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## **Precarious Slopes? The Great Recession, Federal Stimulus, and New Jersey Schools**

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### **Abstract**

While a sparse literature investigates the impact of the Great Recession on other sectors of the economy, there is virtually no research that studies the effect of the Great Recession, or past recessions, on schools. This paper starts to fill the void. Studying school funding during the recession is of paramount importance because schools have a fundamental role in fostering human capital formation and economic growth. We exploit rich panel-data and trend-shift analysis to analyze how New Jersey school finances were affected during the Great Recession and the ARRA federal stimulus period. Our results show strong evidence of downward shifts in both revenue and expenditure following the recession. Federal stimulus seemed to have helped in 2010, however, both revenue and expenditure still declined. While total revenue declined, the various components of revenue did not witness symmetric changes. The infusion of funds with the federal stimulus occurred simultaneously with statistically and economically significant cuts in state and local financing, especially the former. Our results also show a compositional shift in expenditures in favor of categories that are linked most closely to instruction, while several noninstruction categories, including transportation and utilities, declined. Interestingly, budgetary stress seems to have led to significant layoffs of untenured teachers, leading to a rightward shift of the teacher salary and experience distributions.

Heterogeneity analysis shows that high-poverty and urban districts sustained the largest falls in the post-recession era. The findings of this paper contribute valuable insight regarding schools' financial situations during recessions and can serve as a guide to aid future policy decisions.

Key words: school finance, recession, ARRA, federal stimulus, Abbott Districts

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“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 IV

“WHEREAS, the New Jersey State Constitution requires the Governor to take care that the laws of this State be faithfully executed, N.J.Const. (1947) Article V, Section 1, Paragraph 11, including ensuring compliance with the constitutional mandate that a balanced State budget be maintained, N.J.Const. (1947) Article VIII, Section 2, Paragraph 2”

-Executive Order No. 14, signed by Governor Chris Christie, February 11, 2011

## **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.<sup>1</sup> Surprisingly then, one important component of this topic has been vastly 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 contributed to smaller tax revenues and larger budget gaps.<sup>2</sup> These budget gaps had a deleterious effect on state and local governments’ ability to fully fund schools. While a sparse literature investigates the impact of the Great Recession on other sectors of the economy, there is virtually no research so far that seeks to study the effects of the Great Recession, or past recessions, on schools. Our paper starts to fill this void.

This paper examines how school finances in New Jersey were affected by the onset of the Great Recession and the federal stimulus funding period that followed. Understanding how the Great Recession affected schools has long term societal and policy implications. Using rich panel data on a multitude of school finance variables, we apply a trend shift analysis to analyze the above questions.

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<sup>1</sup> Barro (1991), Benhabib and Spiegel (1994), Becker (1994), and Hanushek and Woessmann (2007).

<sup>2</sup> See Gerst and Wilson (2010) and Deitz, et al (2010) for an analysis of the budgets gaps nationally and in New Jersey respectively.

Demonstrating national concern for the safeguarding of student achievement during a recession marked by pervasive budget cuts, the federal government designated the largest portion of its stimulus package grant funding to public education. In February 2009, Congress passed the American Recovery and Reinvestment Act (ARRA), an economic stimulus package that provided an anticipated \$840 billion in new spending, with \$100 billion designated for public education. Of this \$100 billion, New Jersey appropriated \$2.23 billion.<sup>3</sup>

In addition to studying the overall impact of the recession, we also study if the effects varied by poverty, metropolitan area, and urban status. The analysis yields some interesting results. There is strong evidence of downward shift in both revenue and expenditure following the recession in New Jersey. Federal stimulus seemed to have helped in 2010—while both revenue and expenditure still exhibit declines, they are somewhat smaller than that in 2009.<sup>4</sup>

While total revenue declined, the various components of revenue did not witness symmetric changes, rather there were some interesting compositional shifts. State aid per pupil declined in both years after the recession, as did local revenue per pupil. But the percentage decline in state aid per pupil far exceeded the corresponding decline in local revenue per pupil, especially in the second year after recession. In contrast, there was an upward shift in federal aid per pupil in 2010 following the introduction of the ARRA funds. Without the support of the federal stimulus in 2010, total aid to districts would have declined even further, given other components. As a result of these changes, reliance on federal aid increased in 2010, while reliance on state aid declined.

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<sup>3</sup> This number came from a document provided by the State of New Jersey Department of Treasury, Office of Management and Budget and represents the total ARRA appropriation for New Jersey.

<sup>4</sup> In this paper, we refer to school years by the year corresponding to the spring semester.

Next, we delve deeper to investigate how the different components of expenditures were affected. While instructional expenditure per pupil declined in 2009, there is no evidence of any decline in 2010. This indicates that the federal stimulus funding may have been successful in preventing declines in instructional expenditure. This category includes teacher salaries and classroom expenditure and constitutes the spending category that most directly interacts with student learning.

The patterns in instructional support per pupil and student services per pupil show patterns similar to instructional expenditure. In contrast, other non-instructional categories such as transportation and utilities show declines in both years. Median teacher salaries show a positive shift in both years after the recession, while median teacher experience also increased. These teacher patterns are consistent with an increase in lay-offs of less-experienced teachers, which would intuitively shift the teacher salary distribution to the right.

Despite these overall statewide patterns, there was considerable heterogeneity by poverty, metropolitan area, and urban status. High poverty districts sustained larger falls in nearly all expenditure categories as compared to their medium poverty and affluent counterparts. Studying variations by metropolitan areas, we find that Edison fared best both in terms of instructional expenditure as well as most of the non-instructional expenditure categories. Studying variations by urban status reveals that rural districts fared best across most categories, while urban districts experienced the largest 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, 1997)]. While these papers study general school funding patterns, ours is the first study to examine whether recession affects school finance patterns, and also whether federal stimulus funding can make a difference.

It is worth noting here that we view our findings as strongly suggestive, but not necessarily causal. This is because we implement a trend shift analysis—theoretically if there were common shocks in the two years following recession that had the capability to affect our financial variables, these shocks would bias our estimates. We do an exhaustive analysis of potential confounding factors during this period that might bias our results (see section 4.1 and 5.5). This analysis helps us interpret the results, frame our perspective, and put bounds on the recession impact estimates.

Moreover, 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 shock as large as the Great Recession, adding further confidence to our results. Studying school funding during this difficult time 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, our nation's future. Our paper provides valuable insight about how school districts fared during the financial downturn and promises to both improve our understanding of schools' financial situations under duress as well as help to 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 downturn in housing prices, employment, income, and business activity each contributed to smaller tax revenues and larger budget gaps.

Local governments have in the past relied heavily on property taxes, which in the beginning half of the decade were supported by a booming housing market. Housing prices in the United States had been increasing at an average rate of 7.8% between 2000 and 2006, but as delinquencies and foreclosures began to rise, home prices dropped to an average rate of -3.9% during the recession quarters.<sup>5</sup> 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% between 2000 and 2006, and fell to an average 4.7% decline in the recession quarters. This is one of the many contributors to the decline in revenues during the Great Recession.

State governments also experienced depleted revenue streams, as unemployment spikes led to less income tax revenue, and lower consumption led to less revenue from sales tax. New Jersey specifically had relied heavily on the financial industry to provide an increasing portion of its revenues, but as the recession hit the finance sector hard, New Jersey's budget gap grew.<sup>6</sup>

As an attempt to remedy these depletions, Congress passed the American Recovery and Reinvestment Act in February 2009, an economic stimulus package that provided an anticipated \$840 billion in new spending, with \$100 billion designated for public education. Qualitatively,

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<sup>5</sup> For all figures related to home prices, we used the 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 report of the U.S. economic activity (see <http://www.nber.org/cycles/main.html>).

<sup>6</sup> Deitz, et al (2010).

districts were directed to use the ARRA funds to save and create jobs, to boost student achievement, and to bridge student achievement gaps. The quantitative requirements specify that 81.8% of the stabilization funds in education go toward the support of public education, and that states must restore for FY 2009, 2010, and 2011 support for public education to the greater of the FY 2008 or FY 2009 level.

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

## **2.2 Overview of New Jersey's Education History and Programs**

Long before the start of the most recent recession, New Jersey's school funding system has been a topic of much public and legal debate. In 1996, the state adopted a funding system known as the Comprehensive Educational Improvement and Financing Act (CEIFA). In the years leading up to the recession, this funding formula became the central issue in many State Supreme Court orders. The most well known series of litigations, the *Abbott v. Burke* cases, were based on discrepancies in per-pupil spending among the state's school districts. These important court orders and their implications for New Jersey's school finances are beyond the scope of this paper, but are explored in detail in our companion paper Chakrabarti and Sutherland (2012) which studies how school finance patterns in the Abbott districts were affected during the Great Recession and federal stimulus funding periods..

In January of 2008, Governor Jon Corzine's School Funding Reform Act of 2008 (SFRA) was approved by legislature. This highly anticipated act was the first official change to the funding formula since 1996 and was the product of five years of development by the Department of



Education. The formula called for a 7% increase in state funding for K-12 education in the 2008-09 school year. It was also the first change to the state funding formula since 1990 that did not include a special earmark assigned solely for Abbott districts, but instead, applied a uniform formula based on the portion of low-income students and the number of students requiring special education (Chakrabarti and Sutherland 2012)

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 2008-09 school year were the first to be affected by the recession. Despite the start of the recession, the new SFRA formula was fully met in the 2008-09 school year, and 2009-10 budgets were also prepared using the SFRA formula.

However, midway through 2009-10 the toll of the recession forced some changes. Revenue streams came in at what was projected to be \$2.2 billion less than what was necessary to cover the state's budget deficit. Given the state of New Jersey's constitutional mandate requiring the Governor to maintain a balanced budget, the newly enacted Governor Chris Christie faced some difficult decisions. In an unprecedented movement, the Governor significantly reduced education funding midyear. The funding caps for district aid were cut, and many districts received less state aid than budgeted and less aid than required under the SFRA formula.

### **3 Data**

We developed a rich panel dataset that combines annual school district level data from multiple sources. The dataset covers 572 New Jersey districts and school years 1998-99 through 2009-

10.<sup>7</sup> Most of the finance data were obtained from the New Jersey Department of Education's Office of School Finance. We also supplemented this dataset with school finance data from National Center for Education Statistics's (NCES) School Finance Survey (F-33), as well as data from the US Census Bureau. Non-finance data were obtained from New Jersey Department of Education's Office of Data, Research, Evaluation and Reporting, NCES's Common Core of Data (CCD), and the Bureau of Labor Statistics (BLS).

We have data on total revenue, total expenditure, debt outstanding, as well as components of total revenue and expenditure. In addition to total revenue, we obtained data on amounts and percentage contributions of federal aid, state aid, and local revenue. Data on revenue from property taxes were also collected.

In addition to total district expenditure, detailed data were collected on the various components of expenditure: instruction, instructional support, student services, transportation, student activities, and utilities.<sup>8</sup> Definitions for each of these variables is shown in Appendix Table A2. We also obtained data on median salary and median years of experience for teachers and administrators.<sup>9</sup>

Non-Finance data include district level data on various socio-economic and demographic variables. These include enrollment, racial composition, and percentage of students eligible for free or reduced price lunches. All revenue and expenditure variables are analyzed on a per pupil basis using each school year's average daily enrollment variable.

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<sup>7</sup> Recall that when referring to the year of the data, this paper uses the spring term, for example 2009-10 is called 2010. Charter districts, non-operating districts, and districts that receive students via tuition only are not included in our analysis.

<sup>8</sup> In the text of the paper, we refer to the variable for "utilities and maintenance" as "utilities" for simplicity.

<sup>9</sup> All calculated district medians are reported in October of each school year, and the years experience variables are based on the total number of years in public education.

Heterogeneity breakdowns are performed by poverty level, urbanicity, district size, and Metropolitan Division (MD). For poverty level, urbanicity, and district size, the 2008 levels are used to make the categorization in an effort to capture pre-recession levels. Poverty level is defined by the percentage of students eligible for free or reduced-price lunches, with the top 75% of the districts in our data identified as high poverty, the bottom 25% identified as affluent, and districts falling within the 25-75% range categorized as medium poverty.<sup>10</sup> Urbanicity designations of rural, urban, or suburban are defined using the National Center for Education Statistics Common Core or Data (CCD) classifications.<sup>11</sup>

Heterogeneity breakdowns for metropolitan areas include the four largest New Jersey Metropolitan Divisions: Edison-New Brunswick, New York-White Plains-Wayne, Newark-Union, and Camden (see Appendix Figure A3). We use ArcGIS mapping technology and Census data to visualize changes in financial variables as well as to map out the metropolitan divisions. The district and the metropolitan area shape files are obtained from the US Census Bureau.

In order to adjust for inflation, all expenditure and revenue data were adjusted to 2010 dollars using annual values of the Consumer Price Index for all Urban Consumers which covers approximately 87% of the total population of the United States.

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<sup>10</sup> As of the 2006-2007 school year, districts in the top 75% poverty level had 27.4% of its students on free or reduced lunch, while the bottom 25% had 4.9% on free or reduced lunch.

<sup>11</sup> Districts inside urbanized areas or inside urban clusters less than 35 miles from urbanized areas are categorized as urban. Territories outside principal cities and inside urbanized areas comprise the suburban districts. NCES uses the Census definition of rural territory based on the level of land developed.

#### 4 Empirical Strategy

The goal of this paper is to investigate whether the Great Recession and the Federal Stimulus funding period that followed were associated with shifts in New Jersey education financing. We conduct a trend shift analysis and use specifications (1) and (2) to analyze these effects.

$$Y_{it} = \alpha_0 + \alpha_1 T + \alpha_2 v_1 + \alpha_3 v_2 + \alpha_4 X_{it} + f_i + \varepsilon_{it} \quad (1)$$

where  $Y_{it}$  represents each school finance variable of school district  $i$  in year  $t$ ;  $T$  represents the time trend and takes a value of 0 in the immediate pre-recession year (2007-08) and increments by one for each subsequent year and declines by one in each previous year;  $f_i$  denotes school district fixed effects;  $X_{it}$  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  $\geq 2009$  and 0 otherwise;  $v_2 =1$  if year  $\geq 2010$  and 0 otherwise.

As stated previously, local, state, and federal governments finalize their budgets in the spring prior to the budgeted year. More specifically, the budgets for the 2007-08 school year were finalized in the spring of 2007, before the recession officially began (December 2007), and before decision makers were aware of the impending recession. Therefore, 2007-08 is taken as the last pre-recession year in this paper.

The coefficient  $\alpha_1$  represents the overall trend in the corresponding financial variable during the pre-recession period. The coefficients of interest are  $\alpha_2$ , representing the intercept shift at the onset of the recession, and  $\alpha_3$ , representing the additional intercept shift during the federal stimulus period. All regressions include district level fixed effects,  $f_i$  and control for the

demographic and socio-economic composition of the district. The results are robust to the inclusion and exclusion of these covariates.

While the above specification uses intercept shifts, we also use an alternative specification where we model the shifts as trend shifts.

$$Y_{it} = \beta_0 + \beta_1 T + \beta_2(T * v_1) + \beta_3(T * v_2) + \beta_4 X_{it} + f_i + \varepsilon_{it} \quad (2).$$

Here, the coefficients of interest are  $\beta_2$  and  $\beta_3$ , where  $\beta_2$  represents the shift in trend (if any) during the recession, while  $\beta_3$  represents any additional trend shift during the federal stimulus period.

While we estimate both specifications and the results are qualitatively similar, our preferred specification is specification (1), and we report results from this model. This is because data availability constraints cause the later specification to estimate the later trend shift  $\beta_2$  from a single additional year of data, and we believe that estimation of a differential trend based on a single year of data may not be robust. Rather, intercept shift is a more natural formulation in this case.

While the above coefficients capture actual shifts, we also compute percentage shifts that are obtained by expressing the above shift coefficients as percents of the pre-recession (2008) base of the corresponding financial variable. These percent effects allow for an easier interpretation and are more informative as they give an idea about the size of the effects as well as facilitate comparison between the shifts in the various financial variables. In our discussion, we will focus on the discussion of two percentage shifts: first, the percentage shift immediately following the recession (in 2008-09), and second, the percentage shift in 2009-10 (computed by expressing the

sum of the two effects  $\alpha_2$  and  $\alpha_3$  from specification (1) as a percent of the pre-recession base).<sup>12</sup> The latter captures the combined effect of the recession and the federal stimulus in 2009-10.

#### 4.1 Interpretation of the Treatment Effects

If there were common shocks in the two years following recession that had the capability to affect our financial variables, our estimates of the recession and stimulus effects outlined above would be biased. Understanding these potentially confounding factors is absolutely essential and helps us interpret the results and put them in perspective. Therefore, we conduct an exhaustive analysis of potential confounding factors during the period.

First, while interpreting the shift at the onset of the recession,  $\alpha_2$ , we consider the implementation of Governor Corzine's new school funding formula, SFRA. The formula called for a 7% increase in total state funding for K-12 education in the 2008-09 school year. Since state aid constitutes nearly half of the general formula aid to districts, this new state aid funding formula should be considered a positive shock not only to state aid, but also to total revenue, and total expenditure and its components. Since the shock of the Corzine funding formula is in the opposite direction as the recession shock, any negative shift in these variables in 2009 will be above and beyond the expected positive impact of the new funding formula. Therefore, it is safe to say that negative shifts (if any) in these variables in 2009 can be regarded as underestimates of the recession effects, however in the correct direction. In contrast, positive shifts could mean that the effect of the SFRA surpassed the effect of the recession or that the recession did not have much of a negative effect.

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<sup>12</sup> For specification 2, the percent trend shift in 2009-10 is obtained by expressing the sum of the two effects  $\beta_2$  and  $\beta_3$  in specification 2 as a percent of the pre-recession base.

Second, while interpreting the 2010 stimulus shift,  $\alpha_3$ , we need to consider the impact of Governor Christie's mid-year cuts to the SFRA formula.<sup>13</sup> With the negative impact to 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 mid-year and did not affect school's planned budgets or their expenditure in the first half of the school year. Any positive additional effects in 2010 (over 2009 effects) can therefore be regarded as underestimates of the stimulus effect. Additional negative effects in 2010, on the other hand, may mean that the recession effects (including Governor's Christie's mid-year cuts) dominated. As noted in Section 2.2, these mid-year cuts in 2010 were driven by budget shortfalls brought about by the recession. In that sense, the 2010 effects ( $\alpha_2$  and  $\alpha_3$ ) still capture the combination of the recession and stimulus funding effects.

## **5 Results**

### **5.1 Overall Patterns**

Using all 572 New Jersey districts in our dataset, Figure 1A shows the general statewide trends in per pupil expenditure and revenues, as well as trends in federal, state and local contributions to total revenue. The dotted vertical line represents the pre-recession year, and the horizontal axis represents the spring term of the school year with the last data point showing 2010. Both total expenditure and total revenue show declines in 2009. Despite a slight increase in 2010, the levels for total expenditure as well as for total revenue did not return to the pre recession per pupil levels. Federal revenue increased 1% between 2008 and 2009, and then jumped 35% between 2009 and 2010, the year of the federal stimulus funding. District reliance on federal aid

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

spiked 32% between 2009 and 2010, while reliance on state aid dropped 16% over the same time period, demonstrating the shift in revenue contribution resulting from the combination of the Great Recession and the fiscal stimulus of 2010.

Figure 1B analyzes trends in the various components of expenditures. Instructional expenditures show evidence of flattening in 2009; however this pattern is reversed in 2010. In contrast, non-instructional categories such as transportation and utilities show either a flattening or decline in our years of interest. Teacher and administrator salaries (appendix Figure A2) show an upward shift in the post-recession period (at least in 2010). Below, we investigate whether these patterns continue to hold in a more formal trend shift analysis.

Table 1 presents results from the estimation of specification 1. Each table in this paper is structured in the same way. The top section of each panel presents the percent shifts, with the first row capturing the percent shift in 2008-09, the second row capturing the percent shift in 2009-10, and the third row showing the pre-recession base. The bottom section of each panel presents the regression estimations from which the percent shifts were derived. Our discussion of results will focus on the percent shifts. For easier comparability and a visual representation, the shifts are also illustrated in histograms in Figures 3 through 7.

As Table 1 Panel A and Figure 3 show, both total expenditure and revenue experienced declines in 2008-09, signifying the negative effect of the recession. Note that these effects are likely underestimates of the corresponding recession effects because the change in the state funding formula in the form of SFRA (as discussed earlier) had a positive effect on overall school revenue. While declines are evident in 2010 as well, they are somewhat more modest, at least for total expenditure per pupil.



As expected, federal aid per pupil shows a sharp increase in 2010, coinciding with the infusion of federal funds with the stimulus<sup>14</sup>. In contrast, state aid per pupil shows declines in both years after the recession. Recall from earlier discussion that the SFRA led to an upward shift in state aid per pupil in 2009, so the decline in 2009 is likely an underestimation of the true recession effect. Digging deeper, we find that although the SFRA formula was honored in 2009 as publicized, state level cuts in categories outside the SFRA formula led to the negative shift in overall state aid, specifically in pension funding.

Historically there has been a significant portion of state aid distributed to the Teachers' Pension and Annuity Fund (TPAF). TPAF pension funding is not stipulated in the SFRA formula, so in 2009 when the onset of the recession brought depleted revenue flows, pension funding was cut dramatically. Appendix Figure A1 shows the trends in total state aid, TPAF funding, and state aid less TPAF funding. The gray dotted 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. This figure shows that while SFRA insulated other parts of state aid, the recession adversely affected TPAF funding which in turn negatively impacted total state aid per pupil.

These patterns are also reflected in a formal trend shift analysis of the individual state aid components—the corresponding estimates are not reported to save space, but are available on

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<sup>14</sup> It is worth pointing out here that the coefficient estimate for 2009 provides evidence of a negative shift in 2009. This is due to the fact that there was a sharp positive trend in federal revenue per pupil in the initial years of our data, while the trend changed to flat or slightly negative in the years preceding the recession (Figure 1A). The consequence was the existence of a large positive pre-trend (Table 1) for federal revenue per pupil which in turn led to a negative shift estimate for 2009, although 2009 amount was in line with its immediate preceding years. To investigate how much the 2009 negative shift is an artifact of the positive trend in the previous years, we re-estimate specification (1) using data from 2004 through 2010 for federal revenue per pupil. Now, there is no evidence of any negative shift in 2009, rather a small positive shift that is statistically indistinguishable from zero. In contrast, there is still strong and statistically significant evidence of a large positive shift in 2010. These results are available on request.

request. The situation in 2010, however, was different. Although the state budgets for 2010 were established using the SFRA formula, revenue streams that year were less than expected, and in an unprecedented movement, the funding formula was revamped significantly midyear. The funding caps for district aid were cut, and many districts received considerably less state aid than budgeted and less aid than required under the SFRA funding formula. Indeed, Figure A2 shows that declines are evident in both total state aid as well as in state aid less TPAF. Results for both years suggest that the Great Recession had a marked negative impact on state aid to districts.

As would be expected given the negative recession shock to housing prices and local revenue streams, local revenue per pupil and property taxes per pupil show negative shifts in both years after the recession. 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 nevertheless depleted levels.

Table 1 Panel B illustrates shifts in percentage contributions of the federal, state and local contributions to total revenue. The patterns reveal that the above changes led to districts relying less on state aid and instead, becoming more largely funded 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 shift in the composition of revenue in New Jersey. Figure 2 provides additional illustration of the increased reliance on federal aid, mapping the distribution of percent contribution in federal aid in 2007-08 (the immediate pre-recession year) and 2009-10. As can be seen, there was a nearly across the board increase in federal contribution to total revenue.

The variable for total debt outstanding per pupil represents total long term debt at the end of the school year. The % shifts for debt outstanding are statistically significant and negative both in 2009 and 2010. In New Jersey, districts are not permitted to take out debt to cover current expenses, so the majority of debt is used for school construction. Since there were fewer plans for construction made in light of the recession, there were significant declines in debt outstanding in both school years. Finally, column (11) in table 1 Panel B shows evidence in favor of negative shifts in student enrollment in both years after recession.

While total expenditure suffered declines in both years after the Great Recession hit, it would be interesting to investigate whether the various component expenditure categories followed similar patterns. Table 2 and the lower panel in Figure 3 analyze this question. Interestingly, there are marked variations in the impacts sustained by the various component expenditure categories.

While instructional expenditure suffered a negative shift 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. These are in spite of the 2010 cuts to education budget discussed above.

These patterns provide suggestive evidence that the federal stimulus funding, over 90% of which was used in the 2009-10 school year, have helped temper the negative effect of the recession, at least on these categories. In contrast, other non-instruction categories such as transportation and utilities suffered statistically significant declines in both years after the recession. Conversations with New Jersey Department of Education staff revealed that faced by strained budget conditions, New Jersey cut back on non-essential transportation costs, such as courtesy busing.<sup>15</sup>

This is consistent with the above patterns in transportation spending evidenced in our data.

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<sup>15</sup> Courtesy busing is the provision of busing for non-mandatory students such as students living within walking distance from the school or who otherwise have a reasonable alternative to busing.

It is worth noting here that the patterns suggest that New Jersey tried to maintain the expenditure categories most related to student learning and development. Instructional expenditure, which includes teacher salaries and classroom expenditure, constitutes the spending category that most directly interacts with students' learning. With the stimulus funds coming in, there is no evidence of the negative effects on this category that we see in the previous 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.

The last two columns in Table 2 Panel B investigate the impacts on median teacher salary and median administrator salary following the Great Recession. Some intriguing patterns emerge. Teacher salary shows upward shifts in both years after recession. While administrator salary shows a downward shift in the first year after recession, it shows a positive shift in the second year. To understand and interpret these results, there are two key factors to consider.

First, education personnel retirements spiked in these two school years, as rumors that the new governor would cut pension funding spread across districts.<sup>16</sup> 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 is not what we see for teacher salary; however the increase in

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<sup>16</sup> Surmised using data available from the Department of the Treasury Division of Pensions and Benefits.

administrative retirements in 2009 is consistent with the negative shift in median administrative salary we see that year. This mechanism is corroborated by the patterns we observe in median years of experience of administrators. Though not statistically significant, column (2) in Appendix Table A2 shows evidence of a small decline in the administrators' years of experience. This may have potentially contributed to the decline in the administrators' median salary.

However, there is more to the story. To understand fully the patterns in teacher and administrator salary, we have to consider the second key factor: tenured 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.<sup>17</sup> As a result, the vast majority of lay-offs in New Jersey public education affect employees in their first and second years, reducing the number of lower level salaries. As Appendix Table A2 column (1) shows, there is strong evidence of large positive shifts in teachers' years of experience in both 2009 and 2010, and both these effects are highly statistically significant. These results supports the hypothesis that dramatic cuts in lower level employees shifted the overall median teacher salary up significantly in both years. Administrative employees' years of experience also showed a positive shift in 2010, although it was not statistically significant. These patterns provide evidence that the significant positive shifts in median teacher and administrative salaries are likely due to lower level culling in public education employees during the post-recession era.

## **5.2 Examining Heterogeneities by School District Poverty Level**

While the above analysis focuses on aggregate patterns, the rest of the paper takes a closer look to investigate whether there were differences in impacts within the state by various characteristics such as poverty status, location, and urbanicity. To save space, this analysis

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<sup>17</sup> New Jersey Permanent Statutes Database, Section 18a:6-10.

focuses only on a subset of the finance indicators analyzed above—the indicators that are of most interest—the various components of expenditure. This analysis provides valuable insight as to how the different types of districts allocated funds, and how the students in these districts were affected. Results for the other indicators are available on request.

Discussions about fiscal spending on education in New Jersey are most often framed by the discussion of wealth levels. In this vein, Table 3 and Figure 4 present the results for variations by poverty. The affluent districts fared best in terms of instructional expenditure as well as in most of the non-instruction expenditure categories (instructional support, student services, and transportation). They also experienced the largest upward shifts in both teacher salaries and years of experience for both years after the recession. The combined results for teacher salaries and years of experience imply that affluent districts may have had the largest instance of lower level teacher layoffs. Affluent districts had the smallest declines in utilities in 2009, but their experience in 2010 was not very different from the high and medium poverty districts in this category.

Most noteworthy in the poverty heterogeneity results is the comparatively large declines experienced by high poverty districts in both instruction and non-instruction categories. The most disparate examples are the shifts in student services and instructional support variables in 2010—while high poverty districts show large statistically significant declines, the affluent districts show large and significant increases. The variables for student services and instructional support capture the expenditure 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. These are surprising areas to see cuts in the districts hosting New Jersey's poorest and arguably most susceptible students.

### **5.3 Examining Heterogeneities by Urbanicity**

Perhaps the second most discussed characteristic of school districts in any conversation about New Jersey education financing has been urbanicity. Historically, since urban districts generally have lower property values and more apartment buildings that house multiple families, the ratio of students to potential sources of tax income was comparatively higher. The result was a large disparity between the per-pupil aid available for wealthier, rural districts as compared to poorer, urban districts.

Table 4 and Figure 5 analyze variations by urban status. Once again, while all three groups of districts exhibit statistically significant declines in instructional expenditure in the first year after the recession hit, there is no evidence of negative effects in 2010, suggesting stimulus funding might have helped. This pattern has repeated itself consistently throughout our results and suggests that the districts in general strived to preserve their instructional expenditure. While the decline in instructional expenditure in 2009 is most prominent for urban districts, the experiences in 2010 are very similar across the three groups of districts.

In most non-instruction categories (instructional support, student services, transportation, student activities), the rural districts fared the best, while the urban districts fared the worst. The experiences of the three groups were very similar for utilities.

All three groups show positive shifts in teacher salary and experience. However, rural districts show smaller spikes in both teacher salary and years of experience as compared to the suburban and urban districts, suggesting the lower level teacher lay offs may have been less prominent in rural districts.

## 5.4 Examining Heterogeneities by Metropolitan Area

We next look at the variations by metropolitan area, analyzing the four largest Metropolitan Divisions (MD): 1) New York-White Plains-Wayne, 2) Edison-New Brunswick, 3) Newark-Union, and 4) Camden. Figure A4 shows a map of New Jersey with the metropolitan areas defined. Newark constitutes the northwest portion of the state and includes the most affluent districts. Slightly east of Newark, the Wayne districts are second in terms of wealth and also have the largest population of Hispanic and Asian students. Edison districts are similar in demographics to Wayne, however tend to be larger in size. Camden districts have the highest instance of poverty, the largest black student population, and the largest number of small sized districts.

Table 5 and Figure 6 analyze the variations of impacts by metropolitan divisions. While all four MDs suffered declines in instructional expenditure in 2009, this pattern was reversed in 2010 when they each shifted upward slightly. Camden endured the largest decline in 2009, while the experiences of the various MDs in 2010 were very similar with the exception of Edison. Edison exhibited an upward shift that was about double the shifts of the other MDs. In most of the non-instruction categories, Edison stands out as having the largest upward shifts. All MDs show positive shifts in teacher salaries and years of experience in both years, with Wayne showing the largest increase in both years in both the categories. In summary, our results show that there were quite some variations across MDs and they also provide evidence that different New Jersey regions reacted in different ways to a lack of resources.



## 5.5 Studying the Role of Potential Confounding Factors

It is important to frame our results with a thorough understanding of the potential confounding factors that may have affected our coefficients of interest. First, while interpreting the shift at the onset of the recession,  $\alpha_2$ , we need to take into account the implementation of Governor Corzine's new school funding formula, SFRA in 2009. This shock should have a positive impact on the state as a whole (while having a negative impact on Abbott districts). Analysis of overall patterns in section 5.1 show statistically significant declines in total expenditure, total revenue and state aid in 2009, despite the presence of the SFRA formula. Declines are observed in the various component expenditure categories as well. While interpreting the results, it should be kept in mind that the effects in 2009 capture the joint effect of the Great Recession and the change in the state funding formula. However, since the SFRA acted as a positive shock, the effects are likely underestimates of the recession effects, but not overestimates. Thus, the above 2009 effects can be looked upon as lower bounds of the effects on the respective financial variables.

While interpreting the 2010 stimulus shift,  $\alpha_3$ , it is worth considering the role of Governor Christie's mid-year cuts to the SFRA formula. As discussed above, these cuts were the product of financial stress caused by the recession. So the 2010 effects still capture the joint effect of recession and stimulus funding. Of note here is that, for total expenditure and revenue as well as for most of the expenditure component variables, the effects in 2010 are milder than that the 2009 negative effects. This provides suggestive evidence that that federal stimulus had positive effects on school finance in New Jersey. However, the stimulus effects should be considered underestimates, as the mid-year funding cuts, though generated by the recession, acted in the opposite direction to the federal stimulus.

## 6 Conclusion

There are few more compelling stories in recession than those of the children of a nation. The investment in the education of children has well established relevance to the rebuilding of a nation and its potential for human capital advancement. Despite this, there has been virtually no literature studying the effect of the Great Recession, or past recessions, on schools. Our paper starts to fill this gap.

In this paper, we have explored how school finances in New Jersey were affected during the Great Recession and the federal stimulus funding period that followed. Using rich panel data on a multitude of school finance variables, we apply trend shift analysis to analyze how school revenues, expenditures, and their components were affected during the Great Recession and federal stimulus periods.

The analysis yields some interesting results. There is strong evidence of downward shift in both revenue and expenditure following the recession in New Jersey. Federal stimulus seemed to have helped in 2010—while both variables still exhibit declines, they are somewhat smaller than that in 2009. There is strong evidence of substitution of funds on the revenue side—the infusion of funds with the federal stimulus occurred simultaneously with statistically and economically significant cuts in state and local financing, especially the former. As a result of these changes, reliance on federal aid increased in 2010, while reliance on state aid declined. Without the support of the federal stimulus in 2010, our results suggest that total aid to districts would have declined significantly more than it did in actuality.

Our results also show that the post-recession period was characterized by a compositional shift in expenditures in favor of categories that are linked most closely to students' learning. The

categories for instructional expenditure, instructional support, student services, and student activities were preserved in 2010 when districts received the support from the ARRA funding<sup>18</sup>. In contrast, transportation and utilities expenditures declined, suggesting that New Jersey prioritized the preservation of the expenditure categories most related to student learning and development.

We also find some interesting patterns in the education employee (teacher and administrator) labor market. The results for the salary and years of experience variables provide evidence for lower level culling in public education employees during the post-recession era. As revenue streams were depleted, New Jersey's law for tenured dismissal—the law that makes lay offs nearly impossible for any employee past his or her third year of employment—appears to have taken priority in officials' decisions regarding teacher and administrator job preservation.

In addition to studying the overall impact of the recession, we also study if the effects varied by poverty, urban status, and metropolitan area. As shown, the results provide evidence of considerable heterogeneity. The high poverty and urban groups sustained the largest declines in the post-recession era. The most disparate examples in the poverty heterogeneities are the shifts in student services and instructional support variables in 2010. The high poverty districts, show large statistically significant declines in these categories, while the affluent districts show large and significant increases. These variables capture the expenditure on services that are designed to support, assess, and improve students' well-being, including social work, health services, technology, library costs, and student guidance.

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<sup>18</sup> While Instructional support saw a small (less than 1%) negative shift 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 negative effects and preserve it approximately at trend level. The other categories showed small positive or zero effects in 2010.

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 in the state, state and local revenues will likely continue below trend. The cessation of the federal stimulus funding and lower than trend growth of state and local revenues could lead to more significant downward pressures on revenues and expenditures, and various components of expenditures. In fact, some of this is already being evidenced.

Using a compilation of the annual budgets for the United States and the state of New Jersey, Figure 7 plots budgeted and actual revenue per pupil during 2000-2012. The Figure shows a noticeable decline of budgeted revenue after 2010. It also demonstrates that New Jersey's Treasury department budgeted for steeper declines in 2011 as compared to the nation as a whole.

The state's budget publication for the 2011 school year explicitly states that funds were not available to replace the ARRA federal funding of the year prior. The funding allocations required by the state's funding formula (SFRA) were not met, and the 2011 budget shows state wide declines, with many districts' aid declining by as much as 5% from the year prior. Cuts were made in many expenditure categories: the planned expansion of the preschool program was stalled, special education costs and non public school aid reflect a 15% reduction from the projected need, debt service aid was reduced by 15%, and funding for adult education was cut entirely. Data from the Department of Education show that the number of full- and part-time public school teachers in New Jersey dropped by 4%, while the number of administrators dropped by 7% in 2011.

As economists are predicting continued economic troubles into 2013, school districts will likely face hard decisions ahead that might involve cutting in the salient instructional expenditure

category. This possibility could have potentially deleterious effects on human capital formation, and by extension, our nation's future. The findings of this paper contribute to the understanding of schools' financial situations during recession and can serve as a guide to aid future policy decisions.

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**Table 1: Examining Patterns in Revenues and Expenditures Per Pupil during the Financial Crisis and Fiscal Stimulus Period**

Panel A	(1)	(2)	(3)	(4)	(5)	(6)
	Total Expenditure Per Pupil	Total Revenue Per Pupil	Federal Aid Per Pupil	State Aid Per Pupil	Local Revenue Per Pupil	Property Taxes Per Pupil
	FE	FE	FE	FE	FE	FE
% Shift in 2008-09	-9.51***	-12.68***	-17.5***	-4.02***	-3.36***	-2.81***
% 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*** (25.0)	694.9*** (38.9)	15.3*** (2.0)	116.4*** (6.3)	349.16*** (10.9)	326.33*** (10.2)
Recession	-1919.0*** (161.0)	-2974.1*** (295.1)	-98.8*** (16.6)	-250.2*** (48.8)	-387.61*** (66.3)	-311.28*** (63.2)
Stimulus	208.2 (195.2)	24.9 (338.9)	172.4*** (18.2)	-897.9*** (59.8)	80.67 (93.6)	118.39 (89.9)
Observations	6753	6753	6753	6753	6753	6495
R2	0.576	0.511	0.829	0.936	0.869	0.884

Panel B	(7)	(8)	(9)	(10)	(11)
	% Fed Aid	% State Aid	% Local Aid	Tot Debt Outstanding Per Pupil	Total Students
	FE	FE	FE	FE	FE
% Shift in 2008-09	-10.81***	4.01***	7.48***	-19.59***	-3.56***
% Shift in 2009-10	20.71***	-10.82***	7.58***	-23.37***	-4.26***
Pre-Recession Base	2	27.8	51.3	8,062.5	2,384.9
Trend	0.01 (0.0)	-0.27*** (0.0)	0.10* (0.1)	361.1*** (35.5)	14.4*** (1.5)
Recession	-0.26*** (0.1)	1.12*** (0.2)	3.84*** (0.4)	-1578.8*** (276.9)	-85.0*** (14.3)
Stimulus	0.76*** (0.1)	-4.12*** (0.3)	0.05 (0.5)	-305.3 (339.5)	-16.4 (18.9)
Observations	6759	6759	6759	6626	6753
R2	0.799	0.926	0.784	0.577	0.995

Notes: \*, \*\*, \*\*\* denote significance at the 10, 5, and 1 percent level, respectively. Robust standard errors are in parentheses. All regressions control for racial composition, and percent of students eligible for free or reduced price lunch.



**Table 2: Examining Patterns in the Compositions of Expenditures during the Financial Crisis and Fiscal Stimulus Period**

Panel A	(1)	(2)	(3)	(4)
	Instructional Expenditures Per Pupil	Instructional Support Per Pupil	Student Services Per Pupil	Transportation Per Pupil
	FE	FE	FE	FE
% Shift in 2008-09	-2.14***	-2.12**	-2.0**	-3.21***
% 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	6752	6752	6752	6744
R-squared	0.627	0.704	0.742	0.825

Panel B	(5)	(6)	(7)	(8)
	Student Activities Per Pupil	Utilities and Maintenance Per Pupil	Teacher Salary	Admin Salary
	FE	FE	FE	FE
% Shift in 2008-09	0.81	-2.35***	1.32***	-1.16***
% 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)	-1239.4*** (457.4)
Stimulus	0.9 (3.1)	-34.9** (15.0)	2956.5*** (253.7)	2896.3*** (592.5)
Observations	6685	6752	5614	5605
R-squared	0.959	0.728	0.815	0.787

Notes: \*, \*\*, \*\*\* denote significance at the 10, 5, and 1 percent level, respectively. Robust standard errors are in parentheses. All regressions control for racial composition, and percent of students eligible for free or reduced price lunch.

**Table 3: Examining Heterogeneities by School District Poverty Levels**

Panel A	<u>Instructional Exp. Per Pupil</u>			<u>Instructional Support Per Pupil</u>			<u>Student Services Per Pupil</u>		
	<b>High Poverty</b> FE	<b>Medium Poverty</b> FE	<b>Affluent</b> FE	<b>High Poverty</b> FE	<b>Medium Poverty</b> FE	<b>Affluent</b> FE	<b>High Poverty</b> FE	<b>Medium Poverty</b> FE	<b>Affluent</b> FE
% Shift in 2008-09	-3.24***	-2.64***	-1.29	-5.25**	-2.15*	-0.74	-4.69**	-2.63**	-0.37
% Shift in 2009-10	-1.91	0.40	0.73	-7.78***	0.77	3.53	-5.04**	1.30	4.93**
Pre-Recession Base	8,035	7,678	7,722	2,112	1,799	1,898	1,733	1,519	1,605
Trend	228.5*** -14.8	172.1*** -8	98.6*** -9	100.6*** -7.5	56.3*** -2.7	53.8*** -3.4	88.1*** -5	49.8*** -2.3	45.1*** -3.2
Recession	-260.7*** -90.8	-202.9*** -49.6	(99.9) -64.8	-110.9** -45.1	-38.7* -20.4	(14.1) -30.6	-81.3** -34.2	-40.0** -17.7	-6.0 -27
Stimulus	107.3 -97.4	233.9*** -70.2	156.6* -94.9	(53.5) -58.1	52.6* -28	81.1 -50.4	(6.1) -36.4	59.7** -26.6	85.1** -41.6
Observations	1711.0	3259.0	1782.0	1711.0	3259.0	1782.0	1711.0	3259.0	1782.0
R-squared	0.444	0.817	0.827	0.634	0.806	0.8	0.693	0.809	0.793

Panel B	<u>Transportation Per Pupil</u>			<u>Student Activities Per Pupil</u>			<u>Utilities and Maintenance Per Pupil</u>		
	<b>High Poverty</b> FE	<b>Medium Poverty</b> FE	<b>Affluent</b> FE	<b>High Poverty</b> FE	<b>Medium Poverty</b> FE	<b>Affluent</b> FE	<b>High Poverty</b> FE	<b>Medium Poverty</b> FE	<b>Affluent</b> FE
% Shift in 2008-09	-6.20***	-3.27***	-0.82	0.81	0.72	0.49	-2.32	-3.61***	-1.60
% Shift in 2009-10	-10.0***	-3.15	-4.31	2.92	0.27	-0.37	-5.26***	-4.31***	-4.70***
Pre-Recession Base	742	774	767	196	242	278	1,723	1,577	1,569
Trend	28.9*** (2.7)	16.6*** (1.3)	5.9** (2.3)	4.6*** (0.5)	5.8*** (0.4)	4.0*** (0.6)	64.7*** (3.9)	50.5*** (2.3)	34.9*** (3.0)
Recession	-46.0*** (17.4)	-25.3*** (9.1)	-6.3 (26.3)	1.6 (4.3)	1.7 (3.5)	1.4 (5.5)	-39.9 (25.1)	-56.9*** (15.8)	-25.1 (21.4)
Stimulus	-28.2 (18.7)	0.9 (17.0)	-26.7 (32.3)	4.1 (5.0)	-1.1 (4.5)	-2.4 (6.7)	-50.8* (26.7)	-11.1 (23.4)	-48.7* (29.5)
Observations	1711	3258	1775	1686	3230	1769	1711	3259	1782
R-squared	0.822	0.901	0.752	0.934	0.966	0.965	0.667	0.81	0.802

Panel C	<u>Median Teacher Salary</u>			<u>Median Teacher Years of Experience</u>		
	<b>High Poverty</b> FE	<b>Medium Poverty</b> FE	<b>Affluent</b> FE	<b>High Poverty</b> FE	<b>Medium Poverty</b> FE	<b>Affluent</b> FE
% Shift in 2008-09	0.62	1.27**	2.39***	7.81***	8.52***	13.16***
% Shift in 2009-10	5.23***	6.59***	8.27***	14.65***	15.15***	26.32***
Pre-Recession Base	57,374	57,379	58,308	10.24	10.56	9.12
Trend	-77.4 (87.2)	-409.8*** (57.8)	-591.4*** (72.0)	-0.3*** 0.0	-0.4*** 0.0	-0.5*** 0.0
Recession	358.3 (427.4)	726.6** (315.1)	1391.4*** (418.6)	0.8*** (0.2)	0.9*** (0.2)	1.2*** (0.2)
Stimulus	2644.5*** (431.2)	3057.0*** (385.8)	3428.7*** (508.4)	0.7*** (0.2)	0.7*** (0.2)	1.2*** (0.3)
Observations	1421	2721	1472	1421	2721	1472
R-squared	0.818	0.829	0.832	0.748	0.745	0.664

Notes: \*, \*\*, \*\*\* denote significance at the 10, 5, and 1 percent level, respectively. Robust standard errors are in parentheses. All regressions control for racial composition, and percent of students eligible for free or reduced price lunch.

**Table 4: Examining Heterogeneities by School District Urbanicity**

Panel A	<u>Instructional Exp. Per Pupil</u>			<u>Instructional Support Per Pupil</u>			<u>Student Services Per Pupil</u>		
	Urban	Suburban	Rural	Urban	Suburban	Rural	Urban	Suburban	Rural
	FE	FE	FE	FE	FE	FE	FE	FE	FE
% Shift in 2008-09	-3.83***	-1.89***	-2.24**	-4.58	-2.3**	0.16***	-3.30	-2.00*	-0.98
% 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*** (19.7)	154.5*** (7.9)	183.6*** (9.5)	92.1*** (8.8)	69.7*** (3.1)	53.5*** (3.7)	85.7*** (8.0)	59.5*** (2.3)	47.0*** (3.0)
Recession	-314.5** (152.4)	-147.5*** (47.2)	-168.1** (67.3)	-99.8 (85.6)	-44.9** (21.7)	2.7 (32.2)	-60.5 (68.1)	-32.8* (17.0)	-13.3 (26.9)
Stimulus	380.5* (206.8)	164.1*** (58.2)	169.9* (86.8)	37.1 (108.3)	18.6 (30.3)	33.6 (40.3)	38.9 (87.1)	48.3** (22.7)	40.3 (35.3)
Observations	440	5041	1271	440	5041	1271	440	5041	1271
R-squared	0.797	0.591	0.821	0.828	0.679	0.756	0.84	0.719	0.774

Panel B	<u>Transportation Per Pupil</u>			<u>Student Activities Per Pupil</u>			<u>Utilities and Maintenance Per Pupil</u>		
	Urban	Suburban	Rural	Urban	Suburban	Rural	Urban	Suburban	Rural
	FE	FE	FE	FE	FE	FE	FE	FE	FE
% Shift in 2008-09	-6.16	-4.48***	1.09	0.52	0.47	2.96	-1.70	-2.28***	-2.47
% 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*** (3.1)	14.4*** (1.3)	21.8*** (2.4)	5.6*** (0.8)	5.7*** (0.4)	2.7*** (0.6)	78.5*** (4.6)	45.8*** (2.1)	52.9*** (2.7)
Recession	-42.6 (26.7)	-31.4*** (10.8)	11.3 (19.2)	0.9 (6.5)	1.2 (2.9)	5.1 (5.8)	-29.7 (47.3)	-37.2*** (13.9)	-37.4 (23.1)
Stimulus	-38.9 (30.0)	-9.6 (14.9)	-36.8 (25.1)	-0.2 (9.1)	0.4 (3.7)	3.3 (7.1)	-48.9 (52.9)	-33.8* (17.5)	-33.8 (31.7)
Observations	440	5033	1271	432	5009	1244	440	5041	1271
R-squared	0.905	0.802	0.847	0.968	0.954	0.971	0.898	0.701	0.787

Panel C	<u>Median Teacher Salary</u>			<u>Median Teacher Years of Experience</u>		
	Urban	Suburban	Rural	Urban	Suburban	Rural
	FE	FE	FE	FE	FE	FE
% Shift in 2008-09	3.42**	1.51***	0.07	9.17**	10.32***	4.29**
% 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	2005.5** (823.6)	873.6*** (253.6)	40.6 (447.6)	1.0** (0.4)	1.0*** (0.1)	0.5** (0.3)
Stimulus	2712.8*** (987.9)	3250.6*** (296.5)	1834.1*** (547.8)	0.9* (0.5)	0.8*** (0.1)	0.4 (0.3)
Observations	366	4192	1056	366	4192	1056
R-squared	0.882	0.795	0.853	0.728	0.699	0.741

Notes: \*, \*\*, \*\*\* denote significance at the 10, 5, and 1 percent level, respectively. Robust standard errors are in parentheses. All regressions control for racial composition, and percent of students eligible for free or reduced price lunch.

**Table 5: Examining Heterogeneities by Metropolitan Area**

Panel A												
	<u>Instructional Exp. Per Pupil</u>				<u>Instructional Support Per Pupil</u>				<u>Student Services Per Pupil</u>			
	Camden FE	Edison FE	Newark FE	Wayne FE	Camden FE	Edison FE	Newark FE	Wayne FE	Camden FE	Edison FE	Newark FE	Wayne FE
% 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
% 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	1252	1424	1605	1260	1252	1424	1605	1260	1252	1424	1605	1260
R-squared	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												
	<u>Transportation Per Pupil</u>				<u>Student Activities Per Pupil</u>				<u>Utilities and Maintenance Per Pupil</u>			
	Camden FE	Edison FE	Newark FE	Wayne FE	Camden FE	Edison FE	Newark FE	Wayne FE	Camden FE	Edison FE	Newark FE	Wayne FE
% 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
% 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	1252	1424	1597	1260	1229	1412	1595	1259	1252	1424	1605	1260
R-squared	0.897	0.777	0.916	0.738	0.959	0.946	0.962	0.971	0.849	0.482	0.813	0.899

Panel C								
	<u>Median Teacher Salary</u>				<u>Median Teacher Years of Experience</u>			
	Camden FE	Edison FE	Newark FE	Wayne FE	Camden FE	Edison FE	Newark FE	Wayne FE
% Shift in 2008-09	0.02	1.87**	1.89***	2.87***	3.62	11.78***	12.51***	13.11***
% 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)	-1087.2*** (105.8)	-0.3*** (0.0)	-0.5*** (0.0)	-0.5*** (0.0)	-0.7*** (0.0)
Recession	11.7 (436.7)	1037.6** (471.4)	1106.8*** (427.6)	1734.9*** (560.0)	0.4 (0.3)	1.1*** (0.2)	1.2*** (0.2)	1.2*** (0.2)
Stimulus	2383.8*** (530.4)	3195.2*** (559.4)	3430.8*** (504.9)	3995.3*** (617.4)	0.4 (0.3)	1.0*** (0.3)	0.9*** (0.2)	1.1*** (0.3)
Observations	1042	1181	1335	1047				
R-squared	0.809	0.788	0.813	0.812	0.718	0.692	0.694	0.698

Notes: \*, \*\*, \*\*\* denote significance at the 10, 5, and 1 percent level, respectively. Robust standard errors are in parentheses. All regressions control for racial composition, and percent of students eligible for free or reduced price lunch.

**Table A1: Examining Patterns in Years of Experience during the Financial Crisis and Fiscal Stimulus Period**

	(1) Median Teacher Years of Experience FE	(2) Median Administrator Years of Experience FE
% Shift in 2008-09	8.80***	0.09
% 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
R2	0.72	0.593

Notes: \*, \*\*, \*\*\* denote significance at the 10, 5, and 1 percent level, respectively. Robust standard errors are in parentheses. All regressions control for racial composition, and percent of students eligible for free or reduced price lunch.

**Table A2: Definitions for Expenditure Components**

**Instructional Expenditures**

All expenditure associated with direct classroom instruction. Teacher Salaries and benefits; classroom supplies.

**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.

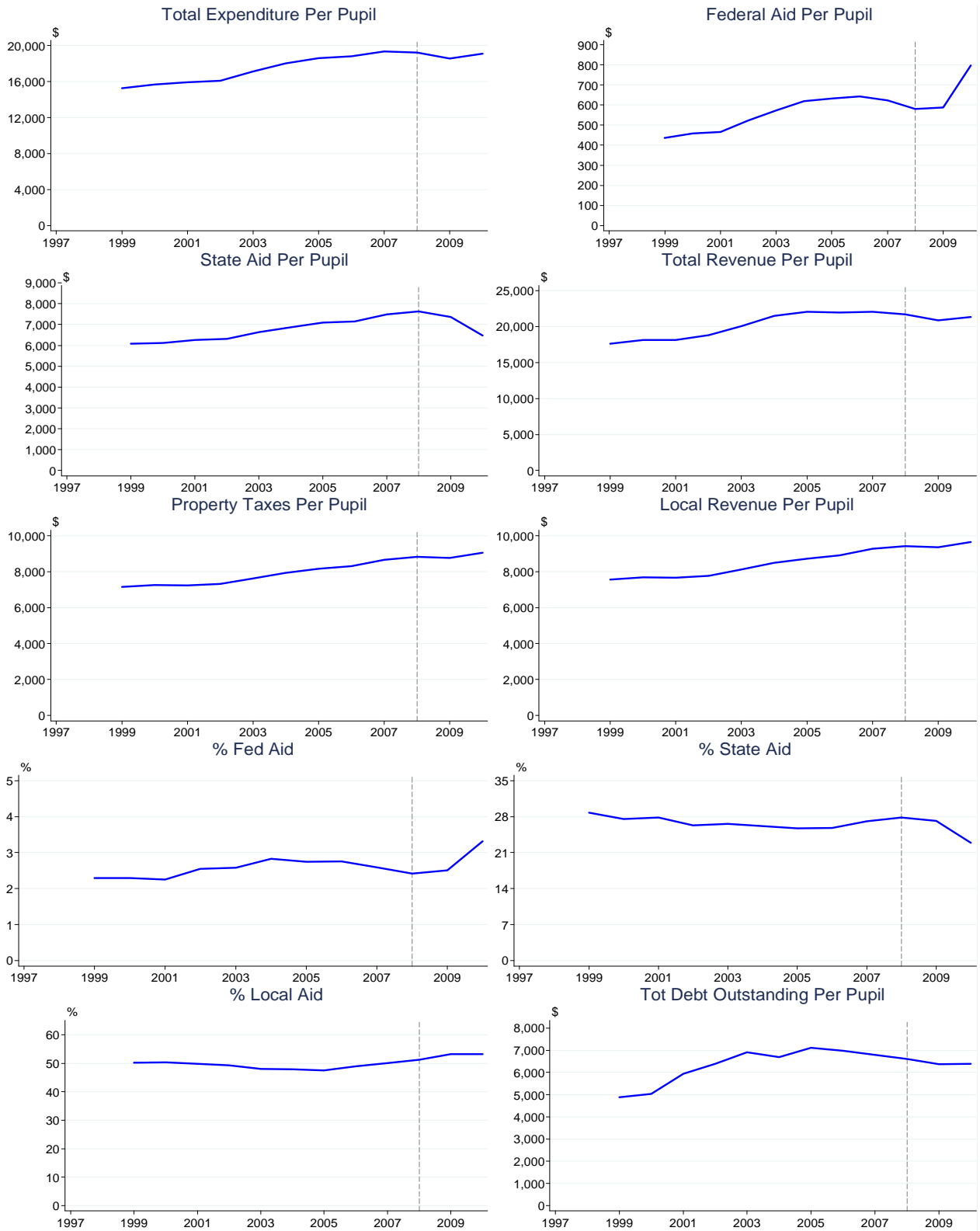
**Transportation**

Total expenditure on student transportation services.

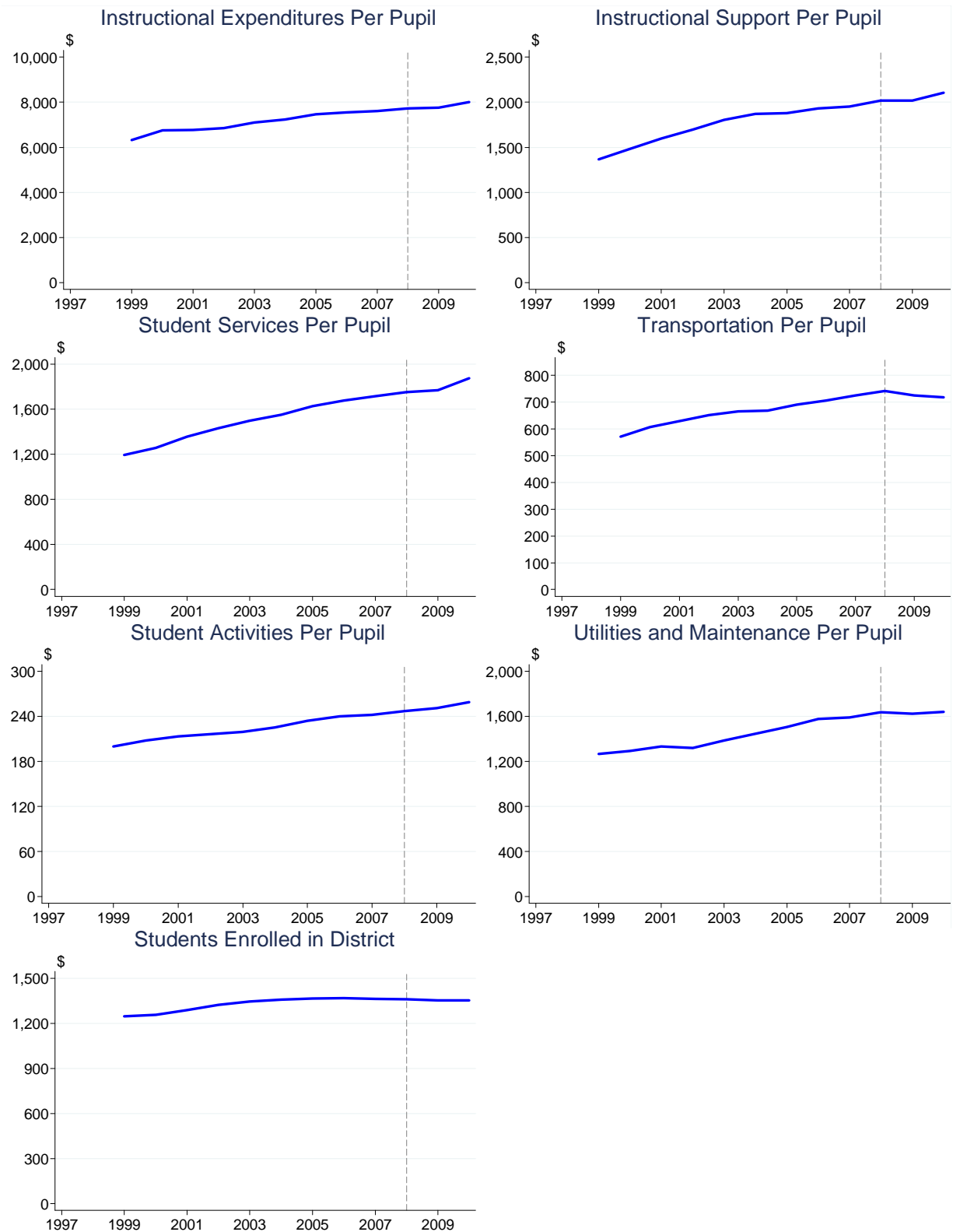
**Student Activities**

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

**Figure 1A: Examining the Trends in School Revenues and Expenditures for New Jersey during the Great Recession**

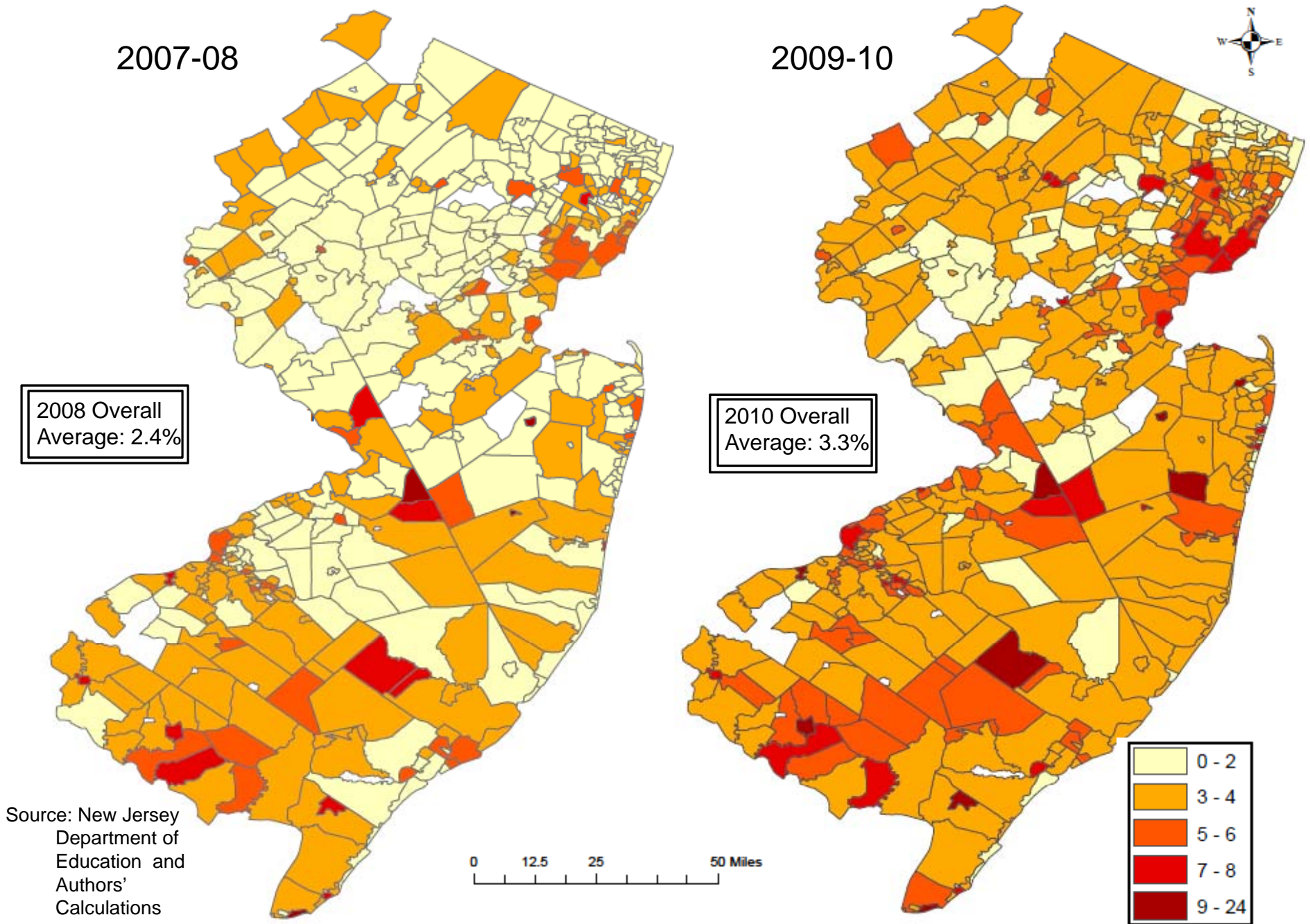


**Figure 1B: Examining the Trends in the Composition of School Expenditures for New Jersey during the Great Recession**



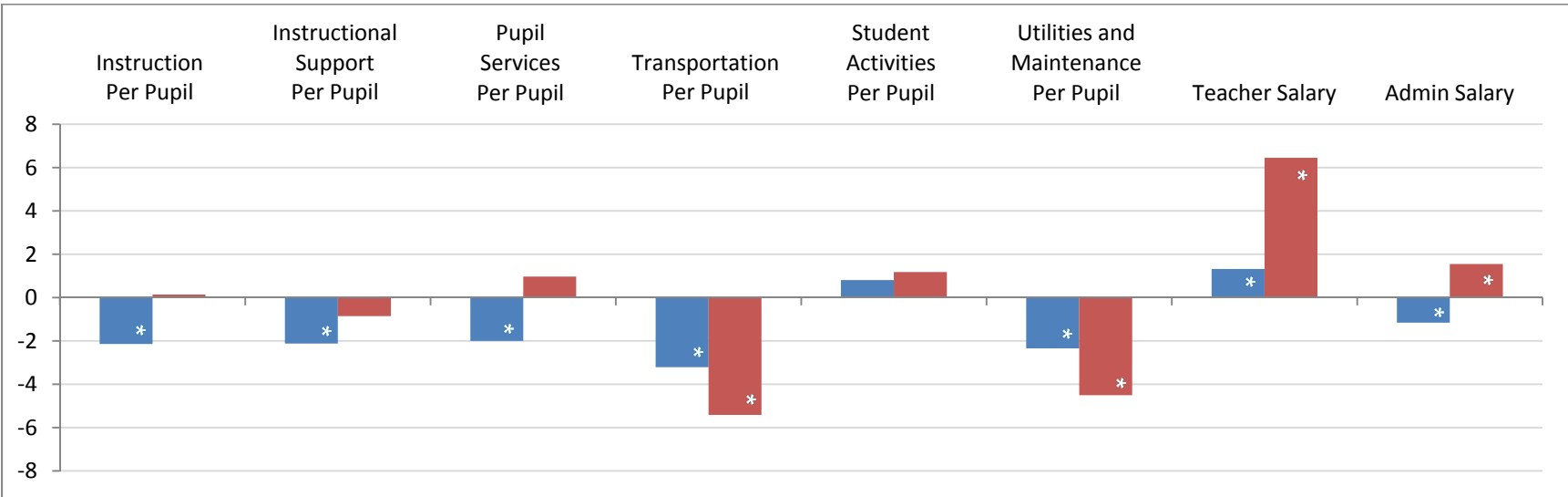
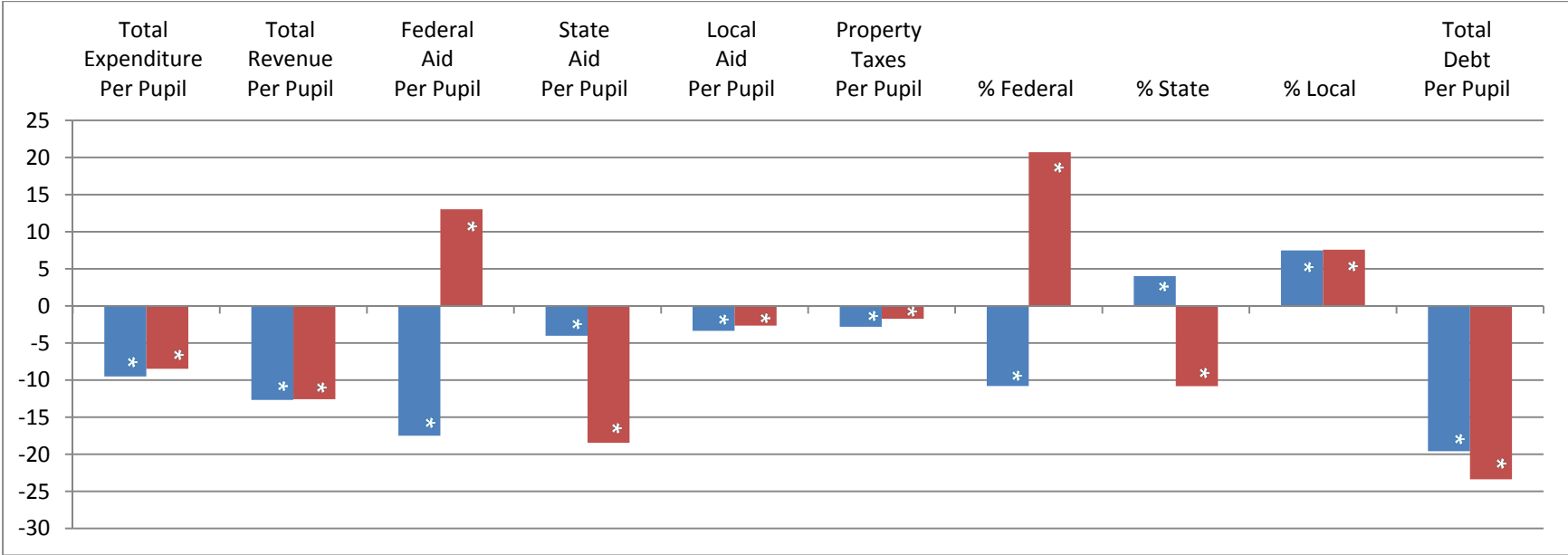


**Figure 2: Percent of District Revenue from Federal Sources**



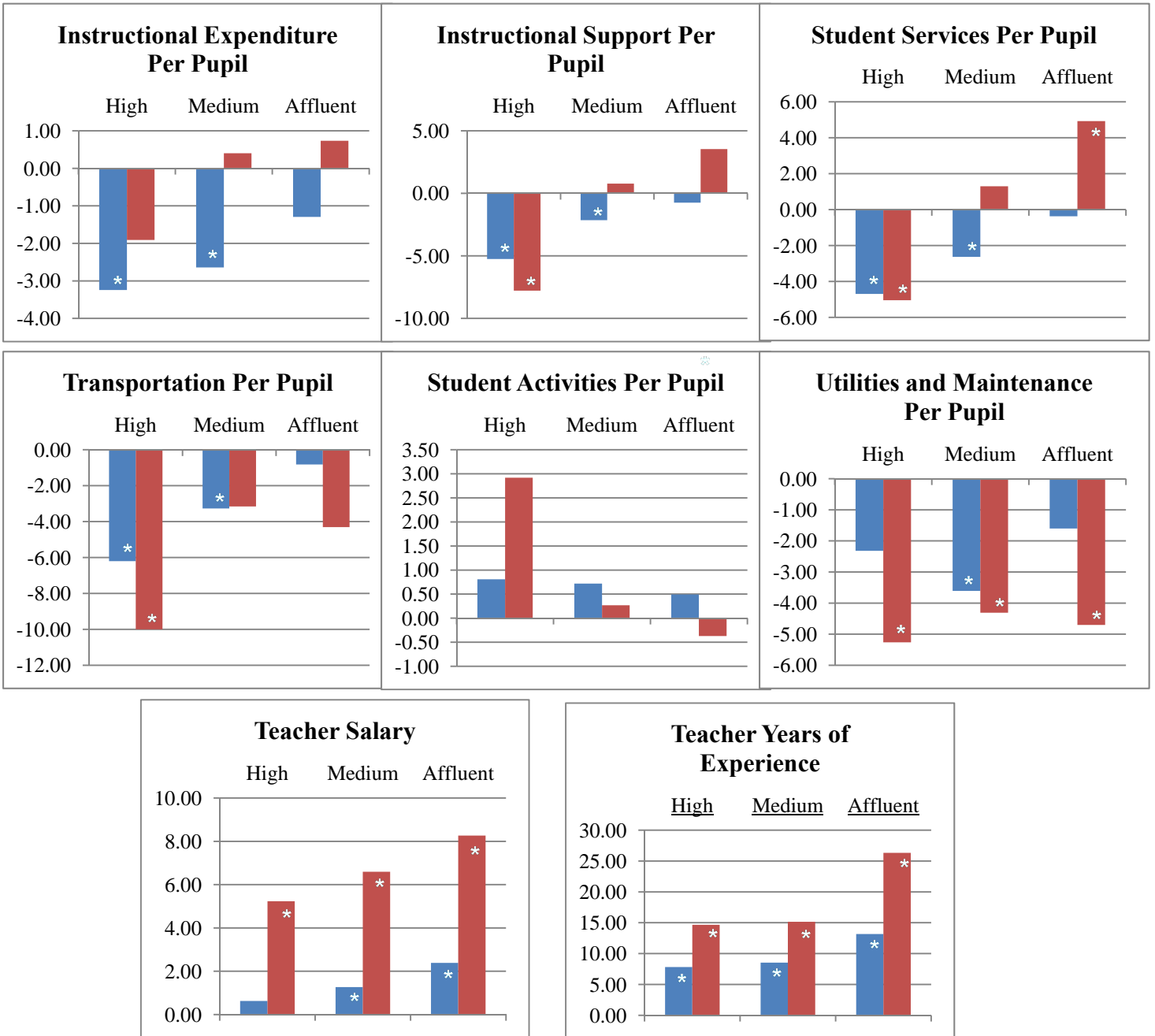
**Figure 3: Examining Patterns in Revenues and Expenditures During the Financial Crisis and Federal Stimulus Period**

**■ % Shift in 2008-09    ■ % Shift in 2009-10**



**Figure 4: Examining Heterogeneities by School District Poverty Status**

■ % Shift in 2008-09    ■ % Shift in 2009-10



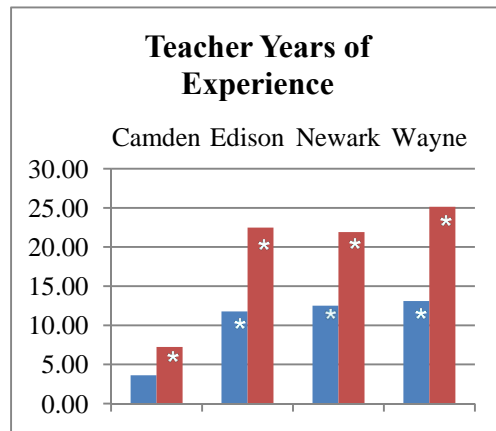
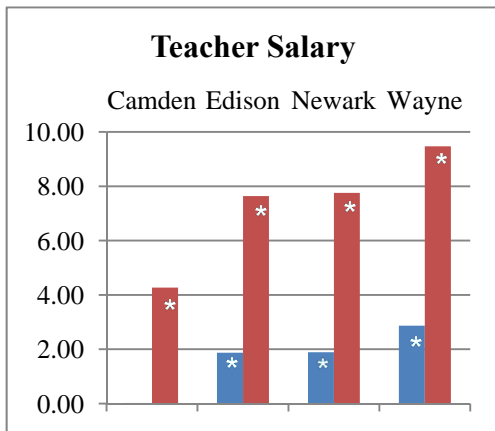
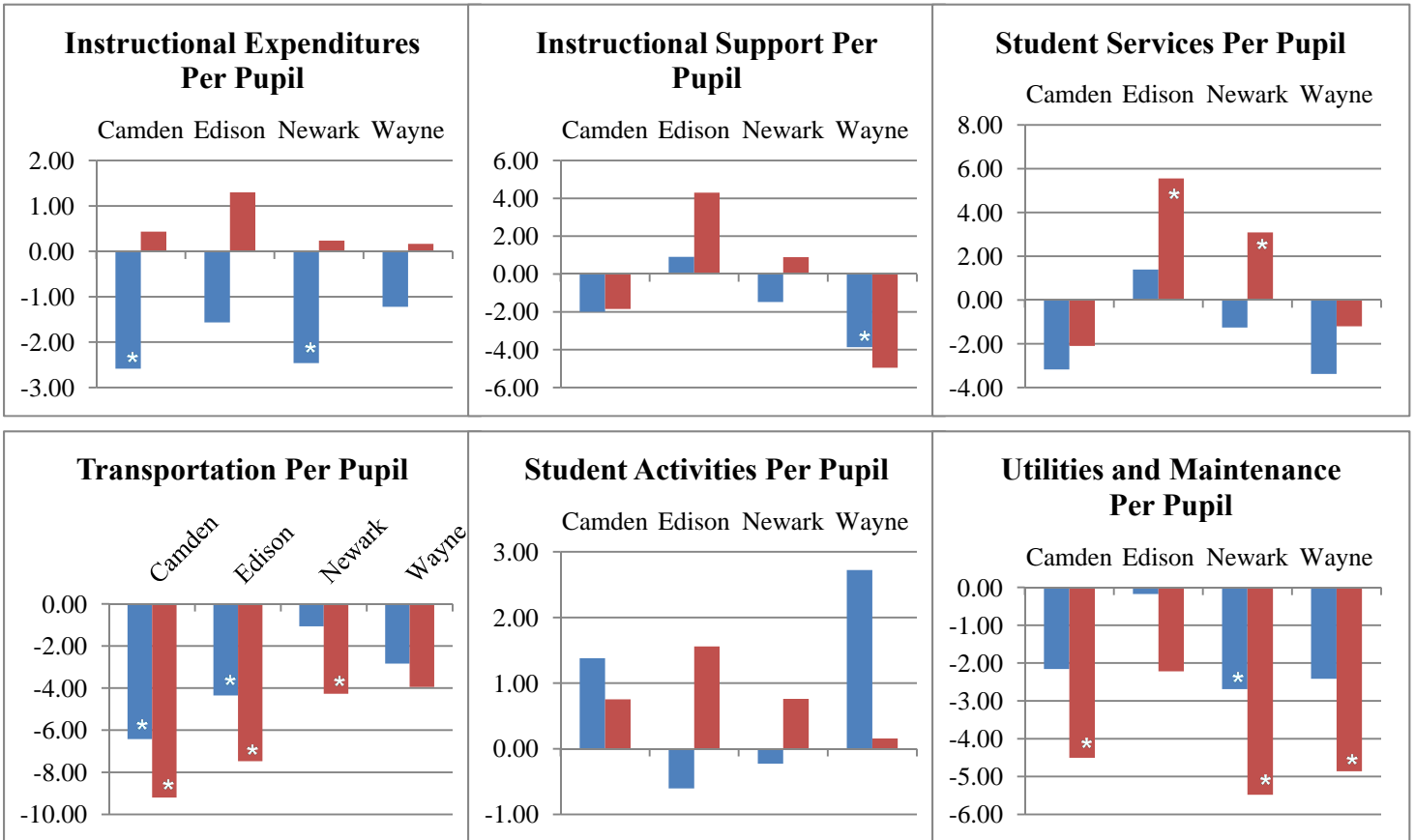
**Figure 5: Examining Heterogeneities by Urban Status**

■ % Shift in 2008-09    ■ % Shift in 2009-10



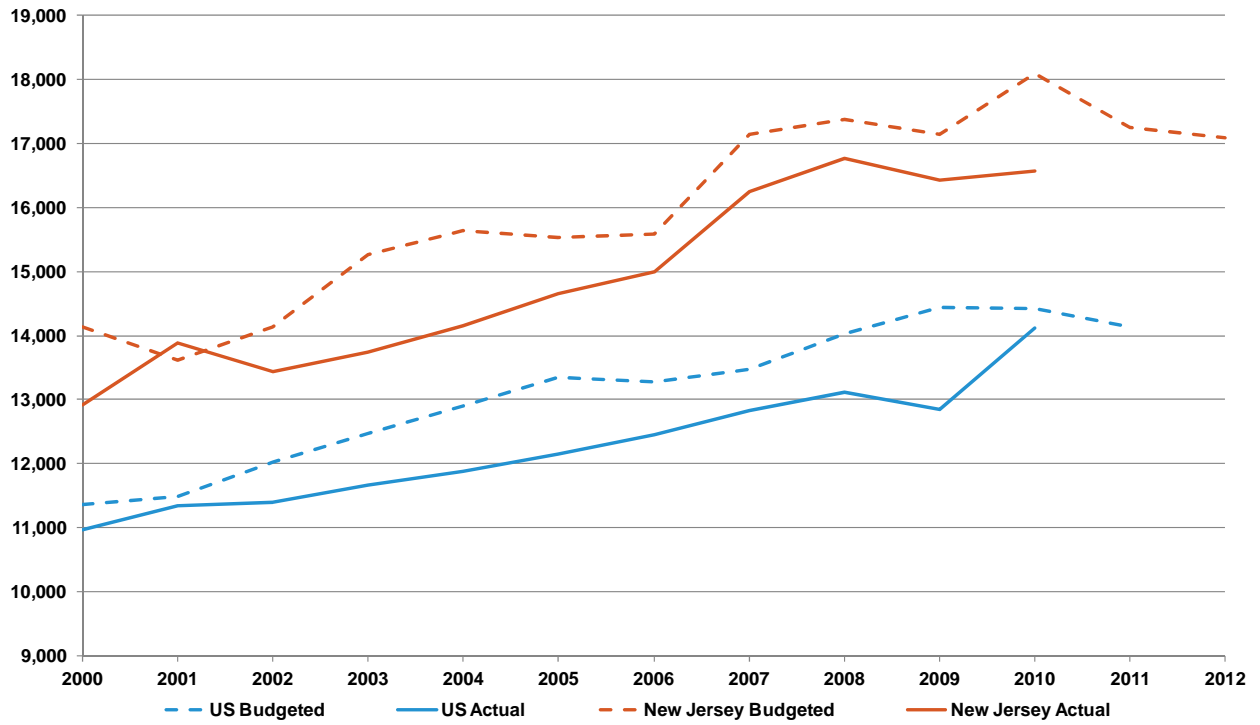
**Figure 6: Examining Heterogeneities by Metropolitan Division**

■ % Shift in 2008-09    ■ % Shift in 2009-10



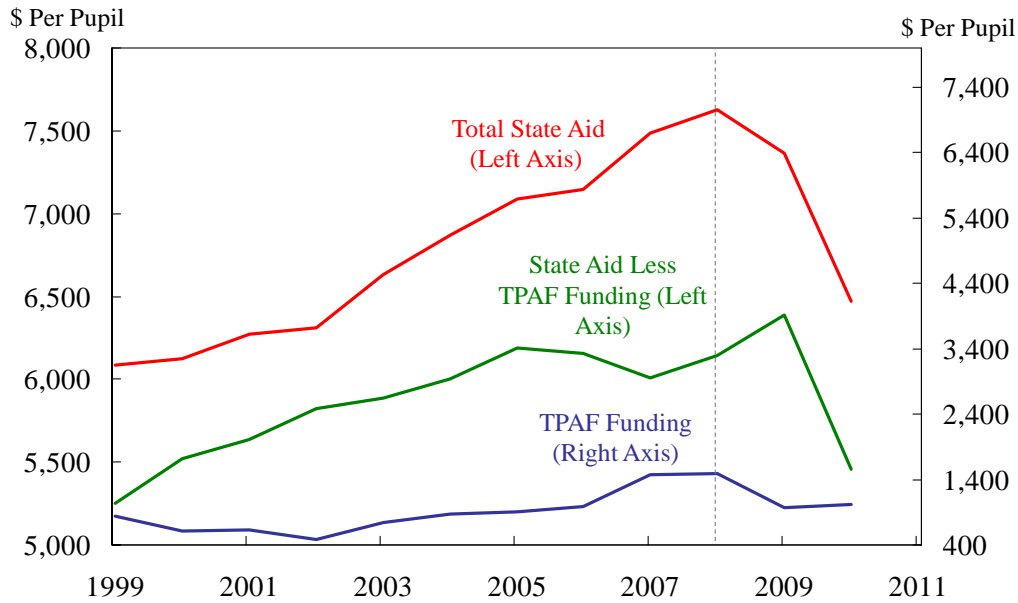
**Figure 7: Total Revenue Per Pupil: Budget vs. Actual**

\$ Inflation Adjusted



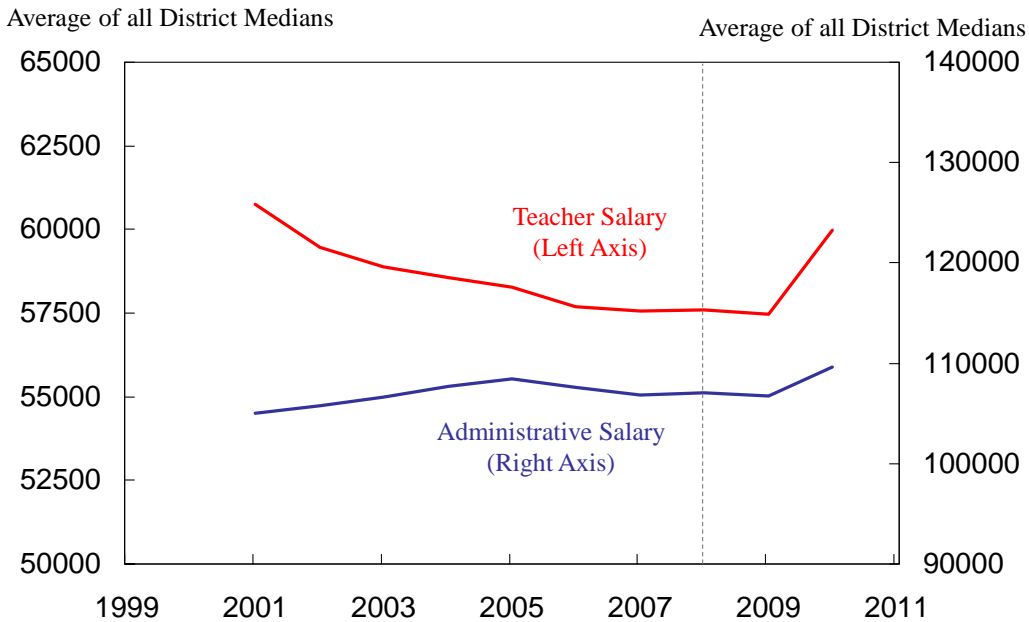
**Figure A1: Trends in Total State Aid and State Aid to Pension Funds**

**New Jersey State Aid**



Note: Years represent spring term.

**Figure A2: CPI Adjusted Salary for Teachers and Administrators**



Note: Years represent spring term.

**Figure A3: New Jersey Metro Areas**

