooled sample, after which we look at heterogeneous effects. Robustness checks and alternative specifications are relegated to the appendix.

2 Data and Methodology

We construct our dataset using three different sources. Education finance data is collected from the annual Survey of School System Finances, which provides detailed financial information (including revenue, expenditure, debt, and assets) for public elementary and secondary school systems across the United States. Economic, demographic, and social covariates is obtained from the American Community Survey – Education Tabulation (ACS-ED). Additionally, we use inequality estimates from the National Historical Geographic Information System (NHGIS). The Local Education Agency Identification Numbers (LEAIDs) were employed to merge these three distinct datasets[2].

The constructed dataset includes three cross-sections covering 5-year periods (2005-2009, 2010-2014, 2015-2019), with each period encompassing 11,877, 12,018, and 11,517 school district observations, respectively [3].

Using this data, we estimate the following equation in first differences:

$$\Delta L_{it} = \beta_0 + \beta 1\ \Delta Ineq_{it} + \beta_2\ \Delta MeanInc_{it} + \beta_3\ \Delta Z_{it} + \beta_4\ X_i + \beta_5\ T_t + \epsilon \qquad (1)$$

where L_{it} represents school district local funding per pupil, $MeanInc_{it}$ and $Ineq_{it}$ are estimates of the mean household income and respectively inequality, Z_{it} is a vector of control variables described below, while X_i and T_t are school district and time fixed effects, respectively. Throughout, errors are clustered at school district level.

The vector of control variables Z_{it} includes the state and federal revenues per student in district i at time t.[4] Given the important skewness in income and expenditure data, all these monetary variables are expressed in logs.

Furthermore, school district size, measured by the number of households is included in addition to a set of socio-demographic variables that have shown to shape local public spending decisions: the share of college educated, the share of over-60 (see Poterba (1997), Harris et al. (2001)), the share of non-white as well as a racial diversity index, computed as a Herfindahl index of population shares (see Alesina et al. (1999), Boustan et al. (2013)).

While first differencing the data removes time invariant unobserved heterogeneities

[2]The Local Education Agency Identification Numbers (LEAIDs) are compatible with the unit identification codes used by the National Center for Education Statistics (NCESIDs).

[3]More details in Appendix

[4]These variables help mitigate other potential biases in the state level policies, such as for example correlations induced by yardstick competition.

in public finance, including district and time fixed effects effectively allows for both national level shocks as well as district specific trends in funding. Finally, given historical differences in initial economic and social conditions across districts, we allow for separate trends in each of the nine Census regions.

We first estimate equation (1) using OLS. However, least squares estimates may be biased due to reverse causality stemming from endogenous sorting across districts. If this is the case, the demographic as well as the economic characteristics of the school districts are likely to be endogenous. The same applies to state and federal funding levels which are, by construction, functions of these characteristics (e.g. poverty level). Additional endogeneity concerns arise from the simultaneity in the determination of the local, state and federal revenues.

To deal with this potentially important issue, we follow a two-step strategy.

First, while our cross-sections cover five year periods due to the limitations of the American Community Survey in small geographies, financial data is available at yearly frequencies. This allows us to mitigate simultaneity concerns by defining our dependent variables in the last year of the five year interval whereas state and federal revenue numbers are defined as five year averages.

Second, we use an instrumental variable strategy to deal with the possibility of endogenous sorting across district lines. In the spirit of shift-share (Bartik) instruments also used in Boustan et al. (2013), we create counterfactual binned income distributions at school district (SD) level that keep the population shares in each bin at their initial levels while allowing the representative income in each bin to grow according to national level trends. These counterfactual distributions therefore capture only the exogenous component of income inequality, due to broader trends in economic activity that have shifted the national income distribution and which individual districts are too small to influence. We now describe briefly the procedure used to construct synthetic income distributions in 2010 and 2015 based on the 2005 data. Further details are included in the appendix. We start by converting the endpoints of the 2005 SD income bins into percentiles of the national income distribution, obtained from 2005 ACS micro-data from IPUMS-USA.[5] The percentiles are then projected onto the 2010 and 2015 national income distributions, again obtained from ACS micro-data, generating new, synthetic income cutoffs. SD level population shares from 2005 are then assigned to the synthetic 2010 and 2015 income brackets. [6]

The Gini coefficients of these counterfactual distributions are used as instruments for

[5]The IPUMS-USA database is provided by Ruggles et al. (2010).

[6]For example, suppose that in a given SD, 12% of the households had an income between $10,000 and $20,000 in 2005. Assume that in the 2005 U.S. income distribution, $10,000 and $20,000 correspond to the $7th$ and the $10th$ percentiles, respectively. In the 2010 U.S. distribution, the $7th$ percentile now corresponds to $15,000 while the $10th$ percentile corresponds to $30,000. Thus, in the synthetic 2010 income distribution of the SD, 12% of the households are assumed to have incomes between $15,000 and $30,000.

the observed ones. The correlation between the synthetic and the actual series is 0.76.

We start by considering the average effects of inequality on redistribution, specifically local revenues per pupil. Next, we follow theoretical results in Arcalean and Schiopu (2016) to consider the possibility of heterogeneous effects depending on the mean household income. Along the way, we present an extensive batch of robustness exercises, including, among others, different local finance variables, different inequality measures and expanded sets of control variables.

3 Results from the pooled sample

In line with the literature, we first focus on the Gini coefficient as a measure of inequality and study its effects on the local revenues per pupil. Columns (1)-(3) of table 1 display least squares estimates. As expected, an increase in the tax base has positive and significant effects on local public finance, with robust coefficients across specifications. Thus an one percent increase in the mean income generates on average an increase of about 0.2 percent in local revenues per pupil. At the same time, higher inequality lowers the growth rate of local revenues per pupil. The negative effect is robust to the inclusion of controls and region specific trends.

Columns (4)-(6) display results from instrumental variable specifications. While both the tax base and the inequality effects maintain their respective signs and significance levels, the coefficient on inequality becomes more negative, moving from -0.27 in column (3) to -0.34 in column (6). Both federal and state level funding have significant effects on local redistribution across specifications, with federal funding acting as substitute while state level revenues complement local revenues. Coefficients are stable, including when allowing for heterogeneous evolutions across Census regions.

Since the Gini coefficient tends to be more sensitive to changes in the middle of the distribution, we use the coefficient of variation (CV) and the log of standard deviation to test the robustness of our results to alternative measures that respond more to changes in the tails. Results in tables 2 and 3 show similarly negative and significant effects on local redistribution in response to higher inequality across both least squares and instrumental variable specifications.

While local revenues per pupil might be lowered by the rise of inequality, total spending per pupil, which is the actual input into the production of human capital could still be unaffected. We therefore re-estimate equation (1) with total current spending per pupil as our dependent variable. Results, displayed in table 4 show the coefficient on total expenditure per pupil is still negative and signifcant, albeit smaller in absolute value. Thus, state and federal level redistribution reduce the impact of inequality on per pupil current expenditure, the latter is still affected negatively by an increase in income dispersion, suggesting changes in local public finance variables have real effects on spending.

Table 1: Local Revenues per Pupil and Income Inequality - Gini

	LS	LS	LS	IV	IV	IV
	(1)	(2)	(3)	(4)	(5)	(6)
Gini	-0.284***	-0.291***	-0.268***	-0.423**	-0.429**	-0.339*
	(-3.942)	(-3.966)	(-3.680)	(-2.458)	(-2.417)	(-1.911)
Mean Income	0.222***	0.226***	0.192***	0.243***	0.247***	0.204***
	(7.997)	(7.939)	(6.624)	(6.600)	(6.375)	(5.057)
Federal Revenue	-0.024***	-0.024***	-0.027***	-0.024***	-0.024***	-0.027***
	(-4.261)	(-4.341)	(-4.455)	(-4.220)	(-4.306)	(-4.432)
State Revenue	0.049***	0.049***	0.050***	0.049***	0.049***	0.050***
	(5.511)	(5.510)	(5.565)	(5.398)	(5.391)	(5.519)
No. of Households	0.006	0.007	0.006	0.008	0.010	0.008
	(0.189)	(0.238)	(0.196)	(0.265)	(0.319)	(0.244)
Share Over 65		-0.055	3.555		2.399	4.830
		(-0.005)	(0.333)		(0.219)	(0.444)
Share College		-2.285	-0.703		-3.758	-1.466
		(-0.245)	(-0.076)		(-0.392)	(-0.154)
Share Non-White		7.706	-5.720		7.977	-5.494
		(0.461)	(-0.346)		(0.478)	(-0.333)
Diversity Index		0.133	0.173		0.134	0.173
		(1.077)	(1.415)		(1.079)	(1.414)
Observations	21208	21208	21208	21208	21208	21208
Time fixed effects	✓	✓	✓	✓	✓	✓
Region fixed effects	✓	✓	✓	✓	✓	✓
Regional trends	✗	✗	✓	✗	✗	✓
R-squared	.094	.096	.13	.014	.016	.013
K-P LM statistic	-	-	-	25.5	25.5	25.3
p-value	-	-	-	4.5e-07	4.4e-07	5.0e-07

Notes: The dependent variable is the change in local public revenues per student, expressed in logs of constant 2019 dollars. Inequality is given by the Gini coefficient at school district level. Covariates include time and school district fixed effects. Mean income, federal revenue, state revenue, and number of households in each school district are in natural logs. For data sources and summary statistics see Appendix A. Standard errors are clustered at school district level and are reported in brackets. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, *** indicates significance at the 1 percent level.

Table 2: Local Revenues per Pupil and Income Inequality - CV

	LS (1)	LS (2)	LS (3)	IV (4)	IV (5)	IV (6)
CV	-0.065***	-0.066***	-0.063***	-0.044**	-0.045**	-0.043**
	(-4.143)	(-4.137)	(-3.946)	(-2.250)	(-2.244)	(-2.160)
Mean Income	0.228***	0.231***	0.199***	0.212***	0.214***	0.183***
	(8.038)	(7.962)	(6.713)	(7.185)	(7.061)	(5.837)
Federal Revenue	-0.024***	-0.025***	-0.027***	-0.024***	-0.025***	-0.027***
	(-4.294)	(-4.374)	(-4.466)	(-4.303)	(-4.381)	(-4.476)
State Revenue	0.050***	0.050***	0.051***	0.050***	0.050***	0.051***
	(5.577)	(5.580)	(5.643)	(5.612)	(5.618)	(5.658)
No. of Households	0.006	0.007	0.006	0.004	0.005	0.004
	(0.178)	(0.224)	(0.189)	(0.131)	(0.172)	(0.134)
Share Over 65	-	-0.262	3.510	-	-1.878	2.004
		(-0.024)	(0.329)		(-0.176)	(0.189)
Share College	-	-2.859	-1.298	-	-1.659	-0.201
		(-0.306)	(-0.140)		(-0.177)	(-0.022)
Share Non-White	-	6.676	-6.569	-	6.828	-6.571
		(0.401)	(-0.400)		(0.409)	(-0.399)
Diveristy Index	-	0.139	0.179	-	0.137	0.177
		(1.133)	(1.466)		(1.111)	(1.452)
Observations	21208	21208	21208	21208	21208	21208
Time fixed effects	✓	✓	✓	✓	✓	✓
SD fixed effects	✓	✓	✓	✓	✓	✓
Regional trends	✗	✗	✓	✗	✗	✓
R-squared	.095	.096	.13	.015	.017	.014
K-P LM statistic	-	-	-	379	377	376
p-value	-	-	-	2.2e-84	5.7e-84	1.0e-83

Notes: The dependent variable is the change in local public revenues per student, expressed in logs of constant 2019 dollars. Inequality is measured as the coefficient of variation (CV) of the school district income distribution. Covariates include time and school district fixed effects. Mean income, federal revenue, state revenue, and number of households in each school district are in natural logs. For data sources and summary statistics see Appendix A. Standard errors are clustered at school district level and are reported in brackets. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, *** indicates significance at the 1 percent level.

4 Heterogeneous effects

We now turn to explore more in depth the link between local redistribution and inequality at different levels of household income levels. For this, we split the sample according to the mean household income in each period, with districts above (below) the median value being labeled rich and poor respectively.

Table 5 contrasts these two subsamples across the same specifications used in table 1. While tax base effects remain positive and similarly sized across income groups, the

Table 3: Local Revenues per Pupil and Income Inequality - Ln(st.dev.)

	LS (1)	LS (2)	LS (3)	IV (4)	IV (5)	IV (6)
Ln SD	-0.063***	-0.064***	-0.060***	-0.040**	-0.041**	-0.041**
	(-4.185)	(-4.212)	(-4.008)	(-1.987)	(-1.974)	(-1.978)
Mean Income	0.293***	0.299***	0.262***	0.253***	0.256***	0.226***
	(7.701)	(7.637)	(6.624)	(5.563)	(5.426)	(4.657)
Federal Revenue	-0.024***	-0.025***	-0.027***	-0.024***	-0.025***	-0.027***
	(-4.296)	(-4.378)	(-4.470)	(-4.305)	(-4.384)	(-4.479)
State Revenue	0.050***	0.050***	0.051***	0.050***	0.050***	0.051***
	(5.542)	(5.542)	(5.603)	(5.587)	(5.592)	(5.629)
No. of Households	0.006	0.008	0.006	0.004	0.006	0.004
	(0.189)	(0.238)	(0.200)	(0.134)	(0.175)	(0.140)
Share Over 65	-	0.357	4.047	-	-1.662	2.348
		(0.033)	(0.380)		(-0.155)	(0.221)
Share College	-	-3.031	-1.443	-	-1.638	-0.283
		(-0.325)	(-0.156)		(-0.174)	(-0.030)
Share Non-White	-	7.178	-6.119	-	7.164	-6.265
		(0.431)	(-0.372)		(0.429)	(-0.380)
Diversity Index	-	0.137	0.177	-	0.135	0.176
		(1.113)	(1.448)		(1.096)	(1.440)
Observations	21208	21208	21208	21208	21208	21208
Time fixed effects	✓	✓	✓	✓	✓	✓
SD fixed effects	✓	✓	✓	✓	✓	✓
Regional trends	✗	✗	✓	✗	✗	✓
R-squared	.095	.096	.13	.015	.017	.014
K-P LM statistic	-	-	-	843	846	842
p-value	-	-	-	2.8e-185	4.9e-186	3.4e-185

Notes: The dependent variable is the change in local public revenues per student, expressed in logs of constant 2019 dollars. Inequality is measured as the standard deviation of the school district income distribution, in constant 2019 dollars, in logs. Covariates include time and school district fixed effects. Mean income, federal revenue, state revenue, and number of households in each school district are in natural log. For data sources and summary statistics see Appendix A. Standard errors are clustered at school district level and are reported in brackets. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, *** indicates significance at the 1 percent level.

response to inequality changes is markedly different in poor and rich districts. Whereas above median income districts still display negative coefficients, they turn our to be insignificant and lower in absolute value. At the same time, the coefficients in below median income districts remain negative and significant. In least squares specifications, they have similar magnitudes in absolute value. However, in specifications that correct for endogeneity, coefficients roughly quadruple in absolute value, relative to their analogues in the pooled sample.

We perform the same sub-sample analysis using the coefficient of variation and the

Table 4: Total Current Expenditure per Pupil and Income Inequality - Gini

	LS (1)	LS (2)	LS (3)	IV (4)	IV (5)	IV (6)
Gini	-0.094***	-0.101***	-0.037	-0.165**	-0.168**	-0.121*
	(-3.145)	(-3.359)	(-1.273)	(-2.264)	(-2.237)	(-1.713)
Mean Income	0.134***	0.138***	0.068***	0.144***	0.147***	0.081***
	(11.915)	(12.010)	(6.135)	(9.924)	(9.720)	(5.345)
Federal Revenue	0.017***	0.016***	-0.006***	0.017***	0.016***	-0.006**
	(6.902)	(6.690)	(-2.636)	(6.950)	(6.731)	(-2.574)
State Revenue	0.033***	0.032***	0.026***	0.032***	0.032***	0.025***
	(8.058)	(8.019)	(6.901)	(7.977)	(7.938)	(6.843)
No. of Households	-0.002	0.002	0.001	-0.001	0.003	0.003
	(-0.155)	(0.151)	(0.074)	(-0.062)	(0.244)	(0.213)
Share Over 65	-	0.075	0.067	-	0.087*	0.083*
		(1.586)	(1.492)		(1.767)	(1.769)
Share College	-	0.001	0.005	-	-0.006	-0.003
		(0.016)	(0.144)		(-0.149)	(-0.080)
Share Non-White	-	0.462***	0.203***	-	0.462***	0.205***
		(6.421)	(3.505)		(6.423)	(3.524)
Diveristy Index	-	-0.272***	-0.153***	-	-0.271***	-0.152***
		(-5.261)	(-3.524)		(-5.243)	(-3.511)
Observations	21244	21244	21244	21244	21244	21244
Time fixed effects	✓	✓	✓	✓	✓	✓
Region fixed effects	✓	✓	✓	✓	✓	✓
Regional trends	✗	✗	✓	✗	✗	✓
R-squared	.32	.32	.43	.032	.039	.013
K-P LM statistic	-	-	-	667	656	668
p-value	-	-	-	4.1e-147	1.1e-144	3.3e-147

Notes: The dependent variable is the change in total current expenditure per student, expressed in logs of constant 2019 dollars. Inequality is given by the Gini coefficient at school district level. Covariates include time and school district fixed effects. Mean income, federal revenue, state revenue, and number of households in each school district are in natural logs. For data sources and summary statistics see Appendix A. Standard errors are clustered at school district level and are reported in brackets. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, *** indicates significance at the 1 percent level.

standard deviation as alternative measures of inequality. Tables 7 and 8 in appendix C.2 bring additional evidence on the heterogeneous response of redistribution to the rise in income dispersion. For both measures, it is the lower income districts that drive the negative effect.

Next, we consider a different threshold in our definition of rich and poor districts. In particular, we define as poor districts below the 1st income quartile. Results, reported in tables 9-11 in appendix C.2 strengthen our finding on the existence of heterogeneous effects. Focusing on changes in the Gini coefficient, districts in the poorest quartile show a negative and significant effect which is twice as large as the effect among the

Table 5: Local Revenues per Pupil and Income Inequality (Gini) - Heterogeneous Effects

	LS Poor	IV Poor	LS Rich	IV Rich	LS Poor	IV Poor	LS Rich	IV Rich
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Gini	-0.244***	-0.818**	-0.109	-0.296	-0.211**	-0.825**	-0.058	-0.199
	(-2.918)	(-2.454)	(-1.285)	(-1.394)	(-2.527)	(-2.418)	(-0.680)	(-0.934)
Mean Income	0.249***	0.256***	0.256***	0.280***	0.226***	0.242***	0.215***	0.246***
	(7.277)	(4.129)	(6.729)	(4.908)	(6.487)	(3.721)	(5.654)	(4.190)
No. of Households	-0.060**	0.029	-0.041	-0.019	-0.067**	0.025	-0.053	-0.012
	(-1.982)	(0.603)	(-1.328)	(-0.381)	(-2.180)	(0.507)	(-1.640)	(-0.232)
Federal Revenue	-0.021**	0.011	-0.041***	-0.050***	-0.019*	0.009	-0.042***	-0.046***
	(-2.370)	(1.004)	(-6.272)	(-7.175)	(-1.953)	(0.749)	(-6.072)	(-6.347)
State Revenue	0.009	0.054***	0.011	0.041***	-0.001	0.047**	0.015*	0.046***
	(0.605)	(2.781)	(1.302)	(3.728)	(-0.074)	(2.327)	(1.765)	(4.146)
Share Over 65	33.348***	15.953	8.799	-18.486	38.986***	19.996	5.852	-14.697
	(3.256)	(0.955)	(0.745)	(-1.026)	(3.823)	(1.197)	(0.498)	(-0.825)
Share College	-1.903	-6.495	-5.899	2.876	-1.042	-7.684	-1.173	6.292
	(-0.157)	(-0.372)	(-0.637)	(0.233)	(-0.086)	(-0.440)	(-0.127)	(0.519)
Share Non-White	-12.817	-26.086	52.278***	81.205***	-13.967	-26.393	18.145	36.469
	(-0.876)	(-1.215)	(3.328)	(3.368)	(-0.957)	(-1.225)	(1.171)	(1.521)
Diveristy Index	0.204*	0.420**	-0.292**	-0.409**	0.208*	0.381**	-0.090	-0.188
	(1.803)	(2.486)	(-2.463)	(-2.299)	(1.832)	(2.245)	(-0.761)	(-1.067)
Observations	10972	8830	11278	9160	10972	8830	11278	9160
Time fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
SD fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
Regional trends	✗	✗	✗	✗	✓	✓	✓	✓
R-squared	.045	.01	.065	.033	.063	.0069	.097	.027
K-P LM statistic	-	201	-	358	-	205	-	358
p-value	-	1.3e-45	-	7.0e-80	-	2.1e-46	-	6.6e-80

Notes: The dependent variable is the change in local public revenues per student, expressed in logs of constant 2019 dollars. Districts are split into Rich and Poor according to the mean income per capita falling above or below the median value every year. Inequality is given by the Gini coefficient at school district level. Covariates include time and school district fixed effects. mean income, federal revenue, state revenue, and number of households in each school district are in natural log. For data sources and summary statistics see Appendix A. Standard errors are clustered at school district level and are reported in brackets. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, *** indicates significance at the 1 percent level.

below median districts. Again, this result holds across specifications and all our three inequality measures.

Taken together, results so far lead us to conclude that the overall negative response to higher inequality is the result of muted responses in rich districts that become negative and significant as average income per capita declines.

Our results are in stark contrast with previous literature estimating the effect of changes in Gini coefficients controlling for the median income per capita. We therefore re-estimate equation (1) adding the median income per capita as a control. Tables 12 - 17 show that irrespective of the measure used, the sign and magnitude of the inequality coefficients do not change while the median has an insignificant coefficient conditional on the mean income per capita.

5 Conclusion

In this paper we take a fresh look at the question of inequality and redistribution. Using the case of U.S. school districts over the period 2005-2019, we make three contributions. First, we collect empirical and theoretical arguments from recent literature to argue that the mean income per capita should be included in the estimating equation in order to properly identify the effect of inequality. Second, we show that this effect is negative and significant, in other words redistribution is reduced in the face of higher income dispersion. Not only do local revenues per pupil decline, but, despite the significant and increasing weight of state and federal funding, total current expenditure per pupil is lowered too, pointing at real effects on the provision of public education services. Adding the median income per capita in the school district to the estimation fails to change the sign of the inequality coefficient, while the median income itself remains insignificant conditional on the tax base being controlled for.

Considering the possibility of heterogeneous effects, we further show the average effect is driven by the strong negative response in redistribution in poor school districts, defined as those with an average income per capita below the median value and muted, insignificant responses in richer school districts. Redefining the poverty threshold to include just districts in the lowest quartile, the negative coefficient on inequality doubles in size, in absolute value, which points at a gradual worsening of local redistribution as the income per capita declines.

We emphasize that our causal estimates are consistent with the non-monotonic effects demonstrated in recent theoretical work highlighting opting out and differential fertility choices across income groups. Thus, our research has implications for the design of equitable education funding policies, against the background of persistent achievement gaps by socioeconomic status. On a more general note, our results invite a closer look at other redistribution policies deployed in the face of higher income inequality.

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A Data

Table 6: Summary Statistics

	mean	median	sd	min	max
Mean income by school district	78595.61	69891.49	33063.46	26079.00	466343.00
Median income by school district	62052.40	56053.13	24560.48	14438.00	296177.20
Local Rev. / Student	6634.68	5132.84	5294.77	0	121717.60
Federal Rev. / Student	1301.97	1024.40	1520.95	2.77	105736.36
State Rev. / Student	6823.79	6296.87	3529.56	90.15	94259.42
Share of Public Ed. Enroll.	0.90	0.91	0.07	0.04	1
Diversity Index	0.21	0.15	0.17	0	0.77
Gini Index	0.42	0.42	0.05	0.26	0.71
N. Households	10304	3517	43215	42	3167034
Share over 65	0.16	0.16	0.05	0	0.71
Share with college	0.15	0.13	0.08	0	0.51
Share non-white	0.15	0.08	0.17	0	1
Observations	35412				

A.1 Public elementary-secondary education finance

- Data on public elementary-secondary education finance for the years 2005-2019 is collected from the Annual Survey of School System Finances.
- The variables of interest in this data set are :
  - NCESID: NCES Identification Number
  - NAME: School System Name
  - YRDATA: Year of Data
  - ENROLL: Fall Membership (numbers of students)
  - TFEDREV: Total Revenue from Federal Sources
  - TSTREV:Total Revenue from State Sources
  - TLOCREV: Total Revenue from Local Sources
  - TCURELSC: Total current spending for elementary-secondary programs.
  - PPCSTOT: per pupil - Total current spending (Elementary Secondary). Note that this variable is not available for all years. We compute it when missing, following this equation $PPCSTOT = (TCURELSC/ENROLL) * 1000$
- Variables are aggregated by 5 year periods (2005-2009, 2010-2014, and 2015-2019)

A.2 American Community Survey – Education Tabulation (ACS-ED)

- Geographic coverage: school district.
- Three 5-year periods 2005-2009, 2010-2015, and 2016-2019.
- Provides economic, demographic, and social data.
  - The economic variables are mean/median income, and The number of households by 10 income bracket (less than $10,000, $10,000 to $14,999, $15,000 to $24,999, $25,000 to $34,999, $35,000 to $49,999, $50,000 to $74,999, $75,000 to $99,999, $100,000 to $149,999, $150,000 to $199,999, and $200,000 or more)
  - The demographic variables used are share of people older than 65 years, share of nonwhite, and Diversity index. These variables are computed using the SEX & Age, and Race estimates available in the Total Population universe.
  - The social variable used is share with college in population 25 and over. This variable is computed using education attainment estimates in the Total Population universe. Additionally, public enrollment share at school district level is calculated using total and public enrollment from the children universe.

A.3 National Historical Geographic Information System (NHGIS)

- Geographic coverage: school district.
- three 5 years periods 2005-2009, 2010-2015, and 2016-2019.
- Provides economic data.
  - The economic variables are median income, aggregate household income, household income quintile upper limits/Lower Limit of Top 5 Percent, mean household income of quintiles/mean income of top 5 Percent, shares of aggregate household income by quintile/top 5 Percent Shares of Aggregate Household Income, gini index of income inequality, and the number of households by 16 income brackets (Less than $10,000, $10,000 to $14,999, $15,000 to $19,999, $20,000 to $24,999, $25,000 to $29,999, $30,000 to $34,999, $35,000 to $39,999, $40,000 to $44,999, $45,000 to $49,999, $50,000 to $59,999, $60,000 to $74,999, $75,000 to $99,999, $100,000 to $124,999, $125,000 to $149,999, $150,000 to $199,999, $200,000 or more). The mean household income by school district is computed using the total number of households and the aggregate household income in the district.

This dataset enables computing more accurate inequality estimates due to its increased number of bins. The availability of additional variables allows for the creation of finer bins, ultimately leading to more precise synthetic inequality measures.

A.4 Consumer Price Index for All Urban Consumers Retrospective Series

All dollar measures are inflated using the R-CPI-U-RS produced by the U.S. Bureau of Labor Statistics.

B Construction of synthetic inequality instrument

The synthetic inequality instrument is constructed following these steps:

- The endpoints of each of the income bins, describing the income distribution at the school district level in the period 2005-2009, are transformed into the percentiles of the aggregate US household income distribution in 2010-2014, and 2015-2019.

- For each district the population counts in bins from the 2005-2009 ACS are stored. The midpoint of each bin is assumed as the representative income for that bin. The top (open-ended) bin is assigned an income consistent with the grand mean.

  It should be noted that depending on the data set used to compute the synthetic controls, different strategies are applied to assign the "midpoint" of the top open-ended bin.

  When using the ACS-ED, the bin is assigned an income consistent with the grand mean. For this end, aggregate household income for the last bin is estimated and divided by the bin‘s population count. In few cases, this output is below 200,000, so it is replaced with 1.4 * 200,000 (see Autor et al. 2008, Lemieux 2006, von Hippel et al. 2017). If the population is zero, the midpoint is set as the lower bound of the bin.

  When using NHGIS, the additional data points (namely the lower limit and the mean Household Income of the top 5 percent) are utilized to enhance the granularity and accuracy of the last bin midpoint. Mainly to compute the shape parameter of the Pareto distribution α. subsequently, if the lower limit of the top bin (let's call it x_m) is greater than 200,000, the midpoint is the median $x = x_m * 2^{(1/alpha)}$. If the scale parameter x_m of the Pareto distribution is less than \$200,000, then to find the midpoint of the top bin, we compute the cumulative probability associated with the value \$200,000 by solving the equation $200,000 = x_m \cdot (1 - F(200,000))^{-\frac{1}{\alpha}}$. Once $F(200,000)$ is determined, the cumulative probability associated with the midpoint of the top bin is calculated by $F(x) = \frac{1+F(200{,}000)}{2}$. Finally, we calculate the value in the distribution corresponding to the cumulative probability $F(x)$ as follows $x = x_m \cdot (1 - F(x))^{-\frac{1}{\alpha}}$.

- The median income for each bin in the 2005-2009 national income distribution is found and the maximum observed value is used to pin down the median in the top bin. The percentiles corresponding to bin ends and the computed bins' medians are stored.

- The percentiles are then mapped to their dollar equivalents on the US household income distribution for the 5 years periods (2010-2014, and 2015-2019) separately.

- New median income levels between the "equivalent" cutoffs are computed. And the empirical maximum is used to pin down the median in the top bin.

- Growth rates in these median incomes are computed relative to 2005-2009 levels.

- Using district midpoint incomes in 2005-2009 and bin-specific growth rates, synthetic incomes for 2010-2014 and 2015-2019 are calculated. Finally, Ginis and other inequality statistics (r9050, r1050, median, mean, and sd) are derived using the **ineqdeco** package.

C Robustness

C.1 Results by Rich and Poor (above/below median income)

Table 7: Local Revenues per Pupil and Income Inequality (CV) - Heterogeneous Effects

	LS Poor	IV Poor	LS Rich	IV Rich	LS Poor	IV Poor	LS Rich	IV Rich
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CV	-0.061***	-0.069***	-0.012	-0.043	-0.053***	-0.067**	0.000	-0.042
	(-4.004)	(-2.594)	(-0.581)	(-1.180)	(-3.544)	(-2.508)	(0.006)	(-1.156)
Mean Income	0.266***	0.208***	0.245***	0.255***	0.242***	0.191***	0.205***	0.237***
	(7.466)	(4.257)	(6.498)	(5.254)	(6.663)	(3.762)	(5.410)	(4.768)
No. of Households	-0.059*	0.023	-0.042	-0.023	-0.066**	0.018	-0.053*	-0.014
	(-1.956)	(0.479)	(-1.361)	(-0.456)	(-2.151)	(0.366)	(-1.665)	(-0.283)
Observations	10972	8830	11278	9160	10972	8830	11278	9160
Time fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
SD fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
Regional trends	✗	✗	✗	✗	✓	✓	✓	✓
Funding controls	✓	✓	✓	✓	✓	✓	✓	✓
Demographic controls	✓	✓	✓	✓	✓	✓	✓	✓
R-squared	.046	.016	.065	.032	.064	.013	.097	.027
K-P LM statistic	-	204	-	238	-	207	-	242
p-value	-	2.4e-46	-	1.1e-53	-	7.4e-47	-	1.7e-54

Notes: The dependent variable is the change in local public revenues per student, expressed in logs of constant 2019 dollars. Districts are split into Rich and Poor according to the mean income per capita falling above or below the median value every year. Inequality is measured as the coefficient of variation (CV) of the school district income distribution. Covariates include time and school district fixed effects. mean income, federal revenue, state revenue, and number of households in each school district are in natural log. For data sources and summary statistics see Appendix A. Standard errors are clustered at school district level and are reported in brackets. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, *** indicates significance at the 1 percent level.

Table 8: Local Revenues per Pupil and Income Inequality (ln(st.dev.)) - Heterogeneous Effects

	LS Poor (1)	IV Poor (2)	LS Rich (3)	IV Rich (4)	LS Poor (5)	IV Poor (6)	LS Rich (7)	IV Rich (8)
Ln SD	-0.063***	-0.073**	-0.013	-0.024	-0.056***	-0.071**	-0.001	-0.028
	(-4.019)	(-2.378)	(-0.684)	(-0.769)	(-3.573)	(-2.272)	(-0.069)	(-0.877)
Mean Income	0.334***	0.289***	0.260***	0.272***	0.301***	0.267***	0.208***	0.260***
	(7.378)	(3.923)	(5.294)	(3.910)	(6.581)	(3.523)	(4.190)	(3.640)
No. of Households	-0.059*	0.023	-0.041	-0.023	-0.066**	0.017	-0.053*	-0.014
	(-1.959)	(0.475)	(-1.356)	(-0.455)	(-2.158)	(0.359)	(-1.664)	(-0.278)
Observations	10972	8830	11278	9160	10972	8830	11278	9160
Time fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
SD fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
Regional trends	✗	✗	✗	✗	✓	✓	✓	✓
Funding controls	✓	✓	✓	✓	✓	✓	✓	✓
Demographic controls	✓	✓	✓	✓	✓	✓	✓	✓
R-squared	.046	.016	.065	.032	.064	.013	.097	.026
K-P LM statistic	-	377	-	398	-	380	-	406
p-value	-	5.6e-84	-	1.6e-88	-	1.6e-84	-	2.5e-90

Notes: The table shows estimates The dependent variable is the change in local public revenues per student, expressed in logs of constant 2019 dollars. Districts are split into Rich and Poor according to the mean income per capita falling above or below the median value every year. Inequality is measured as the standard deviation of the school district income distribution, in constant 2019 dollars, in logs. Covariates include time and school district fixed effects. mean income, federal revenue, state revenue, and number of households in each school district are in natural log. For data sources and summary statistics see Appendix A. Standard errors are clustered at school district level and are reported in brackets. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, *** indicates significance at the 1 percent level.

C.2 Heterogeneous Effects with Alternative Income Threshold (Above/Below First Quartile)

Table 9: Local Revenues per Pupil and Income Inequality (Gini)

	LS Poor	IV Poor	LS Rich	IV Rich	LS Poor	IV Poor	LS Rich	IV Rich
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Gini	-0.393***	-1.466**	-0.113*	-0.275	-0.375***	-1.609**	-0.064	-0.155
	(-3.395)	(-2.296)	(-1.650)	(-1.506)	(-3.277)	(-2.425)	(-0.934)	(-0.852)
Mean Income	0.154***	0.289***	0.292***	0.276***	0.153***	0.324***	0.248***	0.225***
	(3.612)	(2.968)	(9.516)	(6.094)	(3.549)	(3.129)	(8.040)	(4.800)
No. of Households	-0.045	0.022	-0.052**	-0.010	-0.044	0.045	-0.065***	-0.020
	(-1.048)	(0.261)	(-2.136)	(-0.291)	(-1.014)	(0.529)	(-2.585)	(-0.549)
Observations	5406	3678	16844	14582	5406	3678	16844	14582
Time fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
SD fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
Regional trends	✗	✗	✗	✗	✓	✓	✓	✓
Funding controls	✓	✓	✓	✓	✓	✓	✓	✓
Demographic controls	✓	✓	✓	✓	✓	✓	✓	✓
R-squared	.045	.0053	.06	.027	.069	-.00014	.085	.022
K-P LM statistic	-	86.7	-	486	-	89.5	-	484
p-value	-	1.3e-20	-	8.6e-108	-	3.1e-21	-	2.8e-107

Notes: The table shows estimates The dependent variable is the change in local public revenues per student, expressed in logs of constant 2019 dollars. Districts are split into Rich and Poor according to the mean income per capita falling above or below the first quartile every year. Inequality is given by the Gini coefficient at school district level. Covariates include time and school district fixed effects. mean income, federal revenue, state revenue, and number of households in each school district are in natural log. For data sources and summary statistics see Appendix A. Standard errors are clustered at school district level and are reported in brackets. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, *** indicates significance at the 1 percent level.

Table 10: Local Revenues per Pupil and Income Inequality (CV)

	LS Poor (1)	IV Poor (2)	LS Rich (3)	IV Rich (4)	LS Poor (5)	IV Poor (6)	LS Rich (7)	IV Rich (8)
CV	-0.074***	-0.115***	-0.026*	-0.023	-0.071***	-0.123***	-0.015	-0.018
	(-3.619)	(-2.715)	(-1.841)	(-0.939)	(-3.476)	(-2.845)	(-1.047)	(-0.713)
Mean Income	0.167***	0.228***	0.293***	0.246***	0.165***	0.250***	0.249***	0.211***
	(3.744)	(3.085)	(9.501)	(6.683)	(3.659)	(3.285)	(8.022)	(5.560)
No. of Households	-0.044	0.023	-0.053**	-0.015	-0.043	0.045	-0.066***	-0.022
	(-1.015)	(0.265)	(-2.177)	(-0.412)	(-0.980)	(0.532)	(-2.613)	(-0.621)
Observations	5406	3678	16844	14582	5406	3678	16844	14582
Time fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
SD fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
Regional trends	✗	✗	✗	✗	✓	✓	✓	✓
Funding controls	✓	✓	✓	✓	✓	✓	✓	✓
Demographic controls	✓	✓	✓	✓	✓	✓	✓	✓
R-squared	.045	.028	.06	.026	.069	.028	.085	.021
K-P LM statistic	-	123	-	198	-	127	-	195
p-value	-	1.3e-28	-	5.8e-45	-	1.7e-29	-	3.1e-44

Notes: The dependent variable is the change in local public revenues per student, expressed in logs of constant 2019 dollars. Districts are split into Rich and Poor according to the mean income per capita falling above or below the first quartile every year. Inequality is measured as the standard deviation of the school district income distribution, in constant 2019 dollars, in logs. Covariates include time and school district fixed effects. mean income, federal revenue, state revenue, and number of households in each school district are in natural log. For data sources and summary statistics see Appendix A. Standard errors are clustered at school district level and are reported in brackets. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, *** indicates significance at the 1 percent level.

Table 11: Local Revenues per Pupil and Income Inequality - ln (st.dev.)

	LS Poor (1)	IV Poor (2)	LS Rich (3)	IV Rich (4)	LS Poor (5)	IV Poor (6)	LS Rich (7)	IV Rich (8)
Ln SD	-0.086***	-0.122**	-0.024*	-0.020	-0.081***	-0.133***	-0.013	-0.017
	(-4.003)	(-2.487)	(-1.721)	(-0.832)	(-3.871)	(-2.638)	(-0.929)	(-0.722)
Mean Income	0.261***	0.352***	0.317***	0.267***	0.254***	0.387***	0.261***	0.230***
	(4.620)	(3.108)	(7.951)	(4.854)	(4.439)	(3.288)	(6.496)	(4.093)
No. of Households	-0.044	0.019	-0.053**	-0.014	-0.043	0.041	-0.066***	-0.022
	(-1.025)	(0.221)	(-2.168)	(-0.403)	(-0.991)	(0.483)	(-2.609)	(-0.608)
Observations	5406	3678	16844	14582	5406	3678	16844	14582
Time fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
SD fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
Regional trends	✗	✗	✗	✗	✓	✓	✓	✓
Funding controls	✓	✓	✓	✓	✓	✓	✓	✓
Demographic controls	✓	✓	✓	✓	✓	✓	✓	✓
R-squared	.046	.029	.06	.026	.07	.029	.085	.021
K-P LM statistic	-	212	-	517	-	220	-	511
p-value	-	5.9e-48	-	2.1e-114	-	9.2e-50	-	4.3e-113

Notes: The dependent variable is the change in local public revenues per student, expressed in logs of constant 2019 dollars. Inequality is measured as the standard deviation of the school district income distribution, in constant 2019 dollars, in logs. Districts are split into Rich and Poor according to the mean income per capita falling above or below the first quartile every year. Covariates include time and school district fixed effects. mean income, federal revenue, state revenue, and number of households in each school district are in natural log. For data sources and summary statistics see Appendix A. Standard errors are clustered at school district level and are reported in brackets. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, *** indicates significance at the 1 percent level.

C.3 Controlling for the median income in the school district

Table 12: Local Revenues per Pupil and Income Inequality (Gini)

	LS Poor (1)	IV Poor (2)	LS Rich (3)	IV Rich (4)	LS Poor (5)	IV Poor (6)	LS Rich (7)	IV Rich (8)
Gini	-0.352*	-1.337*	-0.416**	-0.615	-0.336*	-1.364**	-0.381**	-0.411
	(-1.879)	(-1.954)	(-2.359)	(-1.031)	(-1.806)	(-1.991)	(-2.194)	(-0.732)
Mean Income	0.182**	0.519**	0.373***	0.447	0.162*	0.515**	0.346***	0.357
	(2.169)	(2.011)	(3.935)	(1.483)	(1.930)	(1.964)	(3.715)	(1.406)
Median Income	0.021	-0.273	-0.111	-0.174	0.022	-0.284	-0.106	-0.115
	(0.303)	(-1.182)	(-1.371)	(-0.832)	(0.316)	(-1.243)	(-1.346)	(-0.551)
Observations	8830	8830	9160	9160	8830	8830	9160	9160
Time fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
SD fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
Regional trends	✗	✗	✗	✗	✓	✓	✓	✓
Funding controls	✓	✓	✓	✓	✓	✓	✓	✓
Demographic controls	✓	✓	✓	✓	✓	✓	✓	✓
R-squared	.08	.0047	.13	.033	.1	.0007	.18	.027
K-P LM statistic	-	20.4	-	18.3	-	20.2	-	18.5
p-value	-	6.2e-06	-	.000019	-	6.9e-06	-	.000017

Notes: The dependent variable is the change in local public revenues per student, expressed in logs of constant 2019 dollars. Districts are split into Rich and Poor according to the mean income per capita falling above or below the median value every year. Inequality is measured as the Gini coefficient of the school district income distribution. Covariates include time and school district fixed effects. mean income, federal revenue, state revenue, and number of households in each school district are in natural log. For data sources and summary statistics see Appendix A. Standard errors are clustered at school district level and are reported in brackets. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, *** indicates significance at the 1 percent level.

Table 13: Local Revenues per Pupil and Income Inequality (CV)

	LS Poor	IV Poor	LS Rich	IV Rich	LS Poor	IV Poor	LS Rich	IV Rich
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CD	-0.073***	-0.062*	-0.076*	-0.053	-0.070**	-0.061*	-0.073*	-0.054
	(-2.579)	(-1.948)	(-1.949)	(-0.853)	(-2.476)	(-1.944)	(-1.883)	(-0.965)
Mean Income	0.194**	0.173*	0.313***	0.284*	0.173**	0.158	0.295***	0.271**
	(2.536)	(1.832)	(3.879)	(1.748)	(2.260)	(1.605)	(3.706)	(2.296)
Median Income	0.025	0.041	-0.061	-0.036	0.027	0.038	-0.064	-0.044
	(0.447)	(0.487)	(-0.869)	(-0.374)	(0.473)	(0.470)	(-0.936)	(-0.455)
Observations	8830	8830	9160	9160	8830	8830	9160	9160
Time fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
SD fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
Regional trends	✗	✗	✗	✗	✓	✓	✓	✓
Funding controls	✓	✓	✓	✓	✓	✓	✓	✓
Demographic controls	✓	✓	✓	✓	✓	✓	✓	✓
R-squared	.081	.016	.13	.033	.1	.013	.18	.027
K-P LM statistic	-	20.4	-	22.3	-	20.4	-	22.3
p-value	-	6.3e-06	-	2.4e-06	-	6.4e-06	-	2.4e-06

Notes: The dependent variable is the change in local public revenues per student, expressed in logs of constant 2019 dollars. Districts are split into Rich and Poor according to the mean income per capita falling above or below the median value every year. Inequality is measured as the coefficient of variation (CV) of the school district income distribution. Covariates include time and school district fixed effects. mean income, federal revenue, state revenue, and number of households in each school district are in natural log. For data sources and summary statistics see Appendix A. Standard errors are clustered at school district level and are reported in brackets. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, *** indicates significance at the 1 percent level.

Table 14: Local Revenues per Pupil and Income Inequality - ln (st.dev.)

	LS Poor (1)	IV Poor (2)	LS Rich (3)	IV Rich (4)	LS Poor (5)	IV Poor (6)	LS Rich (7)	IV Rich (8)
ln SD	-0.083***	-0.067	-0.066*	-0.029	-0.078***	-0.065*	-0.067**	-0.037
	(-2.726)	(-1.626)	(-1.939)	(-0.508)	(-2.607)	(-1.647)	(-1.965)	(-0.740)
Mean Income	0.300***	0.255*	0.383***	0.291	0.272***	0.235	0.370***	0.297*
	(2.895)	(1.766)	(3.456)	(1.276)	(2.631)	(1.626)	(3.381)	(1.712)
Median Income	0.009	0.031	-0.064	-0.017	0.012	0.030	-0.071	-0.034
	(0.152)	(0.334)	(-0.911)	(-0.173)	(0.202)	(0.329)	(-1.039)	(-0.338)
Observations	8830	8830	9160	9160	8830	8830	9160	9160
Time fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
SD fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
Regional trends	✗	✗	✗	✗	✓	✓	✓	✓
Funding controls	✓	✓	✓	✓	✓	✓	✓	✓
Demographic controls	✓	✓	✓	✓	✓	✓	✓	✓
R-squared	.081	.016	.13	.032	.1	.013	.18	.027
K-P LM statistic	-	21.6	-	21.9	-	21.6	-	21.9
p-value	-	3.3e-06	-	2.9e-06	-	3.4e-06	-	2.8e-06

Notes: The dependent variable is the change in local public revenues per student, expressed in logs of constant 2019 dollars. Districts are split into Rich and Poor according to the mean income per capita falling above or below the median value every year. Inequality is measured as the standard deviation of the school district income distribution, in constant 2019 dollars, in logs. Covariates include time and school district fixed effects. mean income, federal revenue, state revenue, and number of households in each school district are in natural log. For data sources and summary statistics see Appendix A. Standard errors are clustered at school district level and are reported in brackets. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, *** indicates significance at the 1 percent level.

C.4 Controlling for the Median Income in the School District (Alternative Income Threshold)

Table 15: Local Revenues per Pupil and Income Inequality (Gini)

	LS Poor (1)	IV Poor (2)	LS Rich (3)	IV Rich (4)	LS Poor (5)	IV Poor (6)	LS Rich (7)	IV Rich (8)
Gini	-0.559*	-2.568*	-0.245*	-0.376	-0.626**	-2.823**	-0.626**	-0.114
	(-1.935)	(-1.872)	(-1.874)	(-0.891)	(-2.156)	(-2.004)	(-2.156)	(-0.273)
Mean Income	0.208	0.852*	0.279***	0.328**	0.240*	0.945**	0.240*	0.204
	(1.639)	(1.857)	(4.148)	(1.993)	(1.879)	(2.013)	(1.879)	(1.241)
Median Income	-0.019	-0.600	-0.012	-0.053	-0.033	-0.666	-0.033	0.022
	(-0.179)	(-1.472)	(-0.208)	(-0.383)	(-0.315)	(-1.608)	(-0.315)	(0.157)
Observations	3678	3678	14582	14582	3678	3678	3678	14582
Time fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
SD fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
Regional trends	✗	✗	✗	✗	✓	✓	✓	✓
Funding controls	✓	✓	✓	✓	✓	✓	✓	✓
Demographic controls	✓	✓	✓	✓	✓	✓	✓	✓
R-squared	.087	-.014	.11	.027	.12	-.023	.12	.022
K-P LM statistic	-	82.8	-	284	-	82.2	-	283
p-value	-	9.1e-20	-	1.2e-63	-	1.2e-19	-	1.5e-63

Notes: The dependent variable is the change in local public revenues per student, expressed in logs of constant 2019 dollars. Districts are split into Rich and Poor according to the mean income per capita falling above or below the first quartile every year. Inequality is measured as the Gini coefficient of the school district income distribution. Covariates include time and school district fixed effects. mean income, federal revenue, state revenue, and number of households in each school district are in natural log. For data sources and summary statistics see Appendix A. Standard errors are clustered at school district level and are reported in brackets. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, *** indicates significance at the 1 percent level.

Table 16: Local Revenues per Pupil and Income Inequality (CV)

	LS Poor (1)	IV Poor (2)	LS Rich (3)	IV Rich (4)	LS Poor (5)	IV Poor (6)	LS Rich (7)	IV Rich (8)
CD	-0.106***	-0.118**	-0.044*	-0.012	-0.114***	-0.127**	-0.114***	-0.007
	(-2.615)	(-2.210)	(-1.690)	(-0.376)	(-2.783)	(-2.357)	(-2.783)	(-0.210)
Mean Income	0.225**	0.246*	0.251***	0.206***	0.251**	0.274**	0.251**	0.171***
	(2.060)	(1.807)	(4.382)	(3.223)	(2.285)	(2.016)	(2.285)	(2.676)
Median Income	-0.005	-0.022	0.013	0.050	-0.010	-0.027	-0.010	0.049
	(-0.064)	(-0.207)	(0.264)	(0.910)	(-0.124)	(-0.269)	(-0.124)	(0.907)
Observations	3678	3678	14582	14582	3678	3678	3678	14582
Time fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
SD fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
Regional trends	✗	✗	✗	✗	✓	✓	✓	✓
Funding controls	✓	✓	✓	✓	✓	✓	✓	✓
Demographic controls	✓	✓	✓	✓	✓	✓	✓	✓
R-squared	.09	.028	.11	.026	.12	.028	.12	.021
K-P LM statistic	-	137	-	169	-	138	-	167
p-value	-	1.5e-31	-	1.3e-38	-	9.3e-32	-	3.4e-38

Notes: The dependent variable is the change in local public revenues per student, expressed in logs of constant 2019 dollars. Districts are split into Rich and Poor according to the mean income per capita falling above or below first quartile every year. Inequality is measured as the coefficient of variation (CV) of the school district income distribution. Covariates include time and school district fixed effects. mean income, federal revenue, state revenue, and number of households in each school district are in natural log. For data sources and summary statistics see Appendix A. Standard errors are clustered at school district level and are reported in brackets. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, *** indicates significance at the 1 percent level.

Table 17: Local Revenues per Pupil and Income Inequality - ln(st.dev.)

	LS Poor	IV Poor	LS Rich	IV Rich	LS Poor	IV Poor	LS Rich	IV Rich
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln SD	-0.131***	-0.128**	-0.040*	-0.006	-0.139***	-0.141**	-0.139***	-0.005
	(-2.986)	(-1.982)	(-1.701)	(-0.177)	(-3.166)	(-2.153)	(-3.166)	(-0.140)
Mean Income	0.397***	0.386*	0.296***	0.204**	0.430***	0.433**	0.430***	0.174*
	(2.713)	(1.853)	(3.767)	(2.042)	(2.906)	(2.065)	(2.906)	(1.733)
Median Income	-0.038	-0.033	0.010	0.056	-0.043	-0.044	-0.043	0.051
	(-0.437)	(-0.285)	(0.202)	(0.948)	(-0.495)	(-0.391)	(-0.495)	(0.863)
Observations	3678	3678	14582	14582	3678	3678	3678	14582
Time fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
SD fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
Regional trends	✗	✗	✗	✗	✓	✓	✓	✓
Funding controls	✓	✓	✓	✓	✓	✓	✓	✓
Demographic controls	✓	✓	✓	✓	✓	✓	✓	✓
R-squared	.092	.029	.11	.026	.13	.029	.13	.021
K-P LM statistic	-	197	-	460	-	199	-	456
p-value	-	8.3e-45	-	4.3e-102	-	3.6e-45	-	2.9e-101

Notes:The dependent variable is the change in local public revenues per student, expressed in logs of constant 2019 dollars. Districts are split into Rich and Poor according to the mean income per capita falling above or below first quartile every year. Inequality is measured as the standard deviation of the school district income distribution, in constant 2019 dollars, in logs. Covariates include time and school district fixed effects. Mean income, federal revenue, state revenue, and number of households in each school district are in natural log. For data sources and summary statistics see Appendix A. Standard errors are clustered at school district level and are reported in brackets. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, *** indicates significance at the 1 percent level.