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EdWorkingPaper No. 21-497

Federal Stimulus Aid and School Finance: Lessons from the Great Recession

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In 2009, the federal government passed the American Recovery and Reinvestment Act (ARRA) to combat the effects of the Great Recession and state revenue shortfalls, directing over $97 billion to school districts. In this chapter, we draw lessons from this distribution of fiscal stimulus funding to inform future federal intervention in school finance during periods of economic downturn. We find that district spending declined by $945 per pupil per year following the Great Recession, particularly after a stimulus funding cliff when ARRA funding declined. Spending declines varied more within than across states, while stimulus funding was directed to districts through pre-Recession state funding formulae which varied in their relative progressivity. Spending losses were greater in districts serving fewer shares of students qualifying for free or reduced-price lunch or special education services, in districts with higher-achieving students, and in districts with greater levels of spending prior to the Great Recession; declines were unassociated with district's racial/ethnic composition, the share of English language learners, or a district's reliance on state aid. We conclude by identifying different stimulus policy targets and with recommendations regarding the magnitude and distribution of future federal fiscal stimulus funding, lessons relevant to the COVID-19-induced recession and beyond.

VERSION: December 2021

Suggested citation: Anglum, J. Cameron, Kenneth A. Shores, and Matthew P. Steinberg. (2021). Federal Stimulus Aid and School Finance: Lessons from the Great Recession. (EdWorkingPaper: 21-497). Retrieved from Annenberg Institute at Brown University: https://doi.org/10.26300/v68m-1s83

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November 2021

Forthcoming in Downes, T. & Killeen, K. (Eds.), *Recent Advancements in Education Finance and Policy*. Charlotte, NC: Information Age Publishing.

ABSTRACT

In 2009, the federal government passed the American Recovery and Reinvestment Act (ARRA) to combat the effects of the Great Recession and state revenue shortfalls, directing over $97 billion to school districts. In this chapter, we draw lessons from this distribution of fiscal stimulus funding to inform future federal intervention in school finance during periods of economic downturn. We find that district spending declined by $945 per pupil per year following the Great Recession, particularly after a stimulus funding cliff when ARRA funding declined. Spending declines varied more within than across states, while stimulus funding was directed to districts through pre-Recession state funding formulae which varied in their relative progressivity. Spending losses were greater in districts serving fewer shares of students qualifying for free or reduced-price lunch or special education services, in districts with higher-achieving students, and in districts with greater levels of spending prior to the Great Recession; declines were unassociated with district's racial/ethnic composition, the share of English language learners, or a district's reliance on state aid. We conclude by identifying different stimulus policy targets and with recommendations regarding the magnitude and distribution of future federal fiscal stimulus funding, lessons relevant to the COVID-19-induced recession and beyond.

KEYWORDS

Education finance, federal fiscal stimulus, Great Recession, economic downturn

INTRODUCTION

During the Great Recession and in the wake of the recession brought about by the Covid pandemic, the U.S. federal government has distributed additional aid to state education agencies in an effort to offset declines in school district budgets. This chapter aims to inform current and future federal efforts to offset recession-induced declines in district resources by describing several lessons from the administration and distribution of federal stimulus aid in the wake of the Great Recession. The Great Recession, which lasted from 2007 to 2009, generated significant declines in education spending and led to the reduction of nearly 300,000 school jobs (Jackson et al., 2020; Evans et al., 2019). To offset these declines in fiscal and human capital, in 2009 the federal government passed the American Recovery and Reinvestment Act (ARRA). ARRA represented an unprecedented level of federal investment in state and local education budgets in an effort to protect P-12 education spending, and included $97.4 billion in total elementary and secondary school education aid, of which $48.6 billion was apportioned directly to state education systems via the State Fiscal Stabilization Fund (SFSF).

Under ARRA, federal guidelines required state administrators to distribute federal ARRA aid to districts in order to make up for recession-induced declines in state revenues. To implement this requirement, federal guidelines directed states to distribute federal stimulus aid to school districts through their respective state's education funding formula. The purported goal of this policy was to offset lost expenditures from recession-induced declines in state revenues. One predictable consequence of this goal was that aid would be dispersed to students who have greater educational needs and are costlier to educate, since state contributions to education spending are typically concentrated among districts with larger shares of economically disadvantaged students (Chingos & Blagg, 2017).

Yet, because states vary in the progressivity of their funding formulae—how much state aid is distributed to districts serving larger shares of economically disadvantaged students—the distribution of federal stimulus aid to districts via state funding formulae may exacerbate pre-existing resource inequalities between states. Further, because district-specific losses during the Great Recession were heterogeneous (Evans et al., 2019; Shores & Steinberg, 2019b) and state funding formulae are not structured to respond to contemporaneous declines in district-specific spending, federal aid would also fail to reach districts experiencing the greatest recession-induced declines in educational spending and thus would have done little to offset district-specific changes in educational spending. Finally, state funding formulae vary in their capacity to equitably distribute state resources to equalize pre-existing differences in district spending. Thus, the extent to which the allocation of stimulus aid under ARRA contributed to the narrowing (or widening) of pre-recession spending gaps remains an open question.

In this chapter, we describe whether (and the extent to which) the allocation and distribution of federal stimulus aid under ARRA ameliorated (or potentially exacerbated) pre-existing resource disparities across school districts. We address the following questions:

(1) What was the magnitude of district expenditure declines in the wake of the Great Recession? How were expenditure declines distributed across districts serving different student populations?

(2) Did ARRA aid mitigate district expenditure declines in the wake of the Great Recession?

(3) Did districts with greater need—in terms of student populations, recession-induced declines in educational spending, and pre-existing levels of educational spending—benefit equally from ARRA aid?

We first show that the magnitude of district spending declines is sensitive to the counterfactual spending condition – what district spending would have been in the absence of the Great Recession. Relying on our preferred spending counterfactual – the district-level spending trend during the 2002-03 to 2005-06 pre-recession period – district spending declined by $945 per pupil per year, on average, during the 2008-09 to 2013-14 period. In addition, estimated declines in district-level spending (i.e., losses) varied primarily within rather than between states. District losses were greater, on average, in districts serving fewer students qualifying for free or reduced-price lunch or special education services, in districts with higher-achieving students, and in districts with greater levels of spending prior to the Great Recession. District losses were not associated with a district's racial/ethnic composition, the share of English language learners, or a district's reliance on state aid.

Because district-level spending losses continued to accumulate after the 2009-10 school year and because ARRA was effectively terminated in 2011-12 (though, districts continued to spend ARRA through the 2013-14 school year), federal fiscal stimulus under ARRA only partially mitigated spending declines. Specifically, ARRA offset 96% of district losses in the 2009-10 school year but only one percent of losses in 2013-14, despite the fact that district spending losses were greater, on average, in 2013-14 than in 2009-10. Further, because ARRA was distributed to districts based on states' existing (i.e., pre-recession) funding formulae, ARRA was more likely to be distributed to districts serving larger shares of students in poverty, English language learners, special education recipients, racial/ethnic minorities, and to districts with higher pre-recession levels of spending. In contrast, the distribution of ARRA was uncorrelated with recession-induced declines in district spending in the wake of the Great Recession.

We then consider three policy-relevant district types (i.e., policy targets) that could plausibly warrant additional federal aid: those with the greatest expenditure losses; those with historically low levels of educational spending; and those serving students with the greatest educational need. ARRA was most effective at offsetting recession-induced declines in district spending among districts serving students with the greatest educational need. Indeed, we estimate that districts with the most vulnerable student populations – those at the 75th percentile of pre-recession levels of need, as measured by the share of a district's students in poverty, English language learners, and special education recipients – lost $772 in per-pupil annual expenditures but received $639 in per-pupil annual aid from ARRA, meaning that in the recessionary period these districts were spending $13,612 per pupil per year. In contrast, districts with the greatest expenditure losses – those in the 75th percentile of recession-induced spending declines – lost $1,932 in per-pupil annual expenditures but received just $508 in per-pupil annual aid from ARRA, meaning that in the recessionary period these districts were spending $12,719 per pupil per year. Further, districts with historically low levels of educational spending – those in the 25th percentile of pre-recession spending levels – lost $715 in per-pupil annual expenditures and received $506 in per-pupil annual aid from ARRA, resulting in expenditures of $12,249 per pupil per year during the recessionary period.

Taken together, the magnitude of federal ARRA aid, especially after 2009-10, was insufficient to offset district expenditure losses. And, while the allocation of ARRA via state funding formulae was effective insofar as additional federal aid was allocated to districts serving more vulnerable student populations, ARRA aid was ineffective insofar as it did little to offset recession-induced expenditure losses in districts most adversely impacted by the fiscal consequences of the Great Recession.

While the long-term effects of the COVID-19 recession will unfold over the coming years, a few important comparisons already may be drawn with the Great Recession. Thus far, and despite initial projections, the COVID-19 recession has not inflicted the same level of damage to state education budgets nor are these losses projected to persist for as many years (McNichol & Leachman, 2020). Meanwhile, federal fiscal stimulus issued in response to COVID-19 has been substantially larger in magnitude and has been directed to school districts through Title I, so that districts with greater concentrations of low-income children receive more federal stimulus aid. (Gordon et al, 2021), rather than through state-specific funding formulae as in the wake of the Great Recession. Going forward, the federal response to the Great Recession via ARRA may be contrasted with federal aid in response to the COVID-19 recession as researchers and policymakers draw lessons about how best to direct federal stimulus to schools to balance potentially competing policy objectives, such as prioritizing students with greater educational needs while at the same time mitigating recessionary declines in state and district budgets.

THE GREAT RECESSION AND FEDERAL AID

The Great Recession inflicted significant long-term damage to P-12 spending, driven primarily through declines in state revenue (Leachman et al., 2017). By some estimates, school spending declined by seven percent nationally (Jackson et al., 2020), with nearly 300,000 school employees laid off (Evans et al., 2019). These losses in resources caused student achievement to decline, especially in areas with the largest employment losses and among districts serving predominantly economically disadvantaged and minority students (Shores & Steinberg, 2019a; Jackson et al., 2020). These findings are informed by a robust extant literature documenting increases in school funding as a key lever to improve student test scores, graduation rates, post-

secondary engagement, and long-term earnings, particularly for low-income students (Jackson et al., 2016; Lafortune et al., 2018; Candelaria & Shores, 2019; Hyman, 2017; Kreisman & Steinberg, 2019; Abott et al., 2020; Gigliotti & Sorenson, 2018).

To combat declines in state revenue, ARRA distributed nearly $50 billion to state education systems in an effort to restore state funding to the greater of 2007-08 or 2008-09 funding levels.[1] To ensure that federal aid replaced declines in state revenues, Title XIV guidelines stipulated that the State Fiscal Stabilization Fund (SFSF), ARRA's largest P-12 funding mechanism, was to restore state support for education through the "state's primary elementary and secondary funding formulae," and if ARRA was insufficient to support full recovery of state aid, then "the Governor shall allocate those funds … in proportion to the relative shortfall in State support," (H.R. 1—166). Evidence from Steinberg et al. (2020) and Evans et al. (2019) suggest that states followed these federal guidelines: ARRA nearly perfectly substituted for state aid during the first three years of the Great Recession.[2]

Though ARRA aid was designed to substitute for recession-induced declines in state revenues, the disbursement of ARRA occurred via states' pre-existing funding formulae. Importantly, most state funding formulae compensate districts serving larger shares of lower income students (or districts where property values are lower), either in the form of foundation plans, flat grants, or categorical aid (e.g., Shores et al., 2020; Verstegen, 2018). Thus, allocating ARRA through the state funding formulae should provide districts serving more vulnerable student populations greater amounts of federal stimulus aid. Yet, states also vary in how much compensatory aid they provide to specific student populations (e.g., Chingos & Blagg, 2017). Thus, allocating ARRA through the state funding formulae is likely to benefit districts with

greater concentrations of high-need student populations in states with more progressive funding formulae.

At the same time, states' pre-recession funding formulae were not designed to identify and target fiscal support to districts experiencing the greatest recession-induced spending declines, nor were they designed to provide fiscal support to the lowest spending districts. Thus, it is currently unknown whether ARRA was distributed to districts with greater expenditure declines or with lower levels of per pupil spending. In the first case, district expenditure losses were likely to be heterogeneous. Indeed, the recession's effects on localities varied among counties (Yagan, 2019; Shores & Steinberg, 2019b; Evans et al., 2019), localities (especially higher wealth districts) differed in their ability to offset spending declines (Chakrabarti et al., 2014; Dye & Reschovsky, 2008; Shores & Steinberg, 2019b), and characteristics of state funding formulae created varying levels of fiscal vulnerability for districts (Evans et al., 2019; Shores & Steinberg, 2019b). For low-spending districts, our priors are less clear. Low-spending districts may be those with lower concentrations of disadvantaged students, since most states spend more on poor students (Chingos & Blagg, 2017), which would suggest ARRA may be negatively correlated with levels of spending. On the other hand, the allocation of ARRA may be relatively uncorrelated with low-spending districts, since these districts are unlikely to be especially low-income (due to the progressivity of state funding formulae) or high-income, since high-wealth districts are more able to rely on local resources (via the local property tax and local property wealth base) to increase educational spending than their low-wealth district counterparts.

Thus, the Great Recession provides an important case to consider the role of federal aid during recessionary periods. Namely, it enables us to examine whether (and the extent to which)

districts with different dimensions of educational need and therefore plausible (but potentially competing) claims for federal fiscal support received equitable treatment under ARRA.

DATA AND SAMPLE

We construct a district-level panel dataset comprised of all traditional public-school districts in the United States for the 2002-03 through 2013-14 school years. We combine district demographic, revenue, and expenditure data from the U.S. Department of Education's Common Core of Data (CCD) with achievement data from the Stanford Education Data Archive (SEDA). District demographic data include enrollment (all prekindergarten, kindergarten, and students in grades 1-12); the proportion of students receiving free or reduced-price lunch (FRPL); the proportion of students identified as English language learners (ELL); the proportion of students receiving Individualized Education Programs (IEP); the proportion of students who are Black or Hispanic (i.e., minority students). Revenue data include revenue derived from state, local and federal sources and expenditure data include total expenditures and ARRA expenditures, all obtained from CCD's F-33 annual survey. In the 2008-09 through 2013-14 school years, the F-33 survey reports two district-level ARRA stimulus expenditure measures – ARRA current expenditures and ARRA capital expenditures. We combine these two variables to measure total district-level ARRA spending for the 2008-09 to 2013-14 period. For the 2008-09 to 2013-14 years, we generate a variable representing total spending in the absence of ARRA by subtracting these combined ARRA expenditures from total expenditures. All revenue and expenditure variables are converted to real per-pupil $2017, based on district enrollment totals, using the Fall to Spring academic calendar (Shores & Candelaria, 2020). SEDA data include estimates of average district achievement pooled across Math and English/Language Arts (ELA) for nearly every U.S. public school district beginning in the 2008-09 school year (Reardon et al., 2017).

Table 1 summarizes descriptive statistics for the district-level sample, including district demographics, achievement, pre-recession expenditure levels, and state and local revenue shares.

< TABLE 1 ABOUT HERE >

RECESSION-INDUCED CHANGES IN DISRICT SPENDING

What was the magnitude of district expenditure declines in the wake of the Great Recession?

To understand whether ARRA met the fiscal challenge presented by the Great Recession, it is first necessary to describe the magnitude of district expenditures lost during this period. This description is not straightforward as it requires an assumption regarding the counterfactual level of spending that would have occurred in the absence of the Great Recession. Here, we examine whether (and the extent to which) the estimated magnitude and correlates of district spending loss in the wake of the Great Recession vary depending on the choice of four plausible spending counterfactuals.

In the school finance literature, different spending counterfactuals have been used to calculate post-recession changes in district spending. For example, Leachman et al. (2017) and the Center on Budget and Policy Priorities regularly cite the 2007-08 school year as the relevant pre-recession benchmark. Similarly, Jackson et al. (2020) rely on the 2007-08 school year to model a state's susceptibility to recession-induced budget declines. Evans et al. (2019) examine the consequences of recession-induced spending declines by calculating changes in district spending between the 2006-07 and 2010-11 years, effectively treating the 2006-07 year as the counterfactual. Finally, Shores & Steinberg (2019a; 2019b) estimate counterfactual expenditures using the 2002-03 to 2007-08 trend in spending, thus assuming that spending would have increased linearly for districts in the absence of the Great Recession.

Like much of the existing literature, it is straightforward to calculate district spending declines ($\Delta Spend_{dt}$) by comparing spending in district *d* in the post-recession period (i.e., 2008-09 through 2013-14 school years) to spending in district *d* in 2007-08, the most recent pre-recession year. Calculating district spending changes in this way assumes that spending during the 2008-09 to 2013-14 period would have stayed at 2007-08 levels in the absence of the Great Recession. Reliance on the 2007-08 level of spending is problematic for two reasons. First, as we show below, in the 2007-08 year we observe an anomalous jump in spending relative to prior years. As others have noted (e.g., Davis & Ferreira, 2017), the run-up to the Great Recession was likely a function, in part, of a housing bubble which positively affected K-12 educational expenditures. Thus, using the 2007-08 level as a benchmark might overstate secular growth in educational spending. Second, K-12 educational spending has been increasing nearly linearly since 1960; thus, projecting future spending using 2007-08 levels likely understates secular growth, thereby underestimating recession-induced expenditures losses.

To assess the sensitivity of post-recession changes in district spending to the assumed counterfactual spending, we calculate $\Delta Spend^{j}_{d[s]t}$ as the change in per-pupil expenditures (net of ARRA-specific expenditures) in district *d* in state *s* during school year *t* relative to four *j* counterfactuals: (i) the level of per-pupil expenditures in the 2007-08 year; (ii) the mean per-pupil expenditures from 2002-03 to 2007-08; (iii) the projected per-pupil expenditures in year *t* based on district-specific per-pupil expenditures linear trends from 2002-03 to 2005-06; and (iv) the projected per-pupil expenditures in year *t* based on district-specific per-pupil expenditures linear trends from 2002-03 to 2007-08.[3] We select 2002-03 as the beginning of the pre-recession period since it was the first full school year following the conclusion of the dot-com bubble recession in November 2001; choosing a prior starting point likely would conflate our pre-Great

Recession spending projection with spending losses caused by the 2001 recession.[4] Comparisons across the counterfactual conditions allow insight into whether the inclusion of the 2006-07 and 2007-08 years overstates estimated recession-induced changes to spending, as well as insight into the magnitude of additional estimated spending losses if post-recession spending projections are based on pre-recession spending levels versus pre-recession spending trends.

The reliance on historical spending trends to forecast future spending is motivated by data shown in Figure 1 (Panel A), which plots average district-level per-pupil expenditures in the US for years 1959-60 to 2013-14. Linear, quadratic, and lowess lines are fit through these data, and all show that the trend for this long period is almost perfectly linear. In Panel B, we plot observed per pupil expenditures and predicted post-recessionary expenditures using the four counterfactual conditions. The distance between observed per pupil spending and the counterfactual line (for the j^{th} counterfactual condition) constitutes $\Delta Spend^{j}_{d[s]t}$. Between 1959-60 and 2007-08, per-pupil expenditures increased by an average of $204 per year. The 2002-03 to 2005-06 expenditures trend most closely approximates historical per-pupil spending, projecting a $188 average annual increase in per-pupil expenditures, whereas the 2002-03 to 2007-08 period overstates the historical secular trend, projecting spending to increase by $263 per year. Approximating counterfactual educational spending using pre-recession spending levels (either 2007-08 or the mean of 2002-03 to 2007-08) does not align with projections based on these historical trends.

< FIGURE 1 ABOUT HERE >

Table 2 reports the average annual post-recession change in per-pupil district spending (which we average across the 2008-09 to 2013-14 period), relative to each of the four spending counterfactual conditions. The magnitude of post-recession changes in district spending are

sensitive to the choice of counterfactual. For example, per-pupil district spending actually *increased* in the post-recession period by $29, on average, relative to the mean level of spending during the 2002-03 to 2007-08 period; in contrast, per-pupil district spending declined by $1,550, on average, based on the projected spending trend from the 2002-03 to 2007-08 period.

Further, we find that post-recession changes in district spending are largely a within-state phenomenon. The percent of variation in spending loss that occurs within states ranges from 70% (based on the mean level of district spending during the 2002-03 to 2007-08 period) to 92% (based on the district-level spending trend during the 2002-03 to 2007-08 period). The extent of within-state variation in post-recession changes in district spending suggests that the allocation of federal fiscal stimulus should consider not only the magnitude of aid provided to states (e.g., as suggested by Gordon and Reber, 2020) but also the mechanism by which federal aid is disbursed to districts within states.

< TABLE 2 ABOUT HERE >

How were expenditure declines distributed across districts serving different student populations?

If recession-induced declines in district expenditures are associated with other indicators of district need, such as the percent of the school age population which qualifies for free/reduced-price lunch or special education services, then the Great Recession may exacerbate pre-existing educational need. At the same time, since state funding formulae often allocate additional aid to districts serving more vulnerable student populations, federal aid under ARRA would then be allocated in greater amounts to these districts. In contrast, if district expenditure declines are relatively uncorrelated with characteristics of educational need, then there may be a misalignment between the allocation of federal fiscal stimulus via state funding formulae and

district-specific expenditure losses. In this case, it will be unlikely that the distribution of ARRA stimulus aid would be concentrated among districts with greater expenditure losses.

To examine whether district characteristics are associated with post-recession changes in district expenditures, we estimate a series of bivariate regressions as follows:

(1) $\Delta Spend^{j}_{d[s]\bar{t}} = \beta_1 X^{k}_{d[s]\bar{t}} + \theta_s + \varepsilon_{ds\bar{t}}$,

where *X* represents district characteristic *k,* including the percent of a district's students who are: (i) racial/ethnic minorities; (ii) in receipt of free- or reduced-price lunch (FRPL); (iii) in receipt of an individualized education plan (IEP); and (iv) identified as English language learners (ELL). We also explore the association between post-recession changes in district spending and district enrollment, student achievement, and the percent of total district revenue derived from local and state sources, respectively, in district *d* and state *s.* All estimates are based on averages of $\Delta Spend^{j}_{d[s]t}$ and district characteristics across the 2008-09 to 2013-14 school years; for local and state revenues shares, we average district-level values during the pre-recession period from 2002-03 to 2007-08. District-level averages across multiple school years are indicated by $\bar{t}$. All specifications include state fixed effects (θ_s) to account for the idiosyncratic nature of state-specific funding environments; indeed, as described above (see Table 2), the vast majority of the variation in spending changes occurred within rather than across states. [5] We use Huber-White standard errors to account for heteroskedasticity. Estimates of student characteristics (minority, FRPL, IEP, ELL) will show the change in district spending associated with a one percentage point increase in the student characteristic in district *d* for years 2008-09 to 2013-14. Additional estimates indicate the spending change associated with a 1,000-student enrollment increase, a one standard deviation increase in average math and ELA standardized test scores, and one percentage point increases in the shares of revenues derived from local and state sources,

respectively. Because the dependent variable $\Delta Spend^{j}_{d[s]\bar{t}}$ is signed to represent change in expenditures, a positive coefficient indicates that the district characteristic is associated with an *increase* in spending.

Table 3 summarizes these bivariate associations. For estimates of $\Delta Spend^{j}_{d[s]\bar{t}}$ based on projections using 2002-03 to 2007-08 levels, 2007-08 levels, and 2002-03 to 2005-06 trends, districts with more minority students, more students qualifying for FRPL, IEPs, or ELL plans *gained* expenditures during the Great Recession relative to districts with fewer of these populations. In other words, for three of four measures of $\Delta Spend^{j}_{d[s]\bar{t}}$, districts with more vulnerable student populations were *less* negatively affected by the Great Recession. The opposite is true for the measure of $\Delta Spend^{j}_{d[s]\bar{t}}$ based on 2002-03 to 2007-08 trends. Here, districts with more minority students and students qualifying for FRPL, IEPs, and ELL lost expenditures relative to districts with fewer of these populations and were more negatively affected by the Great Recession. Thus, our assessment of which students were more negatively affected by recession-induced expenditure losses is sensitive to the assumed counterfactual level of spending; specifically, they tend to diverge when we project post-recession spending using the 2002-03 to 2007-08 trend. Across each spending counterfactual, districts with greater pre-recession levels of spending, districts with greater local revenues shares (typically funded by local property taxes), and districts with greater average student achievement experienced greater declines in spending.

These findings may be contrasted with those of Knight (2017), who found that spending deficits of high-poverty districts (90th percentile) relative to low-poverty districts (10th percentile) increased by $662 per pupil per year over the same period, net of other district characteristics. In contrast, for three of four counterfactuals, we find that FRPL shares predict relative *gains* in

expenditures. Ignoring the difference in signs between the two studies, perhaps the most important takeaway is that the coefficients from our analysis are relatively small. Using the 2002-03 to 2005-06 trend as counterfactual, a 10-percentage point increase in FRPL is associated with a $45 gain in per pupil expenditures; a 10-percentage point increase in IEP is associated with a $235 gain in per pupil expenditures; and many of the coefficients are not statistically significant by conventional levels. Using the same counterfactual, average annual loss for 2008-09 to 2013-14 was $945 per pupil (see Table 2). In effect, these district-level variables explain only a small fraction of $\Delta Spend^{j}_{d[s]\bar{t}}$.

Evans et al. (2019) show that districts located in states which contributed more to K-12 expenditures also lost more expenditures during the Great Recession. Like Gordon and Reber (2020), this result emphasizes the role that states had in mediating district expenditure losses. Our results in Table 2 suggest that primarily focusing on state-specific differences is misguided, since the vast majority of expenditure losses occurred within states. Further, as shown in Table 3, we find little (to no) evidence that districts more reliant on state revenues (state revenue share) lost expenditures relative to districts less reliant on state revenues, once conditioning on state fixed effects.

The fact that these counterfactual conditions do not consistently identify which districts lost more expenditures during the Great Recession is important for policymakers interested in directing fiscal support to districts. Should federal fiscal stimulus aid be allocated based on district demographic characteristics (such as the percent of a district's students eligible for FRPL), or should federal aid be allocated based on district expenditure losses? For three of the four counterfactual estimates, a policymaker faced with this decision will be forced to choose between these alternatives, as we show that district spending losses were lower in districts with

traditional markers of student need. For one of the counterfactual estimates (the 2002-03 to 2007-08 trend), a policymaker could target aid based on district characteristics and still offset losses, though not as effectively as targeting aid directly to districts with expenditure loss. In the following section, we describe how ARRA was allocated and the extent to which ARRA was directed to districts based on district characteristics or expenditure declines. For our purposes, we do not make a normative distinction between whether it is optimal to allocate federal aid based on district characteristics versus expenditure losses; rather, our analysis may be considered akin to an accounting exercise designed to identify which kinds of districts most benefited from federal stimulus.

< TABLE 3 ABOUT HERE >

FISCAL FEDERALISM AND RECESSION-INDUCED CHANGES IN DISTRICT SPENDING

Did ARRA aid mitigate district expenditure declines in the wake of the Great Recession?

Next, we examine whether (and the extent to which) federal stimulus mitigated district spending declines. First, we present evidence on the magnitude and distribution of ARRA aid following the onset of the Great Recession. In Panel A of Table 4, we decompose ARRA over its five years of district-level expenditure, 2008-09 to 2013-14. The magnitude of ARRA aid was greatest in the 2009-10 and 2010-11 years, when it was disbursed to states, with an average of $595 and $463 per pupil allocated to districts, respectively. ARRA expenditures declined precipitously to $106 per pupil in 2011-12, $33 per pupil in 2012-13, and $18 per pupil in 2013-14. Over these five years, districts spent an average of $218 per pupil per year of ARRA aid. In all years except 2008-09, most of the variation in the magnitude of ARRA aid occurred within

rather than between states. Indeed, across the five-year period, 86% of the variation in ARRA aid occurred within states.

Next, we aim to understand the extent to which federal fiscal stimulus insulated school districts from spending declines in the wake of the Great Recession. To do so, we seek a measure of the share of recession-induced declines in district expenditures that were offset by federal fiscal stimulus. An important consideration is the choice of the measure of $\Delta Spend^{j}_{d[s]t}$. In the prior section, we defined $\Delta Spend^{j}_{d[s]t}$ relative to four spending counterfactuals *j*, and found there to be significant variability across these four counterfactuals in the mean change in post-recession district spending (see Table 2). Thus, to simplify our presentation moving forward, we seek a measure of counterfactual spending that best approximates the historical trend in district spending (see Figure 1). We find that the historical trend in spending (beginning in 1960) is most closely approximated by the trend in district-specific spending during the 2002-03 to 2005-06 period. Given this, we subsequently refer to $\Delta Spend_{dt}$ as the post-recession change in district spending relative to the 2002-03 to 2005-06 spending trend counterfactual.

Next, we define *Offset*, or the share of $\Delta Spend_{dt}$ that was offset by federal fiscal stimulus under ARRA, in the following two ways, depending on whether changes in district spending were positive or negative:

$$(2)\ Offset_{dt} = \begin{cases} 1 - \left|\frac{ARRA_{dt}+\Delta Spend_{dt}}{\Delta Spend_{dt}}\right|, \text{ if } \Delta Spend_{dt} < 0 \\ \frac{ARRA_{dt}+\Delta Spend_{dt}}{\Delta Spend_{dt}}, \text{ if } \Delta Spend_{dt} > 0 \end{cases}$$

where $ARRA_{dt}$ is the per pupil dollar amount of federal fiscal stimulus, via the State Fiscal Stabilization Fund (SFSF) of the American Recovery and Reinvestment Act (ARRA), that district *d* spent during school year *t* (i.e., 2008-09 to 2013-14); $\Delta Spend_{dt}$ is the per pupil dollar amount of recession-induced changes in spending in district *d* in year *t* relative to the 2002-03 to

2005-06 spending trend counterfactual. We also calculate $Offset_{d\bar{t}}$, which is based on $ARRA_{d\bar{t}}$ and $\Delta Spend_{d\bar{t}}$, which are $ARRA_{dt}$ and $\Delta Spend_{dt}$ averaged across the 2008-09 to 2013-14 school years, respectively.

In Panel B of Table 4, we report *Offset* in each post-recession year (and overall across the post-recession period). Across the post-recession period, federal fiscal stimulus offset 23% of district spending declines, on average. This corresponds to an average annual decline in district spending in the post-recession period, net of ARRA aid, of $727 per-pupil per year. And while ARRA aid was largely successful in offsetting district spending declines in the 2009-10 school year – the year in which the greatest per-pupil amount of ARRA was distributed to school districts – federal fiscal stimulus did little to mitigate district spending declines in the subsequent post-recession years.

Though ARRA was successful at offsetting expenditure losses in its first year and partially successful in its second year, federal stimulus failed to keep up with persistent expenditure losses even after the Great Recession had officially ended (i.e., June 2009), when average per pupil district spending declines surged to $1,157 and $1,544 in the 2011-12 to 2013-14 years, respectively, and ARRA's offset declined to just 8% and 1% in those years. In short, ARRA was not sustained for a period long enough to mitigate spending declines in the same manner it achieved in its first three years of implementation.

This failure to offset district spending declines during the 2011-12 through 2013-14 school years was not unexpected, both by federal authorities and by local education leaders. From its initial inception, the U.S. Department of Education warned against the possibility of a "funding cliff" immediately following the expiration of ARRA aid:[6]

> Invest one-time ARRA funds thoughtfully to minimize the "funding cliff." ARRA represents a historic infusion of funds that is expected to be temporary. Depending on the program, these funds are available for only two to three years. These funds should be invested in ways that do not result in unsustainable continuing commitments after the funding expires.

Indeed, many district leaders, school organizations, and researchers foresaw such threats in real time. The American Association of School Administrators (AASA), for example, published a paper in May 2010 warning:[7]

> While ARRA Title I dollars represented a significant increase in Title I funding for schools in the 2008-09 and 2009-10 school years, the ARRA Title I dollars—which played a vital role in supporting education budgets in states and districts that have yet to show signs of economic recovery—will no longer be available in 2011-12, a funding cut that will be compounded by the proposal to level fund the FY11 levels.

Similarly, the National Education Association (NEA) warned in November 2009 of a similar funding cliff:[8] "The ARRA provided historic increases for education to help offset state funding cuts precipitated by the economic crisis…However, this funding is scheduled to terminate by the end of FY 2011, leaving states facing a dramatic funding shortfall." In states such as New York and New Jersey, ARRA initially supported a robust federal substitution in place of diminished state funding, though one that eventually only served to delay severe funding cuts, which materialized by fiscal year 2012 (Chakrabarti & Livingston, 2019; Chakrabarti & Livingston, forthcoming). Indeed, at the onset of the 2011-12 school year, the Center for Budget and Policy Priorities estimated that only approximately $6.7 billion in total ARRA aid remained

to be spent, relative to state budget shortfalls in excess of $103 billion (Oliff et al., 2009). So, while federal authorities and local education leaders collectively foresaw a dangerous "funding cliff" following ARRA's expiration, public outcry was insufficient to generate an expanded fiscal stimulus package despite continued state budget shortfalls.

< TABLE 4 ABOUT HERE >

Did districts with greater need—in terms of student populations, recession-induced declines in educational spending, and pre-existing levels of educational spending—benefit equally from ARRA aid?

Next, we turn our attention to the allocation of ARRA aid to districts serving different student populations. State finance systems typically allocate additional state aid to districts serving larger shares of FRPL, ELL, and IEP students (Shores et al., 2020; Verstegen, 2018). Because the federal government distributed ARRA to states which then allocated federal aid to districts through their respective finance systems (per ARRA guidelines), our expectation is that ARRA would continue to fund districts based on these student characteristics, rather than due to recession-specific characteristics such as $\Delta Spend_{dt}$. At the same time, we would also expect states to vary in how much ARRA would be allocated to special populations due to heterogeneity in state-specific funding formulae.

To examine these hypotheses, we plot the bivariate correlations between district per pupil ARRA spending, changes in district spending ($\Delta Spend_{d\bar{t}}$) and district characteristics (including pre-recession spending levels), by state and for the entire the United States. Each of the predictors is standardized within each state to allow comparability between states and predictors; our measure of $\Delta Spend_{d\bar{t}}$ is also reverse signed so that it refers not to change in spending but to district expenditure *losses.* Coefficients are interpreted as a 1 standard deviation change in X^k is

associated with β^k ARRA per pupil spending, where the superscript *k* references one of the predictors shown in Table 1.

Figure 2 plots these bivariate associations. The distribution of ARRA aid is generally orthogonal to $\Delta Spend_{d\bar{t}}$ (i.e., *loss*). On average among states, the average of the coefficients for the association between expenditure loss and ARRA spending cluster around zero ($\bar{\hat{\beta}} = -6$), with some notable exceptions. In Alaska, Maryland, Vermont, and Arkansas, a 1 SD increase in lost expenditures is associated with a $43 to $89 dollar *decrease* in ARRA (p<0.000). At the other extreme, in Connecticut and Rhode Island, a 1 SD increase in lost expenditures is associated with a $47 to $74 dollar *increase* in ARRA (p<0.06). Though ARRA tracked expenditure losses in these states, the coefficients are relatively small. Overall, ARRA was largely uncorrelated with $\Delta Spend_{d\bar{t}}$, both at the national level and among individual states, and the estimated standard deviation of these state-level coefficients is relatively small ($\hat{\sigma_s} = 25$).

Compare, for example, the allocation of ARRA as a function of FRPL. On average among states, the association between ARRA expenditures and a 1 SD increase in FRPL is $57 (p=0.000). For select states, the association between a 1 SD change in FRPL and ARRA aid ranges between -$42 (Vermont) and $200 (Rhode Island). A similar set of results is found for pre-recession levels of spending. On average among states, a 1 SD increase in pre-recession spending is associated with $21 of ARRA aid. For Vermont and Rhode Island, a 1 SD increase in pre-recession spending is associated with $19 and $89 of ARRA aid, respectively.

In general, nearly all states allocated greater amounts of ARRA to districts with greater proportions of FRPL (in results not shown but available upon request, we find that the same is true for districts with greater proportions of IEP, ELL, and racial/ethnic minority students). In this sense, the ARRA regulations functioned as we anticipated; namely, by distributing ARRA

via state funding formulae, federal aid was provided to districts with populations traditionally in need. At the same time, because the progressivity of state funding formulae varies among states, the associated relationship between FRPL shares and ARRA varied significantly ($\widehat{\sigma_s} = 49$). On the high end, states like Rhode Island and New Jersey allocated nearly $200 per pupil in ARRA for each standard deviation increase in FRPL students; on the low end, states like Vermont and Maine allocated ARRA regressively, providing between -$42 to -$15 in per pupil ARRA aid for every SD increase in FRPL shares. Thus, one consequence of ARRA's disbursement rules was to provide different levels of aid to poor students based on features of the state's finance system.

The allocation of ARRA also tended to benefit districts that were already higher spending. On average among states, a 1 SD increase in pre-recession spending is associated with $21 in per-pupil ARRA aid. States also varied in the association between pre-recession spending levels and ARRA ($\widehat{\sigma_s} = 33$). In states like Illinois and Virginia, a 1 SD increase in pre-recession spending corresponded to -$59 and -$31 in ARRA aid, respectively. Whereas in states like New Jersey and South Dakota, a SD increase in pre-recession spending corresponded to an additional $121 and $126 of ARRA aid, respectively. Thus, ARRA also tended to benefit districts that were already relatively high spending.

Taken together, ARRA did provide support to districts with more vulnerable student populations. Yet, ARRA did not provide fiscal relief to districts most adversely impacted by spending declines in the wake of the Great Recession or to those districts with lower levels of pre-recession spending. Finally, states varied dramatically in how they distributed ARRA to different student populations, meaning that FRPL students received relatively little benefit from ARRA in some states whereas in other states FRPL students benefited greatly.

< FIGURE 2 ABOUT HERE >

Next, we examine whether the share of spending declines that were offset by federal fiscal stimulus varied across districts serving different student populations. Table 5 summarizes these results. To examine this, we report three variables: (i) $\Delta Spend_{d\bar{t}}$, which is the average post-recession change in per pupil spending in district *d* across the 2008-09 through 2013-14 school years, and is calculated based on the 2002-03 to 2005-06 trend counterfactual; (ii) $ARRA_{d\bar{t}}$, which is the average spending from federal fiscal stimulus in district *d* across the 2008-09 through 2013-14 school years; and (iii) $Offset_{d\bar{t}}$ from equation (2). Assessing all three quantities allows for insight into both the magnitude of post-recession changes in district spending and federal fiscal stimulus under ARRA aid, and the relative efficacy of ARRA aid in terms of offsetting (or supplementing) post-recession changes in district spending. We examine these variables by quartiles of $\Delta Spend_{d\bar{t}}$ and quartiles of the following district characteristics (quartiles are constructed within states based on district-level percentages), including: (i) FRPL; (ii) ELL; (iii) IEP; and (iv) minority. We examine whether the share of recession-induced declines (or increases) in district revenues that were offset (or supplemented) by ARRA federal stimulus was evenly distributed across a state's districts, or whether (and the extent to which) the onset of the Great Recession – and, in particular, the distribution of ARRA aid – mitigated (or even exacerbated) district resource inequality.

Comparing across quartiles of $\Delta Spend_{d\bar{t}}$ in Table 5 (i.e., within the same quartile of a district characteristic), districts with greater declines in spending did not receive substantively more ARRA funding. For example, among districts serving the most economically disadvantaged students (Q4 of FRPL with 74% of students, on average, qualifying for FRPL; see Panel A, Table 5), those with the largest spending declines in the amount of $4,081 per pupil per year across the 2008-09 through 2013-14 period (Q1 of $\Delta Spend$) spent $304, on average, in per-

pupil annual ARRA funds across the post-recession period. In contrast, districts where spending increased in the post-recession period in the amount of $3,055 per pupil per year across the 2008-09 through 2013-14 period (Q4 of $\Delta Spend$) spent $301, on average, in per-pupil annual ARRA funds across the post-recession period. The orthogonality of $\Delta Spend$ and *ARRA* holds for districts serving the fewest students in poverty (Q1 of FRPL), as well as by quartile of other district characteristics (ELL, IEP and minority).

Comparing within quartiles of $\Delta Spend_{d\bar{t}}$ in Table 5 (i.e., across quartiles of a district characteristic), districts serving larger shares of students with greater educational need received more ARRA aid. For example, among districts with the largest spending declines (Q1 of $\Delta Spend$), those serving the most economically disadvantaged students (in Q4 of FRPL; 74% FRPL) spent significantly more ARRA aid – $304 per pupil per year, on average, across the post-recession period – than districts serving the least economically disadvantaged students (in Q1 of FRPL; 29% FRPL), who spent, on average, $164 per pupil per year. Similarly, among districts with the smallest spending declines (Q4 of $\Delta Spend$), those serving the most economically disadvantaged students (in Q4 of FRPL) spent significantly more ARRA aid – $301 per pupil per year, on average, across the post-recession period – than districts serving the least economically disadvantaged students (in Q1 of FRPL), who spent, on average, $153 per pupil per year of ARRA aid. These patterns again hold for other district characteristics (ELL, IEP and minority), and further confirm prior evidence in this article (from Figure 2) that shows that districts serving students who are costlier to educate, such as low-income students, received more ARRA aid.

< TABLE 5 ABOUT HERE >

EXAMINING THE DISTRIBUTION OF ARRA AMONG DIFFERENT POLICY TARGETS

Up to now, we have shown that ARRA aid disproportionately benefited districts serving larger shares of vulnerable student populations and those districts with higher levels of pre-recession spending; yet, ARRA did little to offset spending declines among districts with the greatest recession-induced expenditure losses. Thus, the extent to which ARRA was an effective policy depends on the welfare criteria upon which policymakers and stakeholders design and distribute federal fiscal stimulus. Indeed, should federal aid during recessionary periods be targeted to districts serving more disadvantaged students? Alternatively, should federal aid be employed as a mechanism for holding districts harmless and maintaining secular trends in pre-recession spending? Or, should federal aid be viewed as a tool for equalizing educational spending?

We next examine whether the distribution of ARRA generated different welfare consequences for different types of districts (i.e., policy targets) – those with the greatest expenditure losses; those with historically low levels of educational spending; and those serving students with the greatest educational need. To do so, we estimate the total level of per-pupil spending (net of ARRA expenditures), the magnitude of expenditure declines, and the amount of ARRA aid for three different policy targets: (i) high loss, which are those districts at the 25th percentile of $\Delta Spend$ (i.e., those with greater losses); (ii) low spending, which are those districts at the 25th percentile of pre-recession per-pupil spending; and (iii) high need, those districts at the 75th percentile of student need, as measured by pre-recession (i.e., 2002-03 to 2007-08) average annual FRPL, ELL, and IEP shares. Because $\Delta Spend$ is correlated with pre-recession spending and district demographics (see Table 3), and because pre-recession spending levels are likely

correlated with district demographics due to features of state funding formulae, we estimate models of the following form:

(3) $Y_{i[s]} = \alpha + \beta_1 \Delta Spend + \beta_2 preGRspend + \beta_3 FRPL + \beta_4 ELL + \beta_5 Sped + \gamma_s + \varepsilon_i$,

where $Y_{i[s]}$ is either: (i) total spending per pupil in district *i* in years 2009-10 to 2010-11 net of ARRA expenditures; (ii) counterfactual spending per pupil in district *i* in years 2009-10 to 2010-11 using the 2002-03 to 2005-06 trend-based counterfactual; or (iii) ARRA expenditures per pupil in district *i* in years 2009-10 to 2010-11. To fix ideas, we focus on the two years during the Great Recession in which the majority of ARRA aid was spent, i.e., 2009-10 to 2010-11. From these regression estimates, we calculate a district's total per pupil spending including ARRA; a district's estimated loss (i.e., $\Delta Spend$); and the percent of estimated loss offset by ARRA.[9]

Table 6 summarizes these results. During the 2009-10 through 2010-11 years (i.e., the two years in which the majority of ARRA was spent), high loss districts – those in the 25th percentile of $\Delta Spend$ – had $12,719 in total per-pupil spending inclusive of ARRA. For these districts, the $508 per pupil of ARRA aid that they received offset 26% of their estimated $1,932 decline in spending. Among low spending districts – those in the 25th percentile of pre-recession spending – the $506 per pupil of ARRA aid that they received offset 71% of their estimated $715 decline in spending yielding total per pupil spending of $12,249 per year. Among high need districts – those in the 75th percentiles of FRPL, IEP, and ELL shares – the $639 per pupil of ARRA aid that they received offset 83% of their estimated $772 decline in spending yielding total per-pupil spending of $13,612 per year.

Comparing the first two policy goals (high loss districts versus low spending districts), total per-pupil spending is similar – $12,719 and $12,249, respectively; however, estimated total spending for these two policy goals is the result of different factors. For high loss districts,

ARRA offset only 26% of spending losses, and counterfactual spending was $14,143. Thus, high loss districts have less total spending because losses were high and ARRA was low, relative to those losses. For low spending districts, ARRA offset 71% of losses but total spending remained relatively low because spending per pupil was low to start, at $11,605 per pupil. Thus, low spending districts have less total spending not because ARRA failed to offset losses but because ARRA was not specifically targeted towards districts with low levels of pre-recession spending. Finally, for high need districts, total spending inclusive of ARRA was $13,612, which is about $900 to $1,400 per pupil more than high loss and high need districts, respectively. For high need districts, ARRA offset 83% of spending losses; and, because pre-recession spending levels were relatively high ($12,743), high need districts were relatively unaffected both in terms of their counterfactual level of spending and compared to their high loss and low spending district counterparts.

< TABLE 6 ABOUT HERE >

LESSONS FOR CURRENT AND FUTURE FEDERAL FISCAL POLICY

The empirical results presented in this article suggest the following important lessons learned about the allocation of federal aid during recessionary periods. First, based on historical spending patterns, a growth-based approach to approximating the spending counterfactual provides a better estimate of what district spending would have been in the absence of the Great Recession (Figure 1). Indeed, estimates of post-recession declines in district spending that are based on pre-recession spending trends are much larger in magnitude than estimates based on pre-recession spending levels (Table 2). Second, policy decisions about the magnitude of aid to be distributed to states is surely important, as suggested by Gordon and Reber (2020), but the allocation of aid to districts within states is likely more important, given that the vast majority of

the variation in recession-induced spending declines occurs within (as opposed to between) states (Table 2). Third, recession-induced declines in district spending were largely uncorrelated with traditional indicators of district need, such as FRPL (Table 3). Fourth, districts continued to experience expenditure declines after ARRA aid expired; thus, federal aid lacked the staying power to prevent long-lasting and extensive expenditure losses. Fifth, distributing ARRA through a state's pre-recession funding formula did provide districts with more disadvantaged students additional aid, but it did not distribute federal stimulus aid to those districts with the greatest recession-induced expenditure declines (Figure 2; Table 5). Sixth, because the structures of state finance systems differ and therefore the amount of additional aid given to vulnerable populations varies across states, the distribution of ARRA through state-specific funding formulae also exacerbated cross-state spending inequalities for districts serving the neediest populations of students (Figure 2). And seventh, educational spending (inclusive of ARRA) was approximately unchanged in the post-recession period among high need districts; in contrast, educational spending (inclusive of ARRA) was lower for districts with the greatest recession-induced spending declines and districts with the lowest levels of pre-recession spending.

In short, ARRA's legacy is mixed. The purpose of ARRA was to provide state fiscal stabilization, meaning that it was designed to substitute a lost dollar of state aid with a dollar of federal aid. And, in its first year, ARRA successfully offset 96% of district spending losses, on average, but it ran out too quickly, resulting in offsets of less than 10% in years 2011-12 to 2013-14. Moreover, by distributing federal aid through the state's funding formulae, ARRA implicitly reflected a specific policy target that precluded other plausible policy targets. Specifically, ARRA provided fiscal support to districts with greater concentrations of students with

educational need, but did not provide fiscal support to districts with greater expenditure declines or historically low levels of per-pupil spending.

The COVID-19 recession has posed a significant challenge for state and local funding capacities, in part due to uncertainty in state revenue projections as the pandemic began to unfold. By the end of April 2020, the Congressional Budget Office estimated $350 billion in fiscal year 2021 state revenue shortfalls and $650 billion in total revenue shortfalls over fiscal years 2020 through 2022 (Leachman, 2020). These figures dwarfed the $510 billion shortfall over a similar Great Recession period (fiscal years 2009 through 2011). By July 2020, however, COVID-related state shortfall estimates had been revised to $290 billion in fiscal year 2021 and $555 billion over the three-year projection (McNichol & Leachman, 2020). October 2020 estimates were again revised downward, totaling $327 billion, $22 billion observed in 2020 and $305 billion projected over 2021 and 2022 (Leachman & McNichol, 2020). The series of revised projections underscores the fluidity of state and local revenue uncertainty and the difficulty of accurately projecting district losses as recession-induced economic circumstances rapidly evolve. These projections may even have been more difficult than in past recessions due to difficulty in projecting COVID-19 outbreaks and their relationship with unemployment and economic recovery (Leachman & McNichol, 2020).

In response to the COVID-19 recession, the federal government has begun to distribute federal aid in an effort to offset declines in school district resources. To date, the federal government has directed three substantial stimulus packages to states in support of public P-12 education, consisting of $16.2 billion through the Coronavirus Aid, Relief, and Economic Security (CARES) Act; $54 billion through the Coronavirus Response and Relief Supplemental Appropriations (CRRSA) Act; and $122 billion through the American Rescue Plan (ARP)

(Gordon et al., 2021). The majority of CARES Act funding ($13.2 billion) was distributed to states proportionally based on Title I, Part A shares[10] with the remainder ($3 billion) directed to states through block grants to be spent at the discretion of state governors[11], with many critics pointing out that disbursements via Title I will inefficiently target low-income students (Gordon and Reber, 2020). Similarly, states are required to distribute a minimum of 90% of their respective CRRSA and ARP allocations to local school districts and charter schools in amounts determined directly through district shares of Title I students, funds available to be spent by September 2022 and 2023, respectively.[12]

For CARES, CRRSA, and ARP, states are limited in how much additional aid they can offer districts disproportionately affected by the recession. With CARES, for example, states were required to distribute at least 90% of the $13 billion in funding to districts based on district shares of Title I students and were thus able to distribute a maximum of approximately 25% of their respective CARES Act funding in a manner that responds directly to the economic conditions generated by COVID-19. And though CRRSA and ARP requires districts to spend minimum amounts on pandemic-related costs (e.g., evidence-based learning loss interventions), states are not granted leeway to allocate funds to districts in a manner directly responsive to local economic circumstances, including pandemic-induced district revenue losses.

As was the case following the Great Recession, the impact of the COVID-19 economic downturn on district spending losses will be determined in large part by the heterogeneous nature of local economic conditions (and, therefore, revenue capacities) and by the magnitude of federal stimulus aid. Prior evidence from ARRA demonstrates that amid economic downturns, state revenues were substituted for federal stimulus (Evans et al., 2019; Steinberg et al., 2020), emphasizing the importance of the distribution, magnitude, and rules governing stimulus aid.

Part of the reason why federal aid has been required to be disbursed through existing funding channels (state funding formulae with ARRA and Title I shares with CARES, CRRSA, and ARP) is that real-time (or near real-time) loss predictions remain infeasible. Practically, real-time national education finance data is not widely available to make contemporaneous projections, typically becoming available on at least a two- to three-year time lag. As a result, state and federal agencies will struggle to observe expenditure losses as recessions unfold, making it difficult to target aid concurrently. Moreover, the circumstances driving local economic losses may be highly idiosyncratic (e.g., local employment loss during the Great Recession versus virus infection outbreaks during the COVID-19 recession) and therefore not easy to predict.[13] Thus, the reliance on predicted district revenue losses to allocate federal aid may not result in the distribution of federal aid to districts where recession-induced spending losses are most concentrated.

To support K-12 educational spending during periods of economic downturn, federal and state policymakers should therefore address both the magnitude and distribution of federal stimulus aid, including: (1) how much federal aid should be provided to states and districts; and (2) how should federal aid be distributed to districts? Evidence from this article suggests the following guidance for policymakers on these critical considerations:

How much federal aid should be provided? The magnitude of federal stimulus should be appropriately tailored to the estimated decline in district spending, which we show can be best approximated by historical trends in educational spending and not pre-recession levels of spending. For federal stimulus to offset declines in education spending, it will need to persist through protracted budget declines, which are likely to last longer than the recessionary event itself. To address the evolving nature of budget shortfall projections, analysts have suggested

federal stimulus incorporate "automatic stabilizers," similar to how unemployment insurance operates, (e.g., Sahm, 2021).[14] These stabilizers would mitigate the risk of experiencing another "funding cliff," as occurred with ARRA.

How should federal aid be distributed to districts? Allocating federal aid via the state funding formulae solves the problem of substituting federal dollars for lost state dollars but carries with it implicit and perhaps unintentional policy goals. Indeed, allocating federal aid via state funding formulae is an effective mechanism for protecting specific vulnerable populations of students, such as those qualifying for free or reduced-price lunch, as nearly all losses in districts with these students were offset by federal aid. Yet, these funding formulae are not well suited to disburse aid to districts experiencing the greatest declines in spending or districts with historically low levels of spending. Moreover, due to variation among states in the progressivity of their funding formulae, distributing federal aid through the funding formulae will widen extant between-state resource inequalities among our nation's most disadvantaged students.

We recommend setting explicit policy targets for federal aid, which can then be implemented using various distributive schemes. These policy targets might include, among others, reducing pre-existing resource disparities among districts or providing aid to districts with greater expenditure losses. The challenge to addressing the latter policy target is that observable spending losses tend to lag actual spending losses due to data limitations, thereby limiting the analyst's and policymaker's ability to provide aid to districts with greater spending losses in real time. To address this concern, policymakers could incorporate one distribution scheme at the start of the economic downturn – by allocating, for example, federal aid based on the share of a district's students in poverty (e.g., Title I shares or other poverty estimates) – and then update the distribution scheme once data describing district expenditure losses becomes

available. Such a scheme would allow states to provide lagged compensation to districts to compensate them for variation in predicted spending losses after initially distributing federal aid to districts based on their student population characteristics.

Ultimately, the aims of federal fiscal stimulus are subject to the choices of policymakers, which likely reflect complex welfare criteria, such as insulating vulnerable student populations, offsetting district expenditure losses, and/or equalizing district expenditures. This article shows that federal aid is unlikely to successfully meet these policy goals if a 'one-size-fits-all' approach to distributing fiscal support is pursued. Rather, federal policymakers can create distributional schemes that are designed to meet explicit policy targets.

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ENDNOTES

[1] American Recovery and Reinvestment Act of 2009; Public Law 111-5 (H.R. 1), February 17, 2009: https://www2.ed.gov/policy/gen/leg/recovery/statutory/stabilization-fund.pdf.
[2] ARRA directed an additional $3 billion to local education agencies through Title I, Part A in support of School Improvement Grants (SIGs) to persistently low-performing schools, a component of approximately $7 billion in total federal SIG funding from 2007 to 2014 (U.S. Department of Education, 2009). Several studies have analyzed the impact of SIG interventions on student outcomes. For example, Dee (2012), Papay and Hannon (2020), Sun et al. (2017), and Carlson and Lavertu (2018) analyze the effects of SIGs in California, Massachusetts, San Francisco Unified School District, and Ohio, respectively. Across each study, the authors find significant improvements in academic outcomes. Dragoset et al., (2017), conversely, find null effects in a 22-state 60-district study (Source: U.S. Department of Education, https://www2.ed.gov/policy/gen/leg/recovery/factsheet/title-i.html).
[3] For counterfactual approaches (iii) and (iv), to guard against overfitting, projected per-pupil expenditures are calculated as Empirical Bayes estimates (i.e., random effects) instead of OLS predictions. Results are very similar throughout regardless of which estimator is used, though the random effects estimates have lower variance and fewer outliers.
[4] Source: The National Bureau of Economic Research (https://www.nber.org/research/data/us-business-cycle-expansions-and-contractions).
[5] We do not include district fixed effects, therefore, as we average $\Delta Spend$ and district characteristics across the analytic time period in cross-sectional regressions.
[6] U.S. Department of Education (2009 March 7). "State Fiscal Stabilization Fund." Retrieved from: https://www2.ed.gov/policy/gen/leg/recovery/factsheet/stabilization-fund.html.
[7] The American Association of School Administrators (2010 May 18). "School Budgets 101." Retrieved from: https://www.aasa.org/content.aspx?id=13418.
[8] The National Education Association (2009 November 4). "Letter to Congress Showing the Education Funding Shortfall State-by-state when ARRA Funds Disappear." Retrieved from: http://www.useaut.org/home/36856.htm.
[9] To mitigate the influence of cross-state differences, all variables are standardized within states. Predictions for "high loss" districts are based on the 25th percentile of ΔSpend and the 50th percentiles of pre-recession spending levels and district covariates (FRPL, ELL, and IEP). Predictions for "low spending" districts are based on the 25th percentile of pre-recession spending and the 50th percentiles of ΔSpend and district covariates. Predictions for "high need" districts are based on the 75th percentiles of FRPL, ELL, and IEP and the 50th percentiles of ΔSpend and pre-recession spending levels.
[10] Source: U.S. Department of Education: https://www.ed.gov/news/press-releases/secretary-devos-makes-available-over-13-billion-emergency-coronavirus-relief-support-continued-education-k-12-students
[11] Source: U.S. Department of Education: https://www.ed.gov/news/press-releases/secretary-devos-announces-3-billion-emergency-education-block-grants-governors
[12] Source: U.S. Department of Education: https://oese.ed.gov/files/2021/03/FINAL_ARP-ESSER-FACT-SHEET.pdf.
[13] In regressions not shown, we estimate our preferred measure of expenditure loss against pre-recession minority enrollment, FRPL enrollment, special education enrollment, and ELL enrollment (the same variables in Table 3 but for years 2002-03 to 2005-06). Only pre-recession special education enrollment is associated with district-level expenditure losses; coefficients for the other variables are not different from zero.
[14] Source: *New York Times*: https://www.nytimes.com/2021/01/21/opinion/biden-stimulus-checks.html.

TABLES AND FIGURES

Table 1: Summary Statistics of Analytic Sample

District Characteristics	Analytic Sample
Enrollment	3,442 (14,464)
FRPL	50.1 (21.6)
Minority	20.5 (16.2)
IEP	14.9 (9.4)
ELL	13.3 (15.7)
Achievement	0.00 (1.00)
Pre-Recession Mean Spending Per Pupil	$13,023
Local Revenue Share	44.2 (18.9)
State Revenue Share	47.6 (16.8)
Districts	13,894

Notes. Each cell reports mean (standard deviation) of district-level characteristics. *Enrollment* is the count of all prekindergarten, kindergarten, and students in grades 1-12 enrolled in a district; *FRPL* is the percentage of a district's students receiving free or reduced-price lunch; *Minority* is the percentage of a district's students who are African American or Hispanic; *IEP* is the percentage of a district's students who receive special education services and have an individualized education plan; *ELL* is the percentage of a district's students who are identified as English language learners; *Achievement* is the average achievement of a district's students in math and English Language Arts (ELA) and is standardized (mean zero, standard deviation one); *Local Revenue Share* is the percentage of a district's educational revenues that come from local resources; and *State Revenue Share* is the percentage of a district's educational revenues that come from state resources. The following district-level characteristics are averaged across the 2008-09 through 2013-14 school years: *Enrollment; FRPL; Minority; IEP; ELL;* and *Achievement*. *Local* and *State Revenue* Shares are district-level measures averaged across the 2002-03 to 2007-08 school years.

Table 2. Changes in District Spending, by Pre-Recession Expenditure Counterfactual

	Spending Counterfactual			
	2002-03 to 2007-08 Level	2007-08 Level	2002-03 to 2005-06 Trend	2002-03 to 2007-08 Trend
Mean (Standard Deviation)	29 (1,974)	-743 (2,122)	-945 (3,408)	-1,550 (2,801)
25th Percentile	-1,099	-1,701	-2,318	-2,759
50th Percentile	-197	-629	-850	-1,355
75th Percentile	960	439	632	-141
Percent Variation Within State	70%	83%	91%	92%
Districts	13,894	13,894	13,894	13,894

Notes. Each column represents a different spending counterfactual upon which post-recession changes in district spending have been calculated. Reported values in dollars represent $\Delta Spend_{dt}^{j}$, which is measured in per-pupil $2017 and averaged at the district-level across the 2008-09 through 2013-14 school years. The *2002-03 to 2007-08 Level* is the district-level per-pupil expenditures averaged across the 2002-03 to 2007-08 school years; the *2007-08 Level* is the district-level per-pupil expenditures in the 2007-08 school year; the *2002-03 to 2005-06 Trend* is the district-level per-pupil expenditures linear trend from 2002-03 to 2005-06 that are projected into the post-recession years (i.e., 2008-09 through 2013-14); and the *2002-03 to 2007-08 Trend* is the district-level per-pupil expenditures linear trend from 2002-03 to 2007-08 that are projected into the post-recession years (i.e., 2008-09 through 2013-14).

Table 3. Correlates of Changes in District Spending, by Pre-Recession Expenditure Counterfactual

	Spending Counterfactual			
	2002-03 to 2007-08 Level	2007-08 Level	2002-03 to 2005-06 Trend	2002-03 to 2007-08 Trend
Enrollment (in 1,000s)	1.788*** (0.324)	-0.248 (0.272)	0.013 (0.391)	-1.391*** (0.243)
FRPL	14.806*** (2.265)	3.555** (1.613)	4.542* (2.711)	-1.327 (2.272)
Minority	19.592*** (3.832)	3.205 (2.415)	0.414 (3.716)	-7.798** (3.453)
IEP	46.217*** (2.436)	8.944*** (3.423)	23.497*** (5.683)	-7.230 (7.436)
ELL	19.227*** (5.756)	-0.478 (2.553)	2.394 (4.995)	-10.969*** (3.522)
Achievement	-273.588** (36.811)	-90.431** (37.707)	-102.867* (58.127)	-20.894 (49.289)
Pre-Recession Mean Spending	-0.17*** (0.02)	-0.23*** (0.01)	-0.24*** (0.02)	-0.31*** (0.02)
Local Revenue Share	-7.112*** (2.012)	-3.748* (1.933)	-2.436 (3.319)	-3.891 (2.531)
State Revenue Share	3.811* (2.190)	2.101 (2.222)	-0.081 (3.941)	3.292 (2.853)
Districts	13,894	13,894	13,894	13,894

Notes. Each cell presents the coefficient from a bivariate regression (with robust standard errors). All specifications include state fixed effects. The number of districts is reduced to 11,172 for mean district achievement. The following district-level characteristics use district-level means from the 2008-09 to 2013-14 school years: *FRPL*; *Minority*; *IEP*; *ELL;* and *Achievement* (which is the average of math and ELA). *Local* and *State Revenue Shares* use district-level means from the 2002-03 to 2007-08 school years. Coefficients are statistically significant at the 1%***, 5%** and 10%* levels.

Table 4. Distribution of Federal Fiscal Stimulus

	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	Total
Panel A: ARRA Expenditures							
Mean (Standard Deviation)	97 (208)	595 (375)	463 (308)	106 (164)	33 (158)	18 (66)	218 (125)
25th Percentile	0	390	243	6	0	0	145
50th Percentile	0	556	427	50	0	0	194
75th Percentile	85	746	591	150	20	6	261
Percent Variation Within State	42%	77%	69%	81%	96%	98%	86%
Panel B: ARRA Offset of $\Delta Spend$							
Offset	137%	96%	43%	8%	2%	1%	23%
ARRA + $\Delta Spend$	360	-23	-602	-1,157	-1,543	-1,544	-727
Districts	13,894	13,894	13,894	13,894	13,894	13,894	13,894

Notes. In Panel A, *ARRA* is the amount of district-level spending from federal fiscal stimulus and is reported in per-pupil $2017; the *Total* column presents the district-level mean across the 2008-09 through 2013-14 school years. In Panel B, $\Delta Spend$ is the post-recession change in district-level spending (in $2017) and calculated based on the 2002-03 to 2005-06 trend counterfactual. *Offset* is the percentage of $\Delta Spend$ that was offset by federal fiscal stimulus under ARRA (see equation (2)).

Table 5. Distribution of ARRA Expenditures, by Δ*Spend* and Quartiles of District Characteristics

		Δ*Spend* Quartiles											
		Q1			Q2			Q3			Q4		
		Δ*Spend*	ARRA	Offset	Δ*Spend*	ARRA	Offset	Δ*Spend*	ARRA	Offset	Δ*Spend*	ARRA	Offset
Panel A: FRPL	Q1 (29%)	-$4,451	$164	0.04	-$1,088	$155	0.14	$436	$168	1.39	$3,100	$153	1.05
	Q2 (46%)	-$4,043	$179	0.04	-$1,245	$204	0.16	$337	$188	1.56	$2,506	$202	1.08
	Q3 (59%)	-$4,161	$205	0.05	-$1,280	$227	0.18	$288	$214	1.74	$3,361	$215	1.06
	Q4 (74%)	-$4,081	$304	0.07	-$55	$356	6.47	$619	$288	1.47	$3,055	$301	1.1
Panel B: ELL	Q1 (4%)	-$5,253	$195	0.04	-$1,206	$199	0.17	$409	$214	1.52	$3,455	$210	1.06
	Q2 (8%)	-$4,820	$177	0.04	-$1,118	$187	0.17	$251	$201	1.8	$3,454	$188	1.05
	Q3 (12%)	-$4,309	$204	0.05	-$1,090	$203	0.19	$374	$209	1.56	$3,092	$203	1.07
	Q4 (19%)	-$3,751	$220	0.06	-$643	$280	0.44	$583	$220	1.38	$2,462	$229	1.09
Panel C: IEP	Q1 (12%)	-$4,364	$202	0.05	-$1,094	$231	0.21	$570	$191	1.34	$3,515	$181	1.05
	Q2 (13%)	-$4,252	$193	0.05	-$937	$208	0.22	$300	$217	1.72	$2,365	$201	1.08
	Q3 (14%)	-$4,061	$202	0.05	-$1,247	$207	0.17	$353	$200	1.57	$3,209	$205	1.06
	Q4 (25%)	-$4,090	$258	0.06	-$67	$312	4.66	$661	$255	1.39	$3,061	$260	1.08
Panel D: Minority	Q1 (8%)	-$4,692	$182	0.04	-$987	$188	0.19	$338	$201	1.59	$3,597	$181	1.05
	Q2 (19%)	-$4,844	$166	0.03	-$1,052	$168	0.16	$398	$172	1.43	$3,060	$185	1.06
	Q3 (33%)	-$4,181	$184	0.04	-$1,162	$178	0.15	$319	$184	1.58	$3,235	$174	1.05
	Q4 (65%)	-$3,802	$251	0.07	-$690	$298	0.43	$553	$258	1.47	$2,493	$266	1.11
Districts		13,894	13,894	13,894	13,894	13,894	13,894	13,894	13,894	13,894	13,894	13,894	13,894

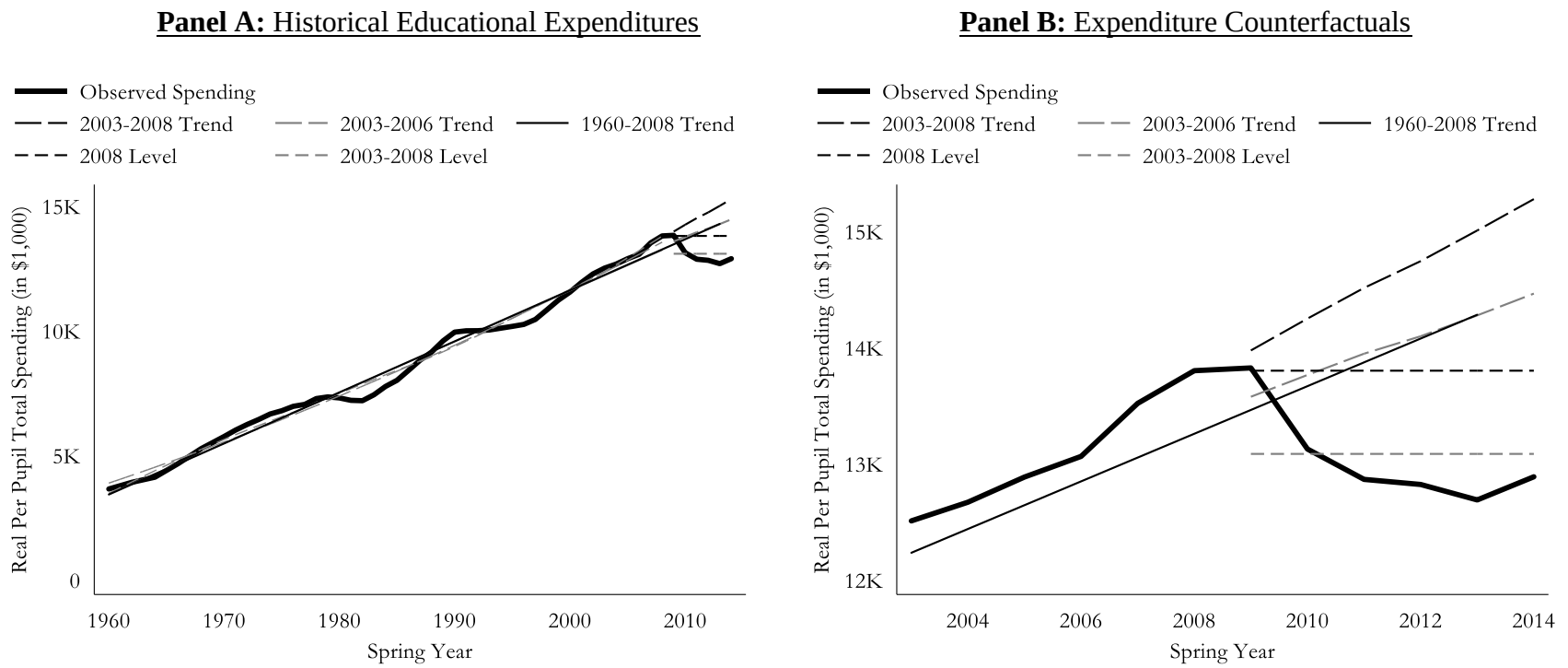
Notes. Each cell (within a panel) reports the district-level mean for the 2008-09 through 2013-14 school years. Δ*Spend* is the post-recession change in per pupil district-level spending (in $2017) and calculated based on the 2002-03 to 2005-06 trend counterfactual. *ARRA* is the amount of district-level spending from federal fiscal stimulus and is reported in per-pupil $2017. *Offset* is the percentage of Δ*Spend* that was offset by federal fiscal stimulus under ARRA (see equation (2)). Quartiles of Δ*Spend* and district-level characteristics (*FRPL*, *ELL*, *IEP*, *Minority*) are constructed within states.

Table 6. Examining the Contribution of ARRA to District Spending, by Policy Target

	High Loss	Low Spending	High Need	High Loss, Low Spending, High Need
Panel A: *Recession-Era District Expenditures*				
Total Spending	$12,719	$12,249	$13,612	$12,130
Total Spending net of ARRA	$12,211	$11,743	$12,973	$11,495
Counterfactual Spending	$14,143	$12,458	$13,745	$13,405
ARRA Expenditures	$508	$506	$639	$635
Panel B: *ARRA Offset of ΔSpend*				
$\Delta Spend$	-$1,932	-$715	-$772	-$1,910
ARRA Offset	26%	71%	83%	33%
ARRA + $\Delta Spend$	-$1,424	-$209	-$133	-$1,275
Panel C: *District Characteristics*				
Pre-Recession Spending	$12,700	$11,605	$12,743	$11,657
FRPL	42%	42%	60%	60%
Sped	18%	18%	20%	20%
ELL	22%	22%	30%	30%

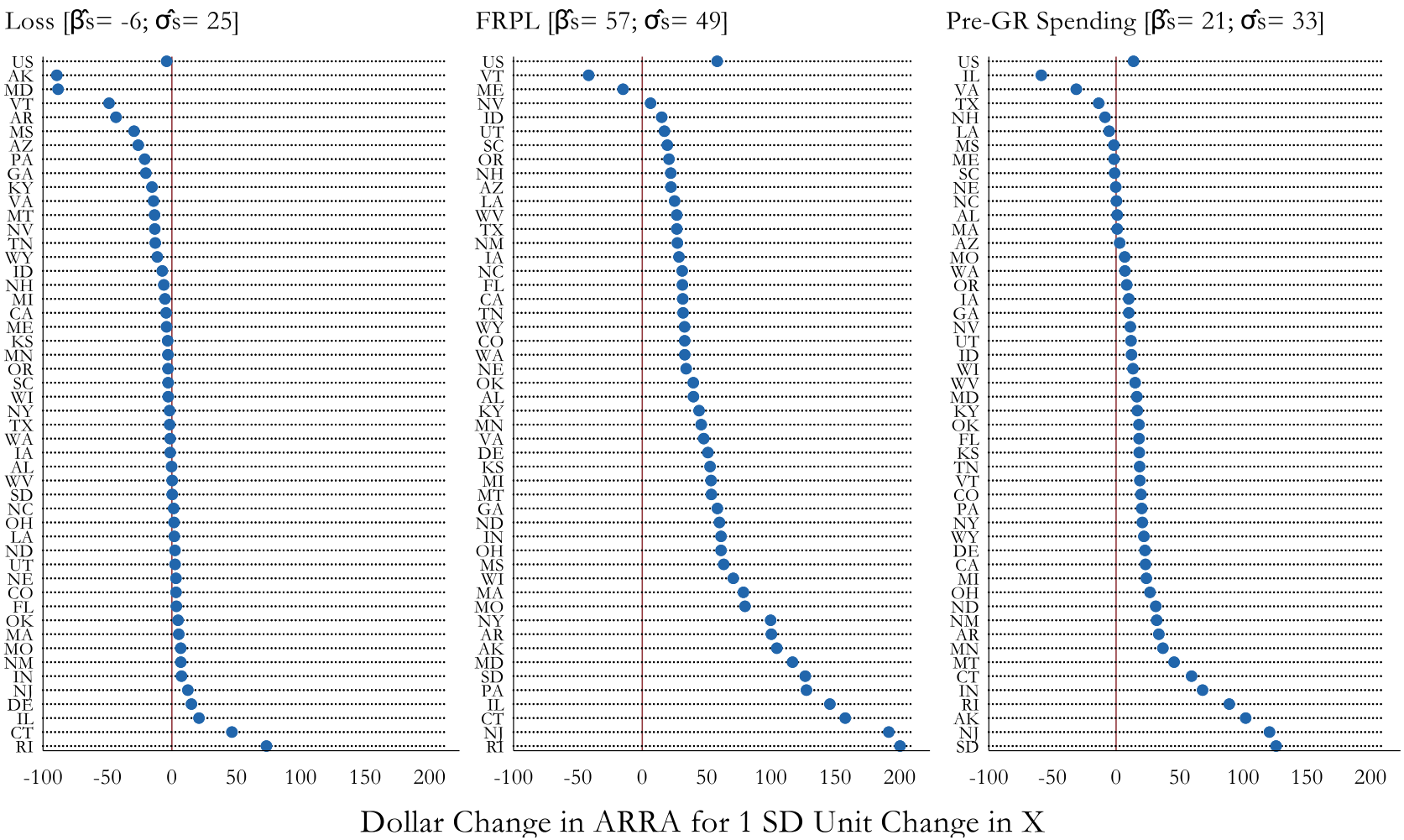
Notess. In Panel A, model-based estimates from: $Y_{i[s]} = \alpha + \beta_1 \Delta Spend + \beta_2 preGRspend + \beta_3 FRPL + \beta_4 ELL + \beta_5 Sped + \gamma_s + \varepsilon_i$, where $Y_{i[s]}$ is either: (i) total spending per pupil in district *i* in years 2009-10 to 2010-11 net of ARRA expenditures (i.e., *Total Spending net of ARRA*); (ii) counterfactual spending per pupil in district *i* in years 2009-10 to 2010-11 using the 2002-03 to 2005-06 trend-based counterfactual (i.e., *Counterfactual Spending*); (iii) ARRA expenditures per pupil in district *i* in years 2009-10 to 2010-11 (i.e., *ARRA Expenditures*). *Total Spending* is the sum of *Total Spending net of ARRA* and *ARRA Expenditures*. Each column represents a different policy target, holding other correlated variables constant. For *High Loss*, $\Delta Spend$ is set to the 25th percentile within states, and all other variables are set to the 50th percentile within states. For *Low Spending*, *Pre-Recession Spending* (i.e., *preGRspend* in the equation above) is set to the 25th percentile within states, and all other variables are set to the 50th percentile within states. For *High Need*, *FRPL*, *ELL*, and *Sped* are set to the 75th percentiles within states, and all other variables are set to the 50th percentiles within states. In *High Loss*, *Low Spending*, *High Need*, $\Delta Spend$ is set to the 25th percentile, *preGRspend* is set to the 25th percentile, and *FRPL*, *ELL*, and *Sped* are set to the 75th percentiles (all within states). For all models, state fixed effects are calculated at the means.

Figure 1. Historical Spending and Pre-Recession Expenditure Counterfactuals



Notes. Panel A plots observed mean district-level spending in per pupil $2017 for school years 1959-60 through 2013-14 (thick solid black) and includes linear (solid gray), quadratic (long-dashed gray), and lowess (short-dashed gray) lines are fit through these data (quadratic and lowess lines are occluded by the linear line). Panel B plots observed mean district-level per-pupil spending for school years 2002-03 through 2013-14 and includes four measures of counterfactual school spending from the 2008-09 through the 2013-14 school years.

Figure 2. Correlates of ARRA Distribution, by State and Nationally



Notes. Each dot represents the correlation between the district-level per-pupil amount of *ARRA* ($2017) and the following district-level characteristics: *Loss*, which we calculate as $[(-1) \times (\Delta Spend)]$; *FRPL*, which is the percentage of a district's students receiving free or reduced-price lunch; *pre-GR Spending* is the average spending in a district for years 2002-03 to 2007-08. $\Delta Spend$ is the post-recession change in per pupil district-level spending (in $2017) and calculated based on the 2002-03 to 2005-06 trend counterfactual. *ARRA* is the amount of district-level spending from federal fiscal stimulus and is reported in per-pupil $2017. All district-level measures are based on district-level means averaged over the 2008-09 to 2013-14 school years and are standardized within states to allow comparability.