

PRECARIOUS SLOPES? THE GREAT RECESSION, FEDERAL STIMULUS, AND NEW JERSEY SCHOOLS

- Despite the significance of the Great Recession’s impact on the economy, virtually no research exists on how schools were affected.
- This article fills the gap by investigating the effect of the downturn and the federal stimulus on New Jersey school finance patterns.
- The authors provide strong evidence of downward shifts in total school funding and expenditures, relative to trend, following the recession.
- The \$2 billion-plus in stimulus earmarked for New Jersey limited damage to budgets; it also helped preserve funding levels in instructional expenditure, the category most closely related to student learning.
- The study offers insight into how school districts fare during downturns and serves as a useful guide for future policy decisions.

“The Legislature shall provide for the maintenance and support of a thorough and efficient system of free public schools for the instruction of all the children in the State between the ages of five and eighteen years.”

New Jersey State Constitution, Article V, Section 4

“[T]he New Jersey State Constitution requires the Governor to take care that the laws of this State be faithfully executed...including ensuring compliance with the constitutional mandate that a balanced State budget be maintained.”

State of New Jersey Executive Order No. 14, February 11, 2010

1. INTRODUCTION

The relevance of the investment in the education of children to human capital formation and economic growth is well established in economic research.¹ Surprisingly, then, one important component of this topic has been overlooked in the literature: the impact of recessions on education.

The Great Recession was marked by a downturn in housing prices, employment, and business activity, each of which

¹ See Barro (1991), Benhabib and Spiegel (1994), Becker (1994), and Hanushek and Woessmann (2007).

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The views expressed are those of the authors and do not necessarily reflect the position of the Federal Reserve Bank of New York or the Federal Reserve System.

contributed to reduced tax revenues and larger budget gaps.² These shortfalls had a deleterious effect on state and local governments' ability to fully fund schools. While a sparse literature investigates the impact of the severe downturn on other sectors of the economy, there is virtually no research on the effects of the Great Recession, or past recessions, on schools. Our paper starts to fill that void by examining how school finances in New Jersey were affected by the onset of the recession and the federal stimulus funding that followed. Using rich panel data capturing a multitude of school finance variables, we apply a trend-shift analysis to study how the Great Recession and federal stimulus affected the level and composition of funding and expenditures in New Jersey school districts. Our findings offer insight into schools' financial situations during recessions and can assist in future policy decisions.

Demonstrating concern for safeguarding schools during a recession marked by pervasive budget cuts, the federal government designated the largest portion of its planned economic stimulus package for public education. In February 2009, Congress passed the American Recovery and Reinvestment Act (ARRA), an economic stimulus package which provided \$840 billion in new spending, with \$100 billion designated for public education. Of this \$100 billion, New Jersey was allocated \$2.23 billion.³

In addition to studying the overall impact of the recession on schools, we examine whether the effects varied by a district's poverty level, metropolitan area, and urban status. The analysis yields some interesting results. There is strong evidence of a downward shift—relative to trend—in both revenue and expenditure following the recession in New Jersey. Federal stimulus seemed to have helped in 2010; while revenue and expenditure still fell (relative to trend), the declines were somewhat smaller than in 2009. (We refer to school years by the year corresponding to the spring semester.)

While total funding to schools declined, the various components of aid did not experience symmetric changes. State aid per pupil fell in both years after the recession (relative to trend), as did local funding per pupil. However, the percentage decline in state aid per pupil far exceeded the corresponding decline in local funding per pupil, especially in the second year after the recession. In contrast, there was an upward shift in federal aid per pupil in 2010 following the introduction of the ARRA funds. These changes marked an important shift in the relative reliance of schools on federal, state, and local funding.

² See Gerst and Wilson (2010) and Deitz, Haughwout, and Steindel (2010) for an analysis of budget gaps nationally and in New Jersey.

³ The \$2.23 billion figure comes from information provided by the New Jersey Department of Treasury's Office of Management and Budget and represents the total ARRA appropriation for the state.

We also delve deeper into how the different components of expenditures are affected. While instructional expenditure per pupil declined in 2009 relative to trend, there is no evidence of any decrease in 2010. Thus, the federal stimulus funding may have been successful in preventing declines in instructional expenditure, a category including teacher salaries and classroom expenses that most directly affect student learning.

The patterns for instructional support per pupil and student services per pupil are similar to those for instructional expenditure. But other noninstructional categories such as transportation and utilities and maintenance (“utilities”) show declines relative to trend in 2009 and 2010. Median teacher salaries show a positive shift in both years, while median teacher experience also increased. These patterns are consistent with an increase in layoffs of less experienced teachers, which would shift the teacher salary distribution to a higher range.

Despite these statewide patterns, there is considerable heterogeneity by poverty level, metropolitan area, and urban status. Specifically, “high-poverty” districts sustained larger falls relative to trend in nearly all expenditure categories compared with their “medium-poverty” and “affluent” counterparts. The metropolitan area of Edison fared best in terms of preserving instructional expenditure and most noninstructional expenditures. Finally, rural districts fare best across most categories, while urban districts experience the largest resource declines.

This paper builds on the existing literature relating to school funding in general (Baker 2009, Bedard and Brown 2000, Betts 1995, Feldstein 1978, Gordon 2004, Rubenstein et al. 2007, and Stiefel and Schwartz 2011), and the literature on New Jersey school finance (Firestone et al. 1994 and Firestone, Goertz, and Natriello 1997). While these authors study school funding patterns broadly, our paper is one of the first to examine whether a recession affects school finance patterns, and what difference federal stimulus funding can have on the trends.

It is worth noting that we view our findings as strongly suggestive, but not necessarily causal. We employ a trend-shift analysis, so theoretically if there were common shocks in the two years following the recession that could affect our financial variables, they would bias our estimates. We conduct a comprehensive analysis of potential confounding factors during this period that might bias our results (see section 4). This analysis helps us interpret the results, frame our perspective, and put bounds on the recession-impact estimates.

Finally, the Great Recession was not a marginal shock; rather, it was a highly discontinuous shock. Therefore, even if there were other small shocks during these two years, they would be dwarfed by a downturn as large as the Great Recession, adding further confidence to our results.

Studying school funding during this period is of paramount importance because schools have a fundamental role

in educating children and fostering human capital formation and growth. Any adverse effect on schools and student learning can have potentially deleterious effects on human capital formation and by extension the nation's future. Our paper provides insight into how school districts fared during the financial downturn and promises to both improve our understanding of schools' financial situations under duress as well as aid future policy decisions.

2. BACKGROUND

2.1 Overview of the Period's Economic Climate and Education Policies

State and local governments in the United States experienced significant fiscal stress as a result of the Great Recession. The downturns in housing prices, employment, income, and business activity each contributed to lower tax revenues and larger budget gaps.

Local governments have, in the past, relied heavily on property taxes, which in the first half of the decade were supported by a booming housing market. Housing prices in the United States had been increasing at an annual average rate of 7.8 percent between 2000 and 2006, but as delinquencies and foreclosures began to rise, home prices declined at an annual average rate of 3.9 percent during the recession quarters.⁴ Demonstrating an even greater swing than the rest of the country, housing prices in New Jersey were increasing at a brisk average of 11.6 percent per year between 2000 and 2006, and fell by an average 4.9 percent per year in the recession quarters. Housing price declines are one of the many contributors to the decline in state and local revenues during the Great Recession.

State governments also took in less revenue as unemployment spikes reduced income taxes collected and lower consumption generated fewer sales taxes. New Jersey also relied heavily on the financial industry to provide an increasing portion of its revenues, but with the recession hitting the finance sector hard, the state's budget gap grew.⁵

⁴ For all figures related to home prices, we use the annualized four-quarter price change in the Federal Housing Finance Agency (FHFA) House Price Index averaged over the specified time period. Recession quarters are based on the National Bureau of Economic Research's definition.

⁵ Deitz, Haughwout, and Steindel (2010).

To remedy these depletions, Congress passed ARRA in February 2009, an economic stimulus package that provided \$840 billion in new spending, with \$100 billion designated for public education. Districts were directed to use the ARRA funds to save and create jobs and to boost student achievement. The requirements specified that 81.8 percent of the stabilization funds go toward the support of public education, and that states must restore public education funding in fiscal years 2009, 2010, and 2011 to the greater of the fiscal year 2008 or fiscal year 2009 level.

Of the \$100 billion earmarked for public education nationally, New Jersey received \$2.23 billion. The largest portion of New Jersey's appropriation was used to implement the state's school funding formula, and these funds were spent by the end of the 2010 school year.

2.2 Overview of New Jersey's Education History and Programs

In January 2008, the School Funding Reform Act (SFRA) was approved by the New Jersey legislature. This Act was the state's first official change to its school funding formula since 1996 and was the product of five years of development by the state's Department of Education. The formula called for a 7 percent increase in state funding for K-12 education in the 2009 school year. The recession officially began in December 2007, and since governments finalize their budgets in the spring prior to the budgeted year, the education budgets for the 2009 school year were the first to be affected. Despite the start of the recession, the amount required by the new SFRA formula was fully met in the 2009 school year, and 2010 budgets were also prepared using the formula.

Midway through 2010, however, the toll of the recession forced some changes. Revenue streams were projected to be \$2.2 billion lower than what was necessary to cover the state's budget deficit. Given New Jersey's constitutional mandate to maintain a balanced budget, education funding was reduced midyear.⁶ The funding caps for district aid were lowered, and many districts received less state aid than budgeted and less aid than required under the SFRA formula.

⁶ In February 2010, a fiscal emergency was declared in New Jersey due to the projected \$2.2 billion budget deficit for fiscal year 2010 and a range of cuts were made to ensure compliance with the state's balanced-budget mandate.

3. DATA

We developed a rich set of panel data combining annual data at the school district level from multiple sources. The data set covers 572 New Jersey districts for the school years 1999 through 2010.⁷ Most of the data were obtained from the New Jersey Department of Education's Office of School Finance. We supplemented this data set with school finance data from the National Center for Education Statistics (NCES) School Finance Survey (F-33) as well as data from the U.S. Census Bureau. Nonfinance data were obtained from the New Jersey Department of Education's Office of Data, Research, Evaluation, and Reporting, NCES's Common Core of Data (CCD), and the U.S. Bureau of Labor Statistics.

The information includes data on total funding, total expenditure, and debt outstanding, as well as data on individual components of total funding and expenditure. On the expenditure side, for example, the figures include spending on instruction, instructional support, student services, transportation, student activities, and utilities. (See Box 1 for definitions of these variables.) We also obtained data on federal aid, state aid, local funding, property tax revenue, and data on median salaries and median years of experience for teachers and administrators.⁸

Nonfinance data include district-level data on various socioeconomic and demographic variables, including enrollment, racial composition, and percentage of students eligible for free or reduced-price lunches. All funding and expenditure variables are analyzed on a per-pupil basis using each school year's average daily enrollment.

Heterogeneity breakdowns are performed by metropolitan division (MD), poverty level, and "urbanicity." MDs are groupings of counties or equivalent entities defined by the U.S. Census Bureau. They are smaller than metropolitan statistical areas but contain a population of at least 2.5 million.⁹ Heterogeneity breakdowns for metropolitan areas include the four largest New Jersey MDs: New York-White Plains-Wayne, Edison-New Brunswick, Newark-Union, and Camden (see Map 1).¹⁰

⁷ See Gerst and Wilson (2010) and Deitz, Haughwout, and Steindel (2010) for an analysis of budget gaps nationally and in New Jersey.

⁸ The \$2.23 billion figure comes from information provided by the New Jersey Department of Treasury's Office of Management and Budget and represents the total ARRA appropriation for the state.

⁹ We use ArcGIS mapping technology and U.S. Census Bureau data to define a district's metropolitan division.

¹⁰ The New York-White Plains-Wayne metropolitan statistical area includes counties in both New York and New Jersey districts. Since it comprises a very populated part of the state of New Jersey, we include it here.

Box 1

Definitions of Expenditure Components

Instructional

Instructional Expenditures

All expenditures associated with direct classroom instruction: teacher salaries and benefits; classroom supplies.

Noninstructional

Instructional Support

All support service expenditures designed to assess and improve students' well-being: food services, educational television, library, and computer costs.

Student Services

Psychological and health services; school store.

Utilities and Maintenance

Heating, lighting, water, and sewage; operation and maintenance.

Transportation

Total expenditure on student transportation services.

Student Activities

Co-curricular activities: physical education, publications, clubs, and band.

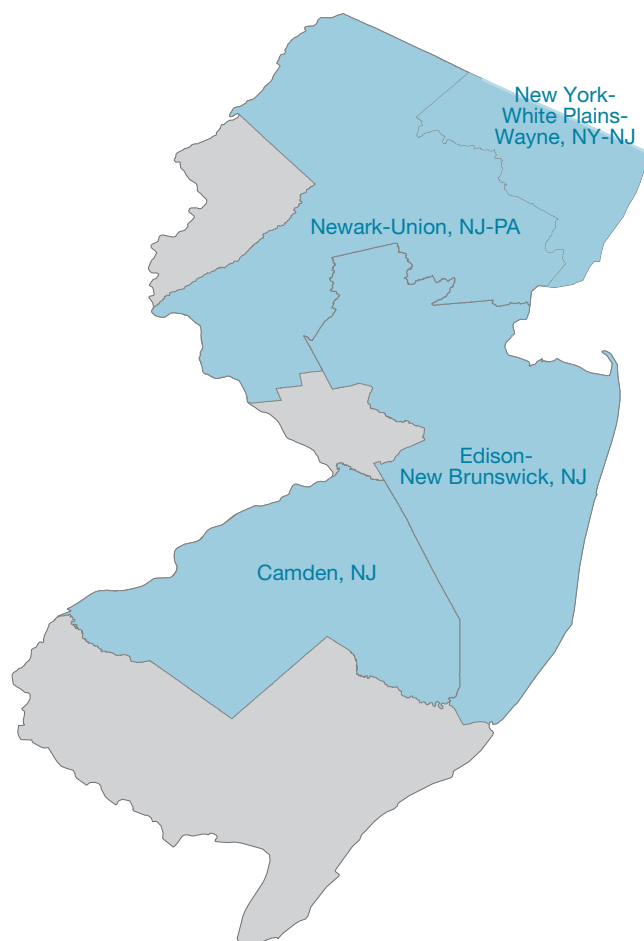
We categorize by poverty level and urbanicity based on the 2008 levels in an effort to capture pre-recession measures. Poverty level is defined by the percentage of students eligible for free or reduced-price lunches. For example, the districts falling above the seventy-fifth percentile in terms of the percentage of students eligible for free or reduced-price lunches are identified as high poverty, those in the bottom twenty-fifth percentile as affluent, and districts falling between these percentiles as medium poverty. Urbanicity designations of rural, urban, or suburban are defined using the NCES CCD classifications.¹¹

To account for inflation, all expenditure and aid data were adjusted to 2010 dollars using annual values of the consumer price index for all urban consumers.¹²

¹¹ As a point of reference, in the 2007-08 school year, districts at the high poverty level had 27.7 percent of their students receiving free or reduced-price lunches, while the affluent districts had 5.1 percent receiving the same.

¹² Districts in urbanized areas or urban clusters less than thirty-five miles from urbanized areas are categorized as urban. Territories outside principal cities and in urbanized areas represent the suburban districts. NCES uses the U.S. Census Bureau definition of rural territory based on the level of land developed.

Four Largest New Jersey Metropolitan Divisions



Source: Authors' representations using U.S. Census Bureau shapefiles.

Note: Our analysis focuses on the four largest New Jersey Metropolitan Divisions identified on this map.

4. INTERPRETATION OF POST-RECESSION EFFECTS

The goal of this paper is to investigate whether the Great Recession and the federal stimulus funding period that followed are associated with shifts in New Jersey education financing. We conduct a trend-shift analysis and use the specification described in Box 2 to analyze these effects. The intuition behind using this methodology is that school finances would be expected to continue to grow at the pre-recession trend had there been no recession. Thus, post-recession effects (α_2 and $[\alpha_2 + \alpha_3]$ in Box 2) are captured by shifts from this trend both in 2009 and 2010.

To quantify the change in each finance variable, we also compute percentage shifts that are obtained by expressing the shifts (α_2 and $[\alpha_2 + \alpha_3]$) from our specification as percentages of the pre-recession (2008) base of the corresponding financial variable (Y_{it}). This pre-recession base is simply the average of each in the 2008 school year. Recall that local, state, and federal governments finalize their budgets in the spring prior to the budgeted year. More specifically, the budgets for the 2008 school year were finalized in the spring of 2007, before the recession officially began in December 2007, and before decision makers were aware of the impending downturn. Therefore, 2008 is taken as the last pre-recession year in this paper.

These percentage effects allow for an easier interpretation and are more informative than the coefficients (α_2 and α_3) alone, since they suggest the size of the effects and facilitate comparison between the shifts in the various financial variables. In our discussion, we focus on two percentage shifts: the 2009 percentage shift immediately following the recession (calculated as $\frac{\alpha_2}{\text{pre-recession base}}$) for each finance variable (Y_{it}) and the percentage shift in 2010 (calculated as $\frac{\alpha_2 + \alpha_3}{\text{pre-recession base}}$) for each finance variable (Y_{it}). The first percentage shift captures the effect of the recession in 2009 and the second captures the combined effect of the recession and the federal stimulus in 2010.

Note that if there were common shocks in the two years following the recession affecting our financial variables, our estimates of the recession and stimulus effects outlined above would be biased. Understanding these potentially confounding factors is essential for interpreting the results. Therefore, we conduct a thorough analysis of them during the period.

First, while interpreting the shift at the onset of the recession, we consider the implementation of the new school funding formula under the SFRA. The formula called for a 7 percent increase in total state funding for K-12 education in the 2009 school year. Since state aid constitutes nearly half of the general-formula aid to districts, the new funding formula should be considered a positive shock not only to state aid, but also to total funding, total expenditure, and the components of total expenditure. Since the shock is in the opposite direction of the recession shock, any negative shift in the school-finance variables in 2009 would be above and beyond the expected positive effect of the new funding formula. Therefore, it is safe to say that negative shifts (if any) in the variables in 2009 are underestimates of the recession effects, though in the correct direction. In contrast, positive shifts could mean that the effect of the SFRA increase surpassed the effect of the recession or that the recession did not have much of a negative effect.

Second, while interpreting the 2010 stimulus shift, we consider the impact of the midyear cuts to the SFRA formu-

la.¹³ With the negative effect on state aid funding, we would expect a dampening effect on the positive shock from the ARRA federal stimulus. Note, however, that these cuts only came at midyear and did not affect schools' planned budgets or their expenditures in the first half of the school year. Any positive additional effects in 2010 (over 2009 effects) could therefore be regarded as underestimates of the stimulus effect. Additional negative effects in 2010, however, could mean that the recession effects (including the midyear cuts) dominated. As noted in our overview of New Jersey's education programs in section 2.2, these midyear cuts in 2010 were driven by budget shortfalls brought about by the recession. In that sense, the 2010 shift would still capture the combined effects of the recession and stimulus funding.

5. RESULTS

5.1 Overall Patterns

Using all 572 New Jersey districts in our data set, Chart 1 shows the general statewide trends in per-pupil expenditure and funding, as well as the change over time in federal, state and local contributions to total funding. The dashed line represents the last pre-recession year of 2008 and the x-axis represents the spring term of the school year with the last data point showing 2010. Both total expenditure and total funding show declines in 2009. Despite a slight increase in 2010, the levels for total expenditure and total funding did not return to pre-recession per-pupil levels. Federal aid increased 1 percent between 2008 and 2009, and then jumped 35 percent from 2009 and 2010, the year of the federal stimulus funding. District reliance on federal aid spiked 32 percent between 2009 and 2010, while reliance on state aid dropped 16 percent. But local funding and property tax declined and flattened out in the post-recession period. Relative reliance on local funding actually shifted upward from pre-recession levels, while reliance on state aid declined. (The former is due to a sharp decrease in state aid.) Finally, Chart 1 shows a flattening of enrollment in the post-recession period.

Chart 2 analyzes compositional changes in expenditures. Instructional expenditures show evidence of flattening in 2009, with the pattern reversing in 2010. In contrast, nonin-

structional categories such as transportation and utilities show either a flattening or a decline in the years of interest. Spending on student activities seems to have remained on trend. Funding for instructional support and student services shows signs of flattening in the first year, then a reversal in 2010. Teacher and administrator salaries (Chart 3) show an upward shift in the post-recession period, at least in 2010. In the next section, we investigate whether these patterns continue to hold in a more formal trend-shift analysis.

Tables 1-6 present results from the estimation of our specification described in Box 2. Each of these tables is structured the same way. The top section of each panel presents the percentage shifts, with the first row capturing the percentage shift in 2009 (calculated as $\frac{\alpha_2}{pre-recession\ base}$), the second row capturing the percentage shift in 2010 (calculated as $\frac{\alpha_2 + \alpha_3}{pre-recession\ base}$), and the third row showing the pre-recession base of the corresponding school finance variable as (Y_{it}). The bottom section of each panel presents the regression estimations from which the percentage shifts were derived. Referring back to the equation in Box 2, "Trend" in this panel corresponds to α_1 , "Recession" to α_2 , and "Stimulus" to α_3 . Our discussion of results will focus on the shifts. For easier comparability and a visual representation, the same percentage shifts are also illustrated in the corresponding histograms in Chart 4 and Charts 6-9.

As Table 1, panel A, and Chart 4 show, both total expenditure and total funding experience downward shifts relative to trend in 2009, signifying the negative effect of the recession. Again, note that these effects are likely underestimates of the corresponding recession effects since the change in the SFRA funding formula had a positive effect on overall school aid. Declines are evident in 2010 as well, but they are somewhat more modest, at least for total expenditure per pupil.

As we expected, federal aid per pupil shows a sharp upward shift relative to trend in 2010, coinciding with the infusion of federal funds from the ARRA stimulus. In contrast, state aid per pupil declines from trend in both years after the recession. Recall from our earlier discussion that the SFRA led to an upward shift in state aid per pupil in 2009, so the decline that year is likely an underestimation of the true recession effect. Digging deeper, we find that although the funding targets set by the SFRA formula were achieved in 2009, state-level cuts in categories outside the formula, such as pension funding, led to a negative shift in overall state aid.

Historically, a significant portion of state aid has been distributed to the New Jersey Teachers' Pension and Annuity Fund (TPAF). Allocations are not stipulated in the SFRA formula, so in 2009, when the recession began depleting revenue flows, pension funding was cut dramatically. Chart 5 shows the trends in total state aid, TPAF funding, and state aid

¹³ Midway through the 2009-10 school year, the funding caps for district aid were lowered, and many districts received less state aid than was budgeted and less aid than was required under the SFRA formula.

CHART 1

Trends in School Revenue and Expenditures during the Great Recession

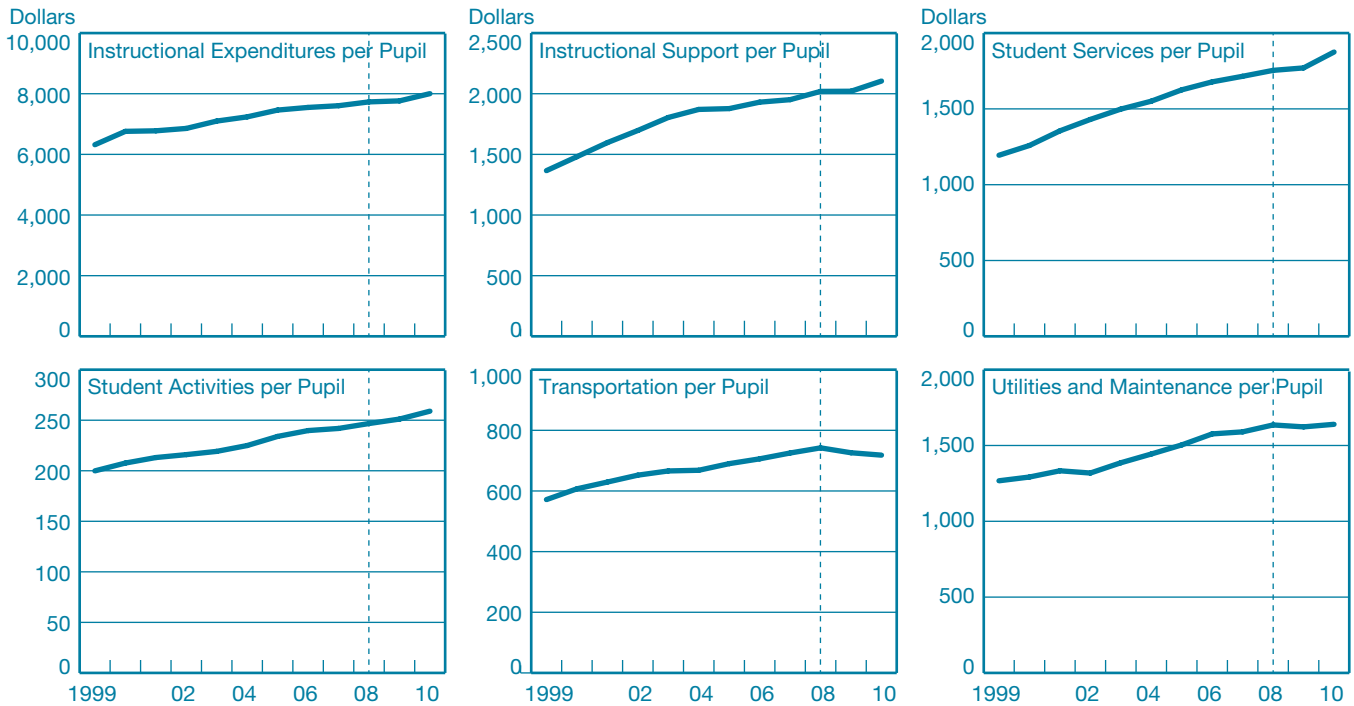


Sources: Authors' calculations, using the New Jersey Department of Education's Audit Summary and Taxpayers' Guide to Education Spending.

Note: Years denote spring terms.

CHART 2

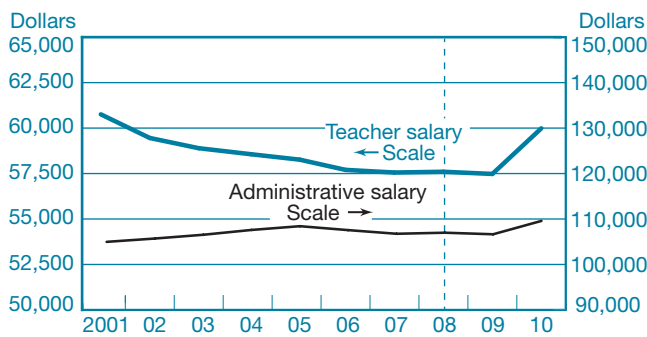
Trends in School Revenue and Composition of Expenditures during the Great Recession



Sources: Authors' calculations, using the New Jersey Department of Education's Audit Summary and Taxpayers' Guide to Education Spending.
 Note: Years denote spring terms.

CHART 3

Median Salary for Teachers and Administrators



Source: Authors' calculations, using the New Jersey Department of Education's Report Card data.

Notes: Years denote spring terms. Y-axis figures represent averages of all district medians. Data are inflation adjusted.

less TPAF funding. The vertical line represents the immediate pre-recession school year. While total state aid declined between 2008 and 2009, in large part due to the decline in TPAF funding, state aid less TPAF increased. So while the SFRA insulated other parts of state aid, the recession adversely affected TPAF funding in 2009, which, in turn, negatively affected total state aid per pupil.

These patterns are also reflected in a formal trend-shift analysis of the state aid components. (For brevity, corresponding estimates are not reported, but are available on request.) The situation in 2010, however, is different. Although the state budgets for 2010 were established using the SFRA formula, revenue streams that year were less than expected. In an unprecedented move, the funding formula was revamped significantly at midyear. The funding caps for district aid were lowered, and many districts received considerably less state aid than was budgeted and less aid than was required under the SFRA funding formula. Indeed, Chart 5 shows that declines are evident in total state aid as well as in state aid less TPAF. Results for 2009 and 2010 suggest that the Great Recession had a marked negative effect on state aid to districts.

TABLE 1

Patterns in Revenue and Expenditures per Pupil during the Financial Crisis and Fiscal Stimulus Period

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A	Total Expenditures per Pupil	Total Funding per Pupil	Federal Aid per Pupil	State Aid per Pupil	Local Aid per Pupil	Property Taxes per Pupil
Percentage shift in 2008-09	-9.51***	-12.68***	-17.5***	-4.02***	-3.36***	-2.81***
Percentage shift in 2009-10	-8.48***	-12.58***	13.02***	-18.46***	-2.66***	-1.74**
Pre-recession base	20,180	23,460	565	6,220	11,539	11,093
Trend	567.6***	694.9***	15.3***	116.4***	349.16***	326.33***
	(25.0)	(38.9)	(2.0)	(6.3)	(10.9)	(10.2)
Recession	-1,919.0***	-2,974.1***	-98.8***	-250.2***	-387.61***	-311.28***
	(161.0)	(295.1)	(16.6)	(48.8)	(66.3)	(63.2)
Stimulus	208.2	24.9	172.4***	-897.9***	80.67	118.39
	(195.2)	(338.9)	(18.2)	(59.8)	(93.6)	(89.9)
Observations	6,753	6,753	6,753	6,753	6,753	6,495
R ²	0.576	0.511	0.829	0.936	0.869	0.884
Panel B	(7)	(8)	(9)	(10)		
	Contribution from Federal Aid	Contribution from State Aid	Contribution from Local Aid	Total Students		
Percentage shift in 2008-09	-10.81***	4.01***	7.48***	-3.56***		
Percentage shift in 2009-10	20.71***	-10.82***	7.58***	-4.26***		
Pre-recession base	2	27.8	51.3	2,384.9		
Trend	0.01	-0.27***	0.10*	14.4***		
	(0.0)	(0.0)	(0.1)	(1.5)		
Recession	-0.26***	1.12***	3.84***	-85.0***		
	(0.1)	(0.2)	(0.4)	(14.3)		
Stimulus	0.76***	-4.12***	0.05	-16.4		
	(0.1)	(0.3)	(0.5)	(18.9)		
Observations	6,759	6,759	6,759	6,753		
R ²	0.799	0.926	0.784	0.995		

Sources: Authors' calculations, using the New Jersey Department of Education's Audit Summary and Taxpayers' Guide to Education Spending.

Notes: Robust standard errors are in parentheses. All regressions control for racial composition and percentage of students eligible for free or reduced-price lunch, and include school district fixed effects. Pre-recession base is expressed in 2010 constant dollars.

***Statistically significant at the 1 percent level.

**Statistically significant at the 5 percent level.

*Statistically significant at the 10 percent level.

As would be expected given the recession's shock to housing prices and local revenue streams, local funding per pupil and property taxes per pupil show negative shifts relative to trend in both years after the recession (Table 1 and Chart 4). It follows from the above analysis that without the support of the federal stimulus in 2010, total aid to districts would have declined even further from their depleted levels.

Table 1, panel B, illustrates percentage shifts in federal, state, and local contributions to total school funding. The patterns reveal that the above changes led to districts relying less on state aid and, instead, becoming largely funded more by federal aid in the 2010 school year. Thus, the Great Recession and the associated infusion of funds from the federal stimulus package seem to have led to a compositional shift in

Empirical Strategy

To analyze how New Jersey school finances were affected during the Great Recession and the ARRA federal stimulus period, we conduct a trend-shift analysis using the following specification:

$$Y_{it} = \alpha_1 T + \alpha_2 v_1 + \alpha_3 v_2 + \alpha_3 X_{it} + f_i + \varepsilon_{it}$$

where Y_{it} represents a school finance variable for school district i in year t ; T represents the time trend and takes a value of 0 in the immediate pre-recession year (2008) and increases in increments of 1 for each subsequent year and decreases by 1 in each previous year; f_i denotes school district fixed effects and controls for any fixed characteristics of districts; X_{it} denotes controls for racial composition and poverty level (percentage of students eligible for free and reduced price lunches) of the district; $v_1 = 1$ if year ≥ 2009 and 0 otherwise; $v_2 = 1$ if year ≥ 2010 and 0 otherwise.^a

The coefficient α_1 represents the overall trend in the corresponding financial variable during the pre-recession period. The coefficients of interest are α_2 , representing the intercept shift at the onset of the recession, and α_3 , representing the additional intercept shift during the federal stimulus period. In Tables 1-6, we define α_2 as “Recession” and α_3 as “Stimulus.” The shifts relative to preexisting trends in 2009 and 2010 are captured by α_2 and $(\alpha_2 + \alpha_3)$, respectively.

^a Local, state, and federal governments finalize their budgets in the spring prior to the budgeted year. More specifically, the budgets for the 2008 school year were finalized in the spring of 2007, before the recession officially began (in December 2007, as defined by the National Bureau of Economic Research), and before decision makers were aware of the impending recession. Therefore, 2008 is considered pre-recession in our analysis of financial variables, and 2009 is taken as the first year budgets were directly affected by recession.

aid to New Jersey. Map 2 provides additional illustration of the increased reliance on federal aid in 2008 (the immediate pre-recession year) and 2010. It shows a nearly across-the-board increase in the federal share of total aid in 2010. Finally, Table 1, panel B, column 10, shows evidence in favor of negative shifts in student enrollment in both years after the recession.

Next, we analyze whether the various expenditure categories follow the declining path experienced by aggregate expenditure in the years after the Great Recession hit. Table 2 and Chart 6 present this analysis. Interestingly, there is marked variation. While instructional expenditure suffers a negative shift from trend in 2009, there is no evidence of any negative effect in 2010. This pattern is repeated for instructional support per pupil and student services per pupil. The resilience

is in spite of the 2010 cuts to the education budget discussed above. These findings suggest that the federal stimulus funds tempered the negative effect of the recession, at least in these categories. In contrast, other noninstructional categories such as transportation and utilities suffer statistically significant declines from trend during this period. Conversations with New Jersey Department of Education staff revealed that the state, faced by constrained budget conditions, cut back on nonessential transportation costs, such as courtesy busing.¹⁴ We find this information is consistent with the above patterns in transportation spending evident in our data.

Patterns suggest that New Jersey tried to maintain continuity in the expenditure categories most related to student learning and development. Instructional expenditure, which includes teacher salaries and classroom expenses, constitutes the spending category that most directly supports students’ learning. With ARRA funds coming in, there is no evidence of the negative effects on this category seen in the year prior to the stimulus. Like instructional expenditure, instructional support, student services, and student activities closely relate to the development of the student. These categories, combined with instructional expenditure, are arguably the categories that most directly impact a students’ access to a “thorough and efficient” education. In summary, our results show that the post-recession period was characterized by a shift in composition of expenditures in favor of categories that are linked most closely to students’ learning and development.

Columns 7 and 8 in Table 3, panel B, investigate the Great Recession’s impact on median teacher and administrator salaries. Teacher salaries show an upward shift in both years after the recession; administrator salaries show a downward shift in the first year, which turns positive in the second year.

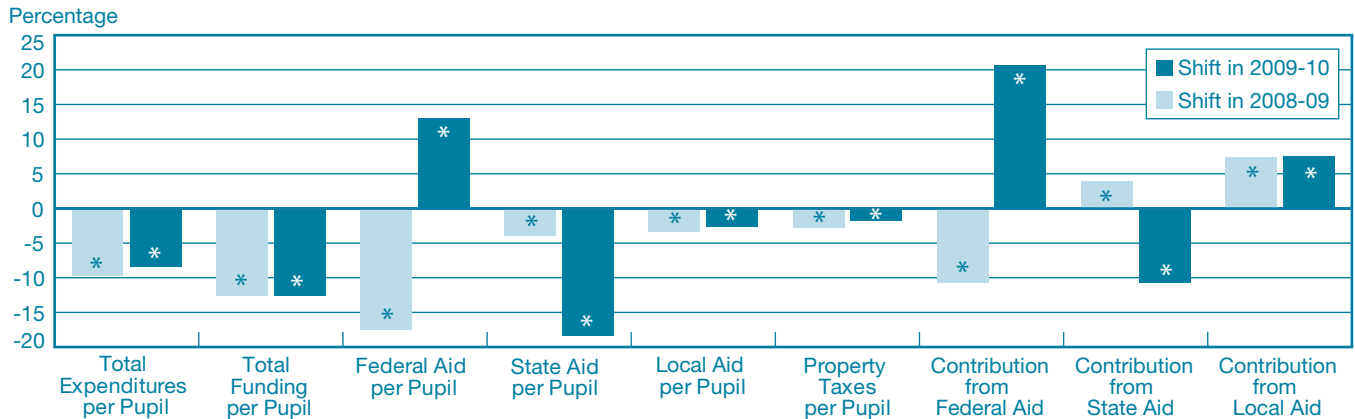
To understand and interpret these results, there are two key factors to consider. First, education personnel retirements spiked during this period, as rumors of potential pension funding cuts spread across districts.¹⁵ Recall that New Jersey is one of the few states in which the state funds pensions, and with state revenue streams depleted, pensions were seen as a probable area to cut. Since teachers and administrators at the age of retirement tend to have the highest salaries, an increase in retirements would logically lead to a decline in the overall median salary. This result is not what we see for teacher salary, although the increase in administrative retirements in 2009 is consistent with the negative shift seen in median administra-

¹⁴ Courtesy busing is the nonmandatory provision of busing such as for students living within walking distance of the school or who otherwise have a reasonable alternative to busing.

¹⁵ Surmised using data available from the State of New Jersey Department of the Treasury’s Division of Pensions and Benefits.

CHART 4

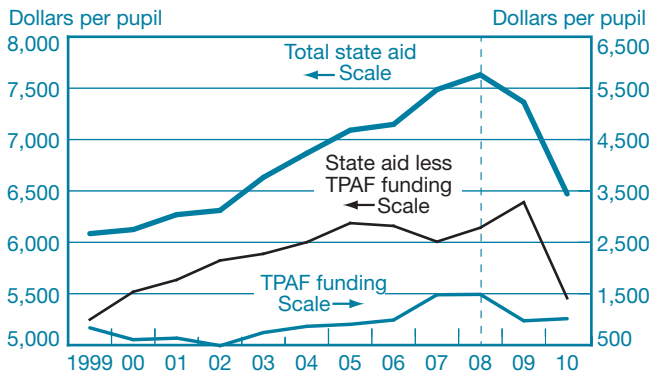
Patterns in Revenue during the Financial Crisis and Federal Stimulus Period



Sources: Authors' calculations, using the New Jersey Department of Education's Audit Summary and Taxpayers' Guide to Education Spending.
 Note: The * symbol denotes significance at the 10, 5, or 1 percent level.

CHART 5

Trends in State Aid to Teachers' Pension Funds



Sources: Authors' calculations, using the New Jersey Department of Education's Audit Summary and Taxpayers' Guide to Education Spending.

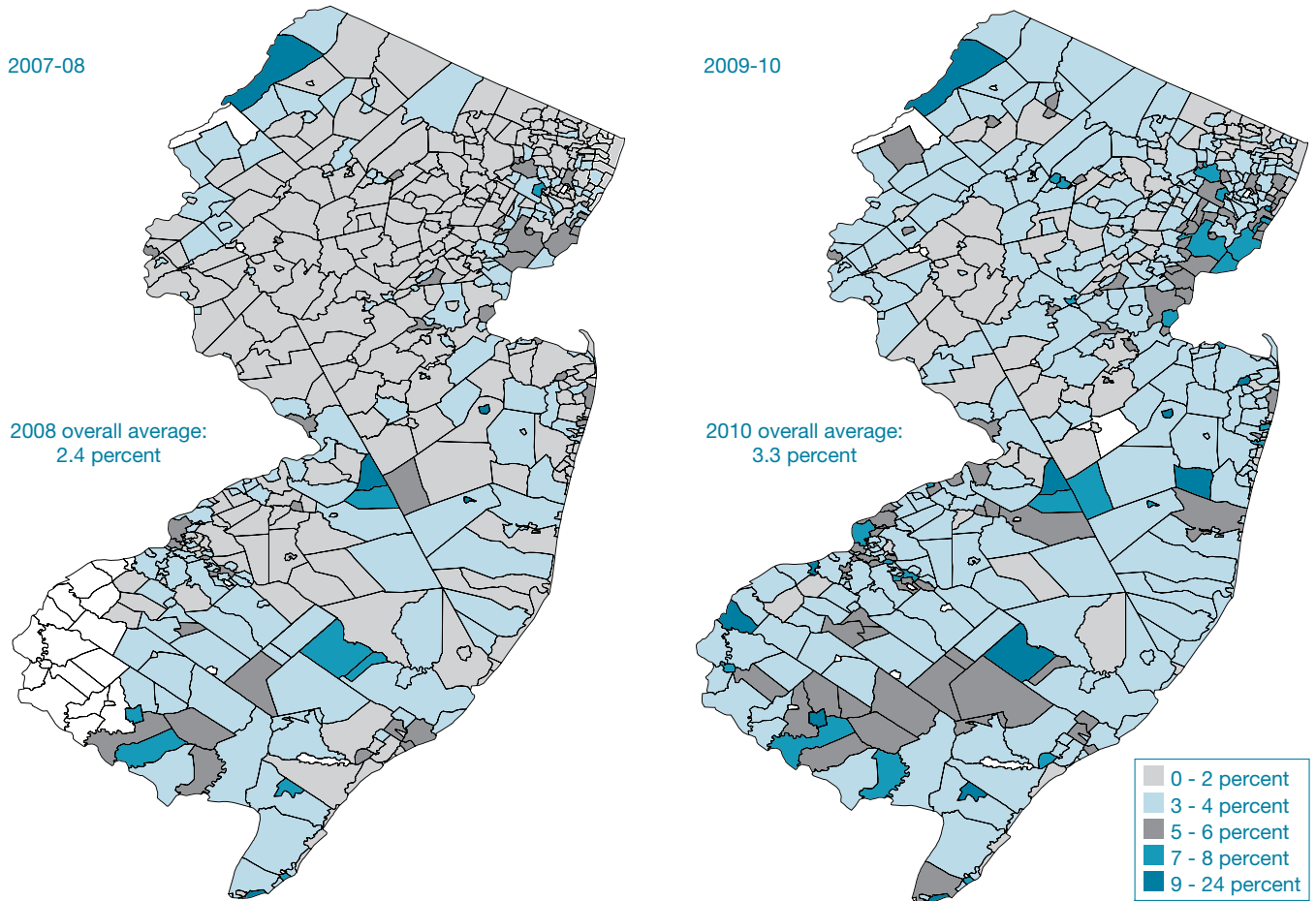
Notes: Years denote spring terms. TPAF is Teacher's Pension Annuity Fund.

tive salary. This relationship is corroborated by the patterns we observe in median years of experience of administrators. Though not statistically significant, there is a small decline in administrators' years of experience in 2009 revealed in Table 3, column 2, a factor potentially contributing to the decline in administrators' median salary.

There is more to the story, however. To understand fully the patterns in teacher and administrator salaries, we consider a second factor: nontenured dismissal. In New Jersey, public school employees attain tenure in their third year of employment. With tenure, it becomes very difficult for an employee to be fired without extraordinary cause.¹⁶ As a result, the vast majority of layoffs in New Jersey public education affect employees in their first and second years, reducing the number of employees at lower-level salaries. As Table 3, column 1, shows, there is strong evidence of large positive shifts in teachers' years of experience in both 2009 and 2010 relative to trend, and both these effects are highly statistically significant. These results support the hypothesis that dramatic cuts in the number of lower-level employees increase the overall median teacher salary significantly in both years. Administrative employees' years of experience also showed a positive shift in 2010, although this finding is not statistically significant. These patterns provide evidence that the significant positive shifts in median teacher and administrative salaries are likely due to a culling of lower-level public education employees during the post-recession era.

¹⁶ New Jersey Statutes, Section 18a:6-10.

Percentage of District Revenue from Federal Sources



Sources: Authors' calculations, using the U.S. Census Bureau shapefiles and the New Jersey Department of Education's Audit Summary and Taxpayers' Guide to Education Spending.

5.2 Examining Heterogeneities by School District Poverty Level

While the above analysis focuses on aggregate patterns, the rest of the paper investigates whether there were differences in impacts within the state by various characteristics, such as poverty status, location, and urbanicity. In the interest of space, we focus here only on a subset of the finance indicators of most interest: components of expenditure. This analysis provides useful insight into how the different districts allocated funds, and how the students in these districts were affected. Results for the other indicators are available on request.

Discussions about spending on education in New Jersey are most often framed in reference to wealth levels. In this vein, Table 4 and Chart 7 present the results for variations by poverty level.¹⁷ Affluent districts fared best in terms of preserving instructional expenditure as well as most of noninstructional expenditure (instructional support, student services, and transportation). They also experience the largest upward shifts in median teacher salaries and years of experience in both years after the recession. The combined results for salary and experience imply that affluent districts may have had the largest instance of lower-level teacher layoffs. Affluent districts

¹⁷ Charts 7-10 are placed in the "Conclusion" of this article (pages 16-24).

TABLE 2

Patterns in the Composition of Expenditures during the Financial Crisis and Fiscal Stimulus Period

Panel A	(1) Instructional Expenditures per Pupil	(2) Instructional Support per Pupil	(3) Student Services per Pupil	(4) Transportation per Pupil
Percentage shift in 2008-09	-2.14***	-2.12**	-2.0**	-3.21***
Percentage shift in 2009-10	0.14	-0.86	0.97	-5.41***
Pre-recession base	7,787	1,909	1,599	763
Trend	165.4*** (5.9)	66.3*** (2.3)	57.4*** (1.8)	17.2*** (1.1)
Recession	-166.5*** (38.9)	-40.5** (18.2)	-31.9** (14.4)	-24.5*** (9.1)
Stimulus	177.6*** (48.9)	24.2 (25.0)	47.4** (19.2)	-16.8 (12.3)
Observations	6,752	6,752	6,752	6,744
R ²	0.627	0.704	0.742	0.825
Panel B	(5) Student Activities per Pupil	(6) Utilities and Maintenance per Pupil	(7) Median Teacher Salary	(8) Median Administrative Salary
Percentage shift in 2008-09	0.81	-2.35***	1.32***	-1.16***
Percentage shift in 2009-10	1.18	-4.50***	6.45***	1.55***
Pre-recession base	238	1,615	57,598	107,074
Trend	5.0*** (0.3)	49.3*** (1.6)	-387.8*** (39.2)	130.9* (73.0)
Recession	1.9 (2.5)	-37.9*** (11.8)	761.3*** (215.8)	-1,239.4*** (457.4)
Stimulus	0.9 (3.1)	-34.9** (15.0)	2,956.5*** (253.7)	2,896.3*** (592.5)
Observations	6,685	6,752	5,614	5,605
R ²	0.959	0.728	0.815	0.787

Sources: Authors' calculations, using the New Jersey Department of Education's Audit Summary, Taxpayers' Guide to Education Spending, and Report Card data.

Notes: Robust standard errors are in parentheses. All regressions control for racial composition and percentage of students eligible for free or reduced-price lunch, and include school district fixed effects. Pre-recession base is expressed in 2010 constant dollars.

***Statistically significant at the 1 percent level.

**Statistically significant at the 5 percent level.

*Statistically significant at the 10 percent level.

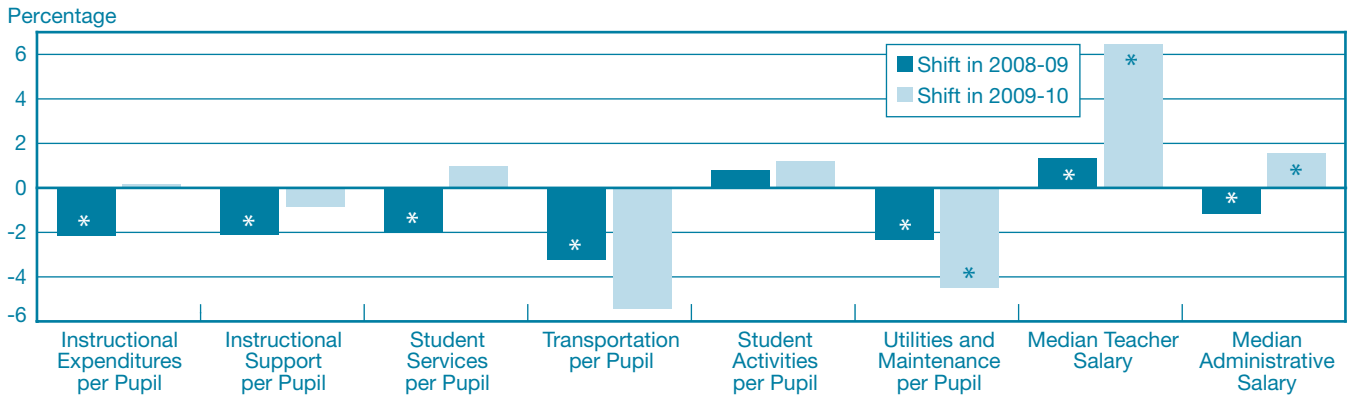
have the smallest declines in expenditures on utilities in 2009, but their experience in 2010 is not very different from that of high- and medium-poverty districts in this category.

The most noteworthy pattern revealed in this analysis is the comparatively large declines in spending in both instructional and noninstructional categories. The most disparate examples are the shifts in student services and instructional support in

2010; while high-poverty districts show large, statistically significant declines, the affluent districts show large, statistically significant increases. The variables for student services and instructional support capture expenditures on services that are designed to support, assess, and improve students' well-being. They include social work, health services, technology, library costs, and student guidance.

CHART 6

Patterns in Expenditures during the Financial Crisis and Federal Stimulus Period



Sources: Authors' calculations, using the New Jersey Department of Education's Audit Summary, Taxpayers' Guide to Education Spending, and Report Card data.

Note: The * symbol denotes significance at the 10, 5, or 1 percent level.

TABLE 3
Patterns in Years of Experience during the Financial Crisis and Fiscal Stimulus Period

	(1) Median Teacher Years of Experience	(2) Median Administrator Years of Experience
Percentage shift in 2008-09	8.80***	-0.10
Percentage shift in 2009-10	15.96***	1.91
Pre-recession base	10.13	20.57
Trend	-0.42***	-0.45***
Recession	0.89***	-0.02
Stimulus	0.73***	0.41
Observations	5,614	5,605
R ²	0.72	0.593

Source: Authors' calculations, using the New Jersey Department of Education's Report Card data.

Notes: Robust standard errors are in parentheses. All regressions control for racial composition and percentage of students eligible for free or reduced-price lunch, and include school district fixed effects. Pre-recession base is expressed in 2010 constant dollars.

***Statistically significant at the 1 percent level.

**Statistically significant at the 5 percent level.

*Statistically significant at the 10 percent level.

5.3. Examining Heterogeneities by Urbanicity

Another characteristic of school districts frequently covered in discussions about New Jersey education financing is urbanicity. Historically, since urban districts generally have lower property values and more apartment buildings housing multiple families, the ratio of students to potential sources of tax income is higher than for suburban or rural districts. The result has been a large disparity between the per-pupil aid available for wealthier, rural districts compared with poorer, urban districts.

Table 5 and Chart 8 analyze variations by urban, suburban, and rural status.¹⁸ Once again, while all three groups exhibit statistically significant declines in instructional expenditure in 2009, there is no evidence of negative effects in 2010, suggesting stimulus funding helped offset the trend. This pattern repeats consistently throughout our results, suggesting that the districts in general strive to preserve instructional expenditure. While the decline in instructional expenditure in 2009 is most pronounced for urban districts, the experiences in 2010 are very similar across the three groups.

In most noninstructional categories (instructional support, student services, transportation, and student activities), the rural districts fare the best, while the urban districts fare the worst. The experiences of the three groups are very similar for expenditures on utilities.

¹⁸ Tables 5 and 6 are placed in the "Conclusion" of this article (pages 16-24).

TABLE 4

Heterogeneities by School District Poverty Level

Panel A	Instructional Expenditures per Pupil			Instructional Support per Pupil			Student Services per Pupil		
	High Poverty	Medium Poverty	Affluent	High Poverty	Medium Poverty	Affluent	High Poverty	Medium Poverty	Affluent
Percentage shift in 2008-09	-3.19***	-2.78***	-1.24	-5.23**	-2.15*	-0.83	-4.63**	-2.69**	-0.41
Percentage shift in 2009-10	-1.93	0.21	0.99	-8.06***	0.94	3.20	-5.21**	1.34	4.61**
Pre-recession base	8,039	7,667	7,749	2,121	1,790	1,913	1,736	1,515	1,615
Trend	227.8*** (15.2)	175.3*** (8.0)	100.0*** (9.0)	101.6*** (7.6)	56.6*** (2.7)	53.2*** (3.3)	88.6*** (5.1)	50.2*** (2.3)	44.6*** (3.1)
Recession	-256.3*** (92.2)	-212.9*** (49.3)	-96.2 (64.5)	-111.0** (46.3)	-38.5* (20.2)	-15.9 (30.8)	-80.3** (35.0)	-40.8** (17.6)	-6.6 (27.1)
Stimulus	101.2 (98.3)	229.0*** (70.1)	173.1* (96.2)	-59.9 (58.8)	55.3** (27.8)	77.1 (49.1)	-10.2 (36.9)	61.1** (26.5)	81.1** (41.0)
Observations	1,682	3,240	1,828	1,682	3,240	1,828	1,682	3,240	1,828
R ²	0.442	0.816	0.827	0.633	0.806	0.803	0.692	0.809	0.796

Panel B	Transportation per Pupil			Student Activities per Pupil			Utilities and Maintenance per Pupil		
	High Poverty	Medium Poverty	Affluent	High Poverty	Medium Poverty	Affluent	High Poverty	Medium Poverty	Affluent
Percentage shift in 2008-09	-5.83**	-3.68***	-0.85	0.73	0.54	0.68	-2.20	-3.65***	-1.49
Percentage shift in 2009-10	-9.71***	-3.54	-4.57	2.91	-0.21	-0.14	-5.26***	-4.39***	-4.53***
Pre-recession base	729	774	780	193	241	281	1,721	1,581	1,568
Trend	28.1*** (2.7)	17.4*** (1.4)	6.1*** (2.3)	4.7*** (0.5)	5.9*** (0.4)	3.9*** (0.6)	64.3*** (4.0)	51.2*** (2.3)	35.1*** (2.9)
Recession	-42.5** (17.8)	-28.5*** (9.1)	-6.6 (26.0)	1.4 (4.4)	1.3 (3.5)	1.9 (5.4)	-37.8 (25.6)	-57.7*** (15.7)	-23.4 (21.3)
Stimulus	-28.3 (19.0)	1.1 (17.2)	-29.0 (32.2)	4.2 (5.0)	-1.8 (4.5)	-2.3 (6.7)	-52.7* (27.0)	-11.7 (23.4)	-47.6 (29.4)
Observations	1,682	3,239	1,821	1,657	3,211	1,815	1,682	3,240	1,828
R ²	0.816	0.901	0.755	0.933	0.966	0.965	0.666	0.810	0.802

All three groups show positive shifts in median teacher salary and experience. However, rural districts show smaller spikes in both measures compared with the suburban and urban districts, suggesting that lower-level teacher layoffs may have been less prevalent in rural districts.

5.4. Examining Heterogeneities by Metropolitan Area

We next look at the variations by metropolitan area, analyzing New Jersey's four largest metropolitan divisions: New York-White Plains-Wayne, Edison-New Brunswick, Newark-Union,

and Camden. Note that there is substantial diversity within these areas by poverty and urbanicity. This fact makes studying heterogeneities by poverty and urbanicity along with distinctions by MD all the more relevant.

Recall that Map 1 defines the metropolitan areas of New Jersey. Newark constitutes the northwest portion of the state and includes the most affluent districts. East of Newark, the Wayne district is second in terms of wealth and has the largest population of Hispanic and Asian students. The Edison districts are similar in demographics to Wayne, however, on average, Edison hosts larger districts. Camden districts have the highest instance of poverty, the largest black student population, and the largest number of small-sized districts.

TABLE 4 (CONTINUED)

Heterogeneities by School District Poverty Level

Panel C	Median Teacher Salary			Median Teacher Years of Experience		
	High Poverty	Medium Poverty	Affluent	High Poverty	Medium Poverty	Affluent
Percentage shift in 2008-09	0.77	1.30**	2.37***	7.78***	8.53***	13.15***
Percentage shift in 2009-10	5.19***	6.54***	8.15***	14.59***	14.22***	26.31***
Pre-recession base	57,492	57,312	58,286	10.28	10.55	9.12
Trend	-54.7 (89.1)	-418.4*** (57.7)	-586.0*** (70.7)	-0.3*** (0.0)	-0.4*** (0.0)	-0.5*** (0.0)
Recession	443.5 (434.5)	746.8** (313.0)	1,379.9*** (415.5)	0.8*** (0.2)	0.9*** (0.2)	1.2*** (0.2)
Stimulus	2,539.8*** (431.5)	3,000.4*** (384.7)	3,372.1*** (510.1)	0.7*** (0.2)	0.6*** (0.2)	1.2*** (0.3)
Observations	1,397	2,711	1,506	1,397	2,711	1,506
R ²	0.821	0.826	0.834	0.750	0.744	0.663

Sources: Authors' calculations, using the New Jersey Department of Education's Audit Summary, Taxpayers' Guide to Education Spending, and Report Card data.

Notes: Robust standard errors are in parentheses. All regressions control for racial composition and percentage of students eligible for free or reduced-price lunch, and include school district fixed effects. Pre-recession base is expressed in 2010 constant dollars.

***Statistically significant at the 1 percent level.

**Statistically significant at the 5 percent level.

*Statistically significant at the 10 percent level.

Table 6 and Chart 9 show our findings. While all four MDs suffer declines in instructional expenditure in 2009, these patterns reverse in 2010 when they each shift upward slightly. Camden endures the largest decline in 2009, while the MDs for the most part see similar positive reversals in 2010. The exception is Edison, which experiences an upward shift about double the size of the other MDs. In most of the noninstructional categories, Edison stands out as having the largest upward shifts. All MDs show positive shifts in median teacher salaries and years of experience, with Wayne showing the largest increase in both years in both categories. In summary, our results show quite a lot of variation across MDs, providing evidence that New Jersey regions reacted differently to a lack of resources.

6. CONCLUSION

This paper explores how school finances in New Jersey were affected during the Great Recession and the ARRA federal stimulus funding that followed. The analysis yields some interesting results. There is strong evidence of a downward shift in both total funding

and expenditure, relative to trend, following the recession in New Jersey. Federal stimulus sparks improvements in 2010; while both variables still exhibit declines, they are somewhat smaller than in 2009. There is also strong evidence of substitution of funds on the aid side. The infusion of funds from the federal stimulus occurs simultaneously with statistically and economically significant cuts in state and local financing, especially the former. As a result, relative reliance on federal aid increases in 2010, while reliance on state aid declines. Without the support of the federal stimulus in 2010, our results suggest that total aid to districts would have declined significantly more.

Our results also show that the post-recession period is characterized by a compositional shift in expenditures in favor of categories linked most closely to student learning. The categories for instructional expenditure, instructional support, student services, and student activities are preserved in 2010 when districts receive ARRA support.¹⁹ In contrast, transportation and utilities expenditures decline, suggesting that

¹⁹ While instructional support saw a small negative shift of less than 1 percent in 2010, it is statistically not different from zero and considerably smaller than the negative shift in 2009, suggesting stimulus funding helped to moderate the recession's negative effects and preserve funding approximately at trend level.

CHART 7
Heterogeneities by School District Poverty Level



Sources: Authors' calculations, using the New Jersey Department of Education's Audit Summary, Taxpayers' Guide to Education Spending, and Report Card data.

Note: The * symbol denotes significance at the 10, 5, or 1 percent level.

policymakers prioritized spending on categories most related to student learning and development.

We also find some interesting patterns in the teacher and administrator labor market. The shifts in median salary and years of experience suggest a culling of lower-level public education employees during the post-recession era, perhaps driven by New Jersey's tenure rules, which make it difficult to lay off more experienced employees.

In addition to studying the overall impact of the recession, we examine whether its effects varied by poverty, urban status, and metropolitan area. We find considerable heterogeneity. For example, the high-poverty and urban groups sustain the largest declines (relative to their respective trends) in the post-recession era. The most extreme examples in the poverty-level heterogeneities are the shifts in spending on student services and instructional support in 2010. The high-poverty

TABLE 5

Heterogeneities by School District Urbanicity

Panel A	Instructional Expenditures per Pupil			Instructional Support per Pupil			Student Services per Pupil		
	Urban	Suburban	Rural	Urban	Suburban	Rural	Urban	Suburban	Rural
Percentage shift in 2008-09	-3.83***	-1.89***	-2.24**	-4.58	-2.3**	0.16***	-3.30	-2.00*	-0.98
Percentage shift in 2009-10	0.80	0.21	0.02	-2.88	-1.35	2.21	-1.18	0.94	2.00
Pre-recession base	8,210	7,820	7,511	2,181	1,954	1,640	1,832	1,641	1,351
Trend	245.1***	154.5***	183.6***	92.1***	69.7***	53.5***	85.7***	59.5***	47.0***
	(19.7)	(7.9)	(9.5)	(8.8)	(3.1)	(3.7)	(8.0)	(2.3)	(3.0)
Recession	-314.5**	-147.5***	-168.1**	-99.8	-44.9**	2.7	-60.5	-32.8*	-13.3
	(152.4)	(47.2)	(67.3)	(85.6)	(21.7)	(32.2)	(68.1)	(17.0)	(26.9)
Stimulus	380.5*	164.1***	169.9*	37.1	18.6	33.6	38.9	48.3**	40.3
	(206.8)	(58.2)	(86.8)	(108.3)	(30.3)	(40.3)	(87.1)	(22.7)	(35.3)
Observations	440	5,041	1,271	440	5,041	1,271	440	5,041	1,271
R ²	0.797	0.591	0.821	0.828	0.679	0.756	0.84	0.719	0.774
Panel B	Transportation per Pupil			Student Activities per Pupil			Utilities and Maintenance per Pupil		
	Urban	Suburban	Rural	Urban	Suburban	Rural	Urban	Suburban	Rural
Percentage shift in 2008-09	-6.16	-4.48***	1.09	0.52	0.47	2.96	-1.70	-2.28***	-2.47
Percentage shift in 2009-10	-11.78***	-5.85***	-2.46	0.42	0.63	4.86	-4.51***	-4.35***	-4.71**
Pre-recession base	691	701	1,037	181	259	172	1,743	1,631	1,512
Trend	21.0***	14.4***	21.8***	5.6***	5.7***	2.7***	78.5***	45.8***	52.9***
	(3.1)	(1.3)	(2.4)	(0.8)	(0.4)	(0.6)	(4.6)	(2.1)	(2.7)
Recession	-42.6	-31.4***	11.3	0.9	1.2	5.1	-29.7	-37.2***	-37.4
	(26.7)	(10.8)	(19.2)	(6.5)	(2.9)	(5.8)	(47.3)	(13.9)	(23.1)
Stimulus	-38.9	-9.6	-36.8	-0.2	0.4	3.3	-48.9	-33.8*	-33.8
	(30.0)	(14.9)	(25.1)	(9.1)	(3.7)	(7.1)	(52.9)	(17.5)	(31.7)
Observations	440	5,033	1,271	432	5,009	1,244	440	5,041	1,271
R ²	0.905	0.802	0.847	0.968	0.954	0.971	0.898	0.701	0.787

districts show large, statistically significant declines in these categories, while the affluent districts show large, statistically significant increases. These variables capture the expenditure on services to support, assess, and improve students' well-being, including social work, health services, technology, library costs, and student guidance.

Since New Jersey spent its appropriation of ARRA funds in 2010, a valid question here is how we might expect the state to fare in the near future. Considering the slow recovery of economic activity and employment, state and local revenues will likely continue to come in below trend. The end of the federal stimulus funding and lower-than-trend growth in state and local revenues could lead to more significant downward pressure on funding and expenditures, including the various

components of expenditures. In fact, some of this pressure is already evident.

Using a compilation of the annual budgets for the United States and the state of New Jersey, we plot budgeted and actual funding per pupil over 2000-12 in Chart 10. The chart shows a noticeable decline in budgeted funding after 2010. It also reveals that New Jersey planned for steeper declines in 2011 compared with the nation as a whole.

The state's budget for the 2011 school year explicitly states that funds were not available to replace the ARRA funding of 2010. The funding levels required by the state's SFRA formula were not met, and the 2011 budget shows statewide declines, with many districts' aid being reduced as much as 5 percent from the previous year. Cuts were made in many expendi-

TABLE 5 (CONTINUED)

Heterogeneities by School District Urbanicity

Panel C	Median Teacher Salary			Median Teacher Years of Experience		
	Urban	Suburban	Rural	Urban	Suburban	Rural
Percentage shift in 2008-09	3.42**	1.51***	0.07	9.17**	10.32***	4.29**
Percentage shift in 2009-10	8.05***	7.13***	3.33***	17.43***	18.58***	7.72***
Pre-recession base	58,634	57,838	56,291	10.90	9.69	11.66
Trend	-446.8** (179.7)	-476.8*** (48.8)	-108.3* (65.3)	-0.4*** (0.1)	-0.5*** 0.0	-0.3*** 0.0
Recession	2,005.5** (823.6)	873.6*** (253.6)	40.6 (447.6)	1.0** (0.4)	1.0*** (0.1)	0.5** (0.3)
Stimulus	2,712.8*** (987.9)	3,250.6*** (296.5)	1,834.1*** (547.8)	0.9* (0.5)	0.8*** (0.1)	0.4 (0.3)
Observations	366	4,192	1,056	366	4,192	1,056
R ²	0.882	0.795	0.853	0.728	0.699	0.741

Sources: Authors' calculations, using the New Jersey Department of Education's Audit Summary, Taxpayers' Guide to Education Spending, and Report Card data.

Notes: Robust standard errors are in parentheses. All regressions control for racial composition and percentage of students eligible for free or reduced-price lunch, and include school district fixed effects. Pre-recession base is expressed in 2010 constant dollars.

***Statistically significant at the 1 percent level.

**Statistically significant at the 5 percent level.

*Statistically significant at the 10 percent level.

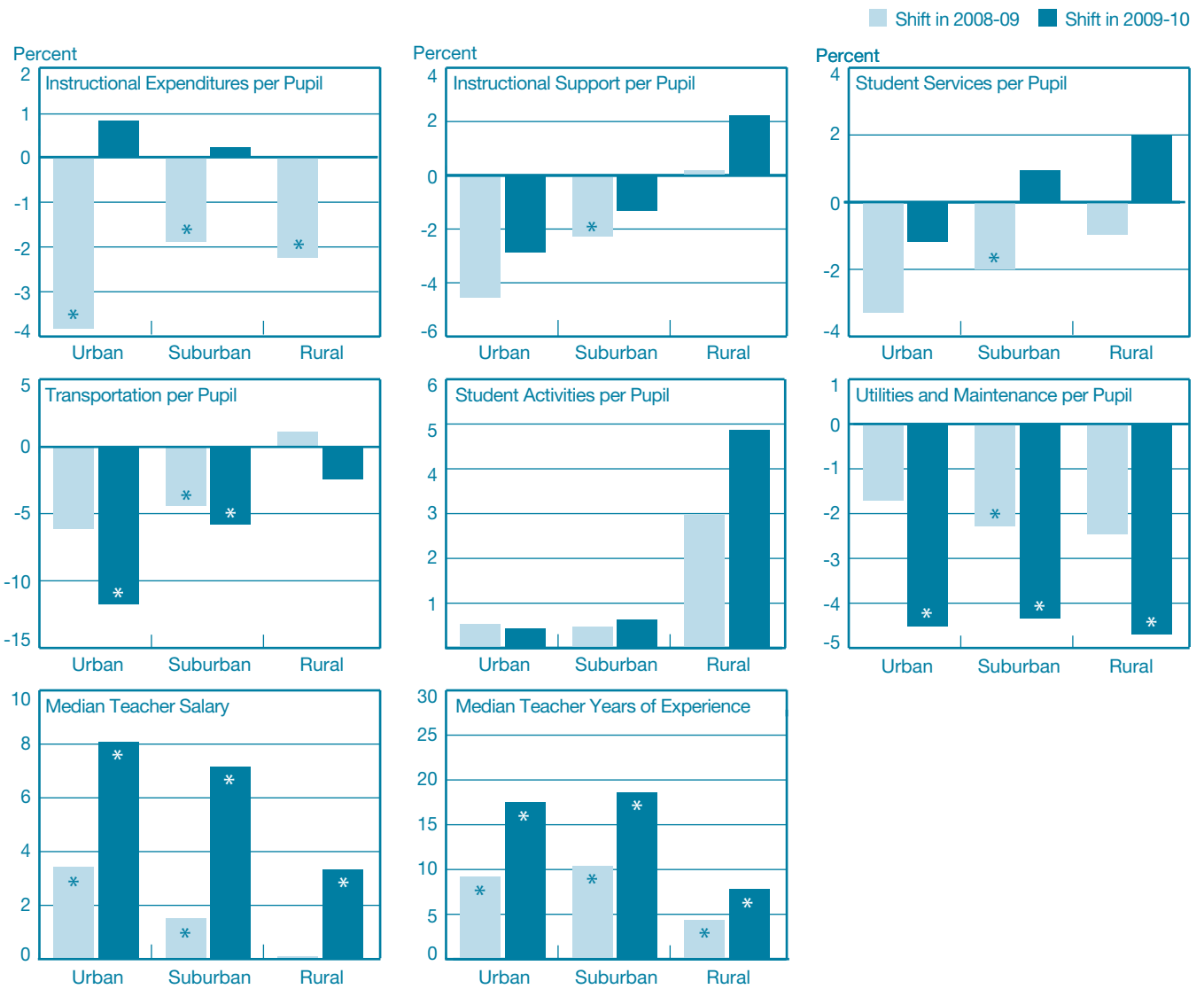
ture categories, leaving the planned expansion of a preschool program stalled, special education allocations and nonpublic school aid 15 percent below projected need, debt service aid down by 15 percent, and funding for adult education slashed entirely. Data from the state's Department of Education show that in 2011 the number of full- and part-time public school teachers in New Jersey dropped 4 percent, while the number of administrators fell 7 percent.

As economists are predicting continued softness, school districts will likely face hard decisions ahead involving cuts to the critical instructional expenditure category that they have so far been successful in preserving. This possibility could have adverse effects on human capital formation and, by extension, the nation's future. Our findings form an important basis for understanding schools' financial situations during recessions and can serve to guide future policy decisions.

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CHART 8

Heterogeneities by School District Urbanicity



Sources: Authors' calculations, using the New Jersey Department of Education's Audit Summary, Taxpayers' Guide to Education Spending, and Report Card data.

Note: The * symbol denotes significance at the 10, 5, or 1 percent level.

TABLE 6

Heterogeneities by School District Metropolitan Area

Panel A	Instructional Expenditures per Pupil				Instructional Support per Pupil				Student Services Per Pupil			
	Camden	Edison	Newark	Wayne	Camden	Edison	Newark	Wayne	Camden	Edison	Newark	Wayne
Percentage shift in 2008-09	-2.58***	-1.56	-2.46***	-1.22	-1.99	0.90	-1.48	-3.87	-3.17	1.39	-1.26	-3.38
Percentage shift in 2009-10	0.43	1.30	0.24	0.16	-1.85	4.30	0.89	-4.95	-2.10	5.55*	3.09*	-1.20
Pre-recession base	7,314	7,783	7,974	7,862	1,757	1,868	1,998	2,031	1,464	1,594	1,692	1,676
Trend	176.2*** (11.1)	185.7*** (18.3)	146.4*** (8.8)	79.1*** (9.4)	68.5*** (4.4)	68.5*** (6.2)	67.1*** (3.6)	59.3*** (7.2)	58.7*** (3.5)	63.1*** (5.0)	56.7*** (3.1)	53.8*** (4.8)
Recession	-189.0*** (67.7)	-121.8 (104.2)	-196.2*** (65.6)	-96.1 (70.1)	-35 (36.2)	16.9 (39.8)	-29.5 (33.4)	-78.6* (44.0)	-46.4 (28.4)	22.2 (36.2)	-21.3 (27.8)	-56.6 (36.2)
Stimulus	220.6** (88.2)	223.0* (128.8)	214.9** (84.6)	108.9 (82.8)	2.6 (41.9)	63.4 (56.4)	47.4 (42.1)	-22.1 (72.1)	15.7 (32.9)	66.3 (49.5)	73.5* (36.9)	36.5 (42.8)
Observations	1,252	1,424	1,605	1,260	1,252	1,424	1,605	1,260	1,252	1,424	1,605	1,260
R ²	0.784	0.368	0.783	0.842	0.752	0.518	0.776	0.8	0.768	0.577	0.79	0.836
Panel B	Transportation per Pupil				Student Activities per Pupil				Utilities and Maintenance per Pupil			
	Camden	Edison	Newark	Wayne	Camden	Edison	Newark	Wayne	Camden	Edison	Newark	Wayne
Percentage shift in 2008-09	-6.42***	-4.35**	-1.06	-2.83	1.38	-0.60	-0.23	2.72	-2.16	-0.17	-2.69**	-2.41
Percentage shift in 2009-10	-9.2***	-7.47***	-4.27**	-3.95	0.75	1.56	0.76	0.16	-4.50***	-2.22	-5.48***	-4.86***
Pre-recession base	726	811	822	612	223	253	264	269	1,540	1,659	1,616	1,616
Trend	23.8*** (2.3)	15.5*** (2.2)	11.8*** (2.0)	4.2 (3.3)	4.6*** (0.7)	6.2*** (0.7)	4.5*** (0.7)	5.1*** (0.7)	49.9*** (3.2)	55.6*** (4.7)	43.3*** (2.6)	34.0*** (3.2)
Recession	-46.6*** (15.0)	-35.3** (17.8)	-8.8 (13.6)	-17.4 (30.4)	3.1 (5.3)	-1.5 (5.7)	-0.6 (5.9)	7.3 (5.2)	-33.2 (22.3)	-2.9 (29.2)	-43.5** (21.4)	-39.0* (23.1)
Stimulus	-20.1 (18.8)	-25.3 (21.1)	-26.4 (16.8)	-6.8 (35.4)	-1.4 (6.6)	5.5 (7.5)	2.6 (6.9)	-6.9 (6.1)	-36.1 (27.3)	-33.9 (37.1)	-45.1* (26.8)	-39.5 (30.4)
Observations	1,252	1,424	1,597	1,260	1,229	1,412	1,595	1,259	1,252	1,424	1,605	1,260
R ²	0.897	0.777	0.916	0.738	0.959	0.946	0.962	0.971	0.849	0.482	0.813	0.899

TABLE 6 (CONTINUED)

Heterogeneities by School District Metropolitan Area

Panel C	Median Teacher Salary				Median Teacher Years of Experience			
	Camden	Edison	Newark	Wayne	Camden	Edison	Newark	Wayne
Percentage shift in 2008-09	0.02	1.87**	1.89***	2.87***	3.62	11.78***	12.51***	13.11***
Percentage shift in 2009-10	4.27***	7.64***	7.76***	9.47***	7.24***	22.48***	21.9***	25.14***
Pre-recession base	56,138	55,400	58,511	60,527	11.05	9.34	9.59	9.15
Trend	-66.3 (74.3)	-493.4*** (79.1)	-607.1*** (76.0)	-1,087.2*** (105.8)	-0.3*** 0.0	-0.5*** 0.0	-0.5*** 0.0	-0.7*** 0.0
Recession	11.7 (436.7)	1,037.6** (471.4)	1,106.8*** (427.6)	1,734.9*** (560.0)	0.4 (0.3)	1.1*** (0.2)	1.2*** (0.2)	1.2*** (0.2)
Stimulus	2,383.8*** (530.4)	3,195.2*** (559.4)	3,430.8*** (504.9)	3,995.3*** (617.4)	0.4 (0.3)	1.0*** (0.3)	0.9*** (0.2)	1.1*** (0.3)
Observations	1,042	1,181	1,335	1,047	1,042.0	1,181.0	1,335.0	1,047.0
R ²	0.809	0.788	0.813	0.812	0.718	0.692	0.694	0.698

Sources: Authors' calculations, using the New Jersey Department of Education's Audit Summary, Taxpayers' Guide to Education Spending, and Report Card data.

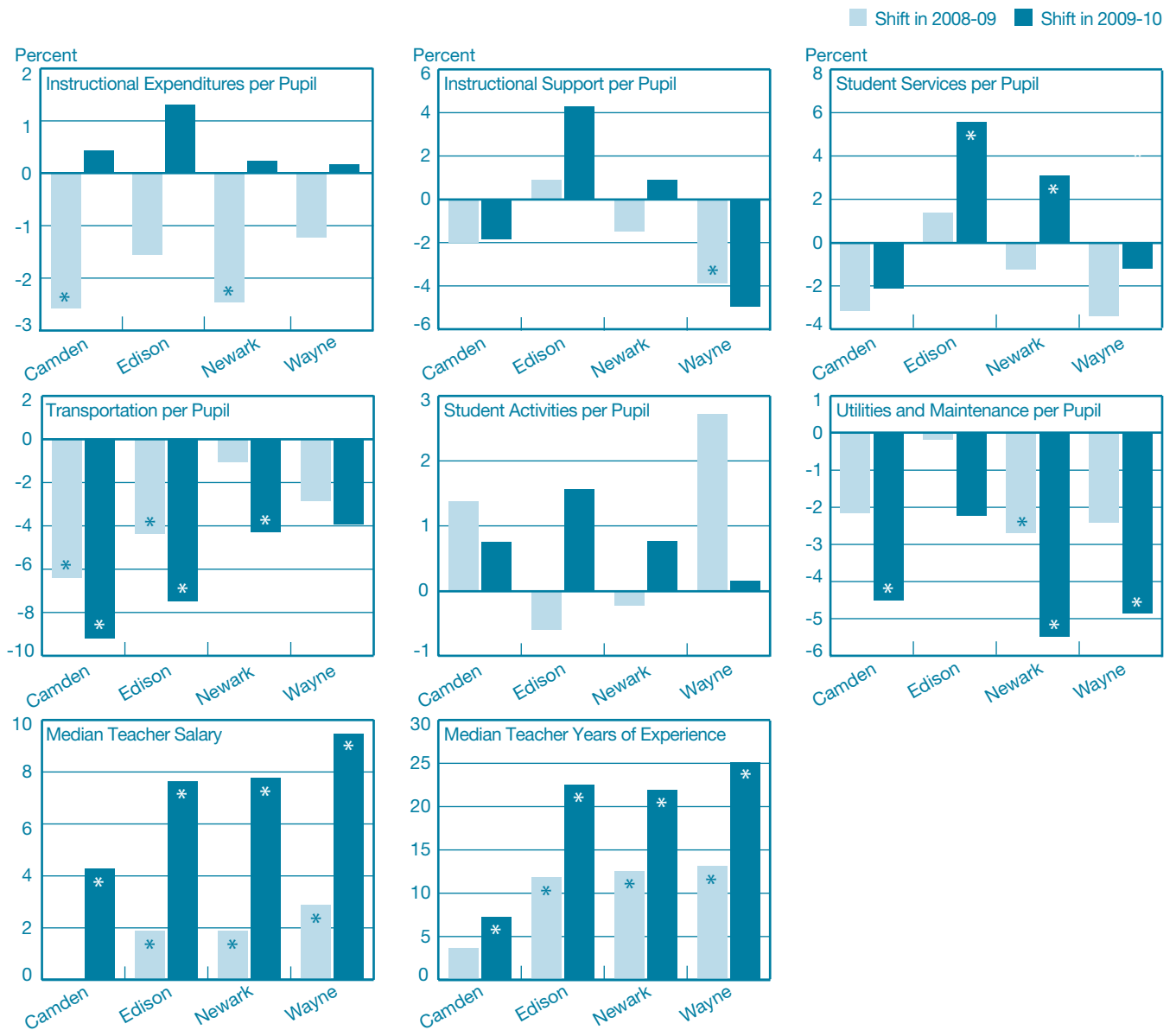
Notes: Robust standard errors are in parentheses. All regressions control for racial composition and percentage of students eligible for free or reduced-price lunch, and include school district fixed effects. Pre-recession base is expressed in 2010 constant dollars.

***Statistically significant at the 1 percent level.

**Statistically significant at the 5 percent level.

*Statistically significant at the 10 percent level.

CHART 9
Heterogeneities by School District Metropolitan Division

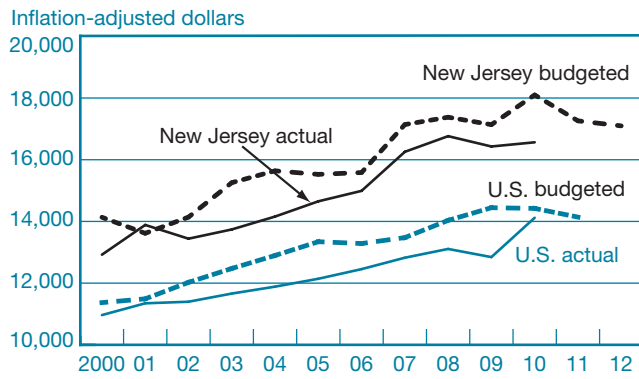


Sources: Authors' calculations, using the New Jersey Department of Education's Audit Summary, Taxpayers' Guide to Education Spending, and Report Card data.

Note: The * symbol denotes significance at the 10, 5, or 1 percent level.

CHART 10

Total Funding per Pupil: Budgeted versus Actual



Source: Authors' calculations, using U.S. Department of Education and New Jersey State Treasury data.

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