

**Katrina's Children:  
The Effects of Peers on Student Achievement and Behavior\***

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\* We are grateful to an anonymous Large Urban School District in the Southwest for giving us access to their data and to the Louisiana Department of Education's Division of Standards, Assessment and Accountability and to Data Recognition Corporation for allowing access to the Louisiana data. We are especially grateful Dr. Fen Chou and Ms. Ann Payne for answering our queries about the Louisiana data and to two unnamed staff members for their assistance with the LUSD data. In addition, we thank a number of anonymous principals and teachers who provided valuable insights about the process of absorption of the evacuees in the receiving schools. We also thank David Frances, Elaine Liu and participants at the Society of Labor Economists Meetings and at the TIMES seminar at the University of Houston for useful comments. We are especially grateful to Josh Angrist for extensive discussions and advise. © 2008 by Scott Imberman, Adriana Kugler, and Bruce Sacerdote. E-mail addresses for correspondence are: [simberman@uh.edu](mailto:simberman@uh.edu), [adkugler@uh.edu](mailto:adkugler@uh.edu) and [sacerdote@dartmouth.edu](mailto:sacerdote@dartmouth.edu).

## **Abstract**

In 2005, hurricanes Katrina and Rita induced the largest internal migration ever in the U.S. More than a 100,000 school age children had to evacuate the Gulf coast areas of Louisiana, Mississippi and Alabama and relocate to schools across the southeast US. Many school districts strived to enroll the evacuees in their schools as quickly as possible so that the children and their families could attain a sense of stability. At the same time, families on the receiving districts worried about disruptions in the schools and decreased resources for non-evacuee students. We investigate the extent to which the arrival of Katrina and Rita evacuee peers adversely affected the academic performance and behavior of the native students in Louisiana and in a large urban school district in the southwest (LUSD-SW). In LUSD, we find that an increase in evacuee enrollment in a school moderately reduced elementary test scores for math. For Louisiana, an influx of evacuees reduced primary and secondary reading test scores and secondary math test scores. Moreover, the adverse peer effects were largest for African-American students who were probably more likely to interact with the evacuees. The results outside of Louisiana are robust to use of the initial exogenous allocation of kids to different schools driven by shelter availability. Finally, while we do not find negative peer effects on the academic performance of middle- and high-school students outside of Louisiana, we find evidence showing that the influx of Katrina evacuees decreased attendance rates for both older and younger students in LUSD. The small negative effects we find on both student achievement and discipline suggest that the receiving school districts did an impressive job of welcoming the evacuees while not drastically reducing the educational experience of their existing student populations.

## **1. Introduction**

On August 29, 2005, Hurricane Katrina made landfall in Southeastern Louisiana. Katrina was one of the five deadliest hurricanes in the U.S. causing about 2,500 deaths. It was also the most destructive and costliest hurricane ever in the U.S., with a total estimated damage of over \$80 billion (Knabb, Rhome and Brown, 2006). The storm surge caused flooding in 80% of New Orleans as well as large areas of the coasts of Mississippi and Alabama. Federal disaster declarations covered 90,000 square miles of the U.S. Just a few weeks later, Hurricane Rita hit Louisiana and East Texas. Rita was the most powerful storm ever recorded in the Gulf and while it hit a less populated area, there was still substantial damage as a result of the storm.

Katrina and Rita caused over a million people to migrate from the Central Gulf coast to other areas of the U.S., causing the greatest migration of children and their families in U.S. history (Ladd, Marzalek and Gill, 2008). Some areas of Louisiana received large numbers of evacuees. Baton Rouge received over 15,000 evacuees and Hammond received over 10,000 evacuees, nearly doubling its population. However, many evacuees left the affected states. Houston, Texas received 75,000 people, which was the largest number of evacuees received by any city (McIntosh, 2008).

As a result of the migration, many school age children were uprooted. Given that schools were probably the best way to bring back stability into children's lives, school districts mounted substantial efforts to enroll the evacuees in their schools as quickly as possible. In Louisiana about 196,000 children were evacuated.

While Baton Rouge, Houston and other cities were seen as great examples of solidarity, the influx of large numbers of kids into the schools created concerns among

the non-evacuee population. On the one hand, the evacuee children came from some of the worst-performing schools in the country and parents worried that their children would experience negative peer effects from the influx of poor performing students. Non-evacuee parents were also concerned about evacuees taking resources away from their kids, as schools districts ran up million-dollar tabs while absorbing the new children.

In this paper, we examine whether the influx of Katrina and Rita students affected the academic performance, attendance and discipline of non-evacuee children. While much of the literature on peer effects for higher education finds positive peer effects (e.g., Sacerdote, 2001; Stinebrickner and Stinebrickner, 2006; and Zimmerman, 2006), studies for elementary and secondary education typically find modest effects (Angrist and Lang, 2004; Hanushek et. al, 2003; Hoxby, 2000; and Hoxby and Weingarth, 2006). An advantage of our study is that we can exploit the exogenous influx of new students into a large urban school district in the southwest (LUSD-SW) and Louisiana schools to examine peer effects. In fact, many evacuees were evacuated on buses without knowing where they were going. Others were able to drive and choose their destination but were mostly allocated to shelters and schools based on availability once they arrived.

We use administrative student-level data from LUSD and from the Louisiana Department of Education. We first examine the impact on student academic performance and then turn to effects on discipline. Our findings show that a 10 percentage point increase in Katrina evacuees reduces math test scores of non-evacuee elementary school children by 0.08 of a standard deviation in LUSD and that this result is mainly driven by drops in math test scores for girls and for African-American children. A concern is that students may self-select into schools after some time in LUSD, assignment to schools

may be endogenous. Since initial shelter assignment and choice of residence was mostly out of the control of the evacuees, we use the fraction of students who were evacuees on September 13, 2005 and the percentage of students living in shelters on October 28, 2005 to instrument the fraction of students who were evacuees in October of each year, which is our measure of evacuee exposure. Our IV results are less precise but not significantly different from the OLS estimates.

In Louisiana, we find that a 10% increase in Katrina evacuees reduces language test scores of non-evacuee elementary school children by 0.02 of a standard deviation in school districts outside of the areas affected by the hurricanes. Moreover, we find that the drop in test scores of non-evacuees is greatest for schools receiving New Orleans evacuees. A 10% increase in New Orleans evacuees decreases math and language test scores of non-evacuees by 0.02 and 0.03 of a standard deviation, respectively.

For LUSD, we can also examine the impact of the influx of Katrina children a number of behavioral outcomes, including the number of disciplinary infractions and the absence rate. We find that a 10% increase in Katrina evacuees increases the absence rate of non-evacuee students by a fifth of a percentage point in elementary schools and by three quarters of a percentage point in middle-schools and high-schools. Black students, in particular, have a large increase in absences of 1.4 percentage points. While we find no overall effect on disciplinary infractions, we do find that the influx of Katrina evacuees increases the number of disciplinary infractions for girls and African-American secondary students. These results are also robust to the use of instruments.

The rest of the paper proceeds as follows. Section 2 describes the absorption of Katrina evacuees into LUSD and the non-affected school districts in Louisiana. Section 3

discusses the identification strategy. Section 4 describes the LUSD data and the data from the Louisiana Department of Education. Section 5 presents the results on the impact of the influx of Katrina students on student achievement in math and language. Section 6 presents the results on the behavioral responses of non-evacuees to the influx of Katrina evacuees. Section 7 concludes.

## **2. Katrina's Children and School Responses**

Hurricanes Katrina and Rita caused the largest displacement of children in the history of the U.S. About 400,000 students were forced to enroll in new schools as a result of these hurricanes (U.S. Department of Education, 2007). About 120,000 of these students moved within Louisiana (Pane et. al, 2007), but many others went outside of the state.

School districts across the country acted very quickly to open the doors to evacuated students. For example, by August 31, 2005, LUSD was already admitting evacuees staying in shelters into the districts' schools. Education agencies in various states informed school district superintendants that displaced children were entitled to public school enrollment under the McKinney-Vento Homeless Assistance Improvements Act (Edwards, 2007). This Act places all responsibility on the districts to monitor the homelessness and enroll homeless children in schools.

Within Louisiana, people mainly evacuated to places where they had family and friends. However, evacuees to East Baton Rouge were mainly living on FEMA assistance and went to cheap hotels and apartments. While some schools in areas of Louisiana not affected by the hurricanes received no evacuees at all, evacuee enrollment accounted for

up to 27% of students in some schools. On average 3.1% of 2005-06 enrollment in schools outside the affected areas were evacuees. Figure 1 shows the map of the percentage of Katrina students in the non-evacuee population in Louisiana. This map also shows substantial variation across the state in terms of exposure to the evacuee children.

Many students, however, went outside of the state. LUSD's state received 50,000 students, with the LUSD area receiving about 20,000 with LUSD itself receiving 5,500 students over the 2005-2006 school year. In LUSD, students and their families were housed in shelters, which included 30,400 residents housed in the stadium complex the largest evacuation shelter in U.S. history.<sup>1</sup> An additional 1,300 individuals were housed in the convention center and many more resided in Red Cross shelters throughout the city. These shelters had school bus stops to pick up the children and send them to various schools and information was spread letting parents know that those temporarily housed within LUSD's borders could enroll their children in the neighborhood school.

Initially, displaced students in the stadium complex and convention center were placed in schools close to the shelters and with available spots, including in two elementary schools, which were reopened to help absorb the evacuees. Students residing in other shelters were mostly sent to the school zoned to the shelter address. In 2005, some schools in LUSD received no evacuees at all, while in others evacuees comprised up to 25% of the student population. However, the mean percentage of evacuees (as a percent of total students) in LUSD at the time was 2.5%, suggesting that many schools received lower shares of Katrina evacuees. Figure 2 shows the map of LUSD and indicates the percent of Katrina students in the population on October 28, 2005. As in

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<sup>1</sup> This figure is from press release by the stadium complex dated September 5, 2005.

Louisiana, the map shows substantial variation in the influx of Katrina students across the district.

While the receiving school districts made a great effort to accommodate the thousands of new students, some worried about the financial burden on taxpayers of the receiving areas. For example, it was predicted that LUSD would face an extra \$20 million over the 2005-2006 school year (Klein, 2006). Given that districts were enrolling homeless students, they were eligible for federal education grants, but these took some time to be disbursed. It took three months before Congress passed the Hurricane Education Recovery Act (HERA) to provide impact aid for districts enrolling displaced students and provide aid to restore educational facilities which had been damaged by the hurricanes. While the amount per student was supposed to cover \$6,000 per displaced student, the allocation per student actually reimbursed to the schools turned out to be a fourth of the original estimate (Radcliffe, 2006). With regards to reduced resources, a main concern was that schools receiving many evacuees would experience a sharp rise in the student/teacher ratio. However, we find that for every 100 Katrina evacuees coming into a school, class size in LUSD increased by 1, probably because the affected schools tended to hire new teachers. In Louisiana, however, there were fewer teachers hired and the student/teacher ratio did rise more substantially.

In addition to funding issues, teachers and parents of non-evacuee students were concerned that some evacuees were years behind in terms of academic achievement. In interviews with teachers and principals of affected schools, many indicated that Katrina students were on average one or several years below grade level. Aside from issues related to academic performance, many worried about the inability to foster goodwill

between some of LUSD’s students and the new arrivals. In middle and high-school, there were reports that feuds between students became more common after the arrival of the evacuees. In response to this in the 2006-2007 school year, police presence increased by 10% in 18 secondary schools. It is because of these types of concerns that Senators Kay Bailey Hutchison and John Cornyn from Texas attempted to introduce a bill that would allow districts across the country to introduce separate schools for displaced students (Scherer, 2006).

In what follows, we discuss the strategy we use to estimate peer effects of Katrina and Rita evacuees on the academic performance and discipline of non-evacuee students.

### 3. Identification Strategy

Given the unexpected influx of Katrina and Rita evacuees in Louisiana’s and LUSD’s schools, we estimate the direct impact of this influx on native students as follows,

$$Y_{igt} = \alpha + \beta \text{Katrina\_Fraction}_{jt} + \Omega X_{igt} + \Pi \text{Grade}_g + \Gamma \text{Year}_t + \Phi \text{Grade}_g \times \text{Year}_t + \kappa_j + \varepsilon_{igt}, \quad (1)$$

where  $Y_{igt}$  is the academic or disciplinary outcome of individual  $i$  in grade  $g$  attending school  $j$  at time  $t$ ,  $\text{Katrina\_Fraction}_{jt}$  is the number of Katrina and Rita evacuees divided by the total number of non-evacuee students in school  $j$  in March of year  $t+1$  for Louisiana and in October of year  $t$  for LUSD, where this fraction is zero before the 2005-2006 academic year.<sup>2</sup>  $X_{igt}$  are observable characteristics of individual  $i$  in grade  $g$  attending school  $j$  at time  $t$ , including indicators for whether the student is female, non-Hispanic white, non-Hispanic Black, Hispanic, Asian, Native American, and whether the

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<sup>2</sup> Louisiana results are limited to Katrina evacuees.

student gets free-lunch, reduced-priced lunch or is classified as being otherwise economically disadvantaged.<sup>3</sup>  $\text{Grade}_g$  and  $\text{Year}_t$  are grade and year effects and  $\kappa_j$  are school-fixed effects.

Given the initial chaos and uncertainty facing the evacuees, the initial assignment to schools was plausibly exogenous, so we interpret the coefficient on “Katrina\_Fraction” as capturing the causal effect of the influx of Katrina children on non-evacuee students. However, after a few months some evacuees moved to apartment complexes and more permanent residences and may have also moved schools. While this would generate endogenous selection into schools, many students remained in temporary residences and those that found permanent residences often moved to places that would allow their children to attend their initially assigned schools. For this reason, we use the initial fraction of Katrina and Rita evacuees in a school on September 13, 2005 and the fraction of evacuees living in shelters as instruments for the fraction of Katrina evacuees in the last week of October in LUSD.<sup>45</sup> Using this instrumental variable strategy, the first-stage is,

$$\begin{aligned} \text{Katrina\_Fraction}_{jt} = & \delta_0 + \delta_1 \text{Initial\_Katrina\_Fraction}_{j2005} + \delta_2 \text{Shelter\_Fraction}_{j2005} \\ & \text{CX}_{igt} + \text{PGrade}_g + \text{TYear}_t + \text{YGrade}_g \times \text{Year}_t + \lambda_j + v_{igt}, \end{aligned} \tag{2}$$

and where the second stage is as before, but the fraction of Katrina evacuees is substituted for the predicted fraction of Katrina evacuees based on initial assignment to different schools and based on whether evacuees were housed in shelters. The exclusion

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<sup>3</sup> The other economic disadvantage and Native American categories are only available for LUSD.

<sup>4</sup> Unfortunately, we do not have similar instruments for Louisiana, so the IV analysis is limited to LUSD data.

<sup>5</sup> “Initial\_Katrina\_Fraction” excludes students who were residing at the stadium complex or convention center, as almost all of these students switched to new schools within two weeks.

restrictions impose that, conditional on school fixed-effects and student characteristics, academic performance and disciplinary measures are independent of the initial fraction of displaced students and the number of students living in shelters.

#### **4. Data Description**

We rely on administrative data from the Department of Education in Louisiana and from a large urban school district in the southwest.

##### **4.1. Louisiana Department of Education Data**

The Louisiana data comes from the Department of Education Division of Standards, Assessment and Accountability and covers the 2003-2004 academic year to the 2007-2008 academic year. The data is at the student-level includes information on gender, race/ethnicity, and free lunch status as well as data on test scores. While scores are available for grades 3 - 10 after Katrina, prior to Katrina only grades 4, 8 and 10 are available.

The Louisiana data allows us to describe where evacuees came from and where they went. The parishes most affected by Hurricane Katrina are Orleans, Jefferson, Plaquemines, and Saint Bernard. These parishes comprise most of the Greater New Orleans Metropolitan Statistical Area. There are 135,316 students in 4, 8 and 10 grades in the analysis sample, 14,400 of whom were in one of the affected parishes in 2005. Ninety percent of the students in the affected parishes become evacuees and, of the Katrina evacuees, ninety-three percent come from the most affected parishes. Even after the hurricanes, the bulk of Katrina evacuees who remain in Louisiana attended a school in one of the four most affected parishes. The percentage of evacuees who attend schools

in the affected parishes is 93% in the 2003-2004 and 2004-2005 school years, before the hurricanes. However, the following academic year, this dips to 68% in the spring, but rises back to 76% by the 2006-2007 school year. Many of the evacuees move from Orleans Parish to Jefferson. Pre-hurricane, the vast majority of these evacuees are located in Jefferson and Orleans Parishes, with an additional 700 to 800 evacuees in each of St. Tammany, Plaquemines, and St. Bernard in 2005. Post-hurricane, the count of evacuees (in grades 4, 8, and 10) in Jefferson Parish grows by about 1,200 evacuees and East Baton Rouge School District gains about 1,000 of these evacuees. This implies that East Baton Rouge gained roughly 3,300 student evacuees in all grades. The remaining school districts in the state each gain 0-150 evacuees. The number of evacuees in Orleans itself shrinks dramatically post-Katrina. The Recovery School District (RSD) in Orleans was set up to administer most of the schools in the former Orleans Parish School District. The RSD has roughly 1100 4th , 8th , and 10th graders by the 2006-2007 school year.

Table 1 shows descriptive statistics for evacuees and non-evacuees in Louisiana. Both groups are fairly evenly divided by gender, but evacuees are more likely to be Black. Non-evacuees are 44% African-American while evacuees are 58% African-American. Also, evacuees are more likely to be economically disadvantaged. Of the evacuees 64% are eligible for free lunch, while 58% of non-evacuees qualify for free lunch.

The administrative data also includes test results for math and language. Under Louisiana's accountability program, students in grades 4, 8, and 10 were tested in March of each year prior to 2005. These tests are known as the LEAP or Louisiana Educational Assessment Program (grades 4 and 8) and the GEE or Graduation Exit Examination. The

subjects tested include math and English Language Arts (ELA) for grades 4, 8 and 10.<sup>6</sup> The LEAP and GEE tests are high stakes tests with the following set of rules: To be promoted to the next grade, students in grades 4 and 8 must score "Basic" on at least one of the math and ELA tests and at least "Approaching Basic" on the other exam. In order to be eligible for a standard high school diploma, high school students must receive "Approaching Basic" or better on both the ELA and math exams and "Approaching Basic" or better on either of the science or social studies exams. High stakes testing policies were suspended for all 4th and 8th grade students during the 2005-2006 school year due to the hurricanes.

In 2005-06, in response to the No Child Left Behind Act of 2003, Louisiana expanded the testing regime to include grades 3, 5, 6, 7 and 9 for math and English Language Arts.<sup>7</sup> Unlike LEAP these exams are based on the Iowa Test of Basic Skills and with questions added to align the test to criteria required by state and Federal law. In addition, while the iLEAP contributes to determining whether the school meets "adequate yearly progress" under the NCLB act, it is a "low-stakes" exam for students in that their scores do not affect grade advancement. We include LEAP, iLEAP, and GEE in our analysis.

Test scores are measured as standard deviation within a grade and year, including all those tested which also include the evacuees. Table 1 shows that evacuees are about a fifth of a standard deviation below the non-evacuees. Table 2 reports differences in test scores in the 2005-2006 academic year, after controlling for individual characteristics and school effects. Math and ELA test scores of evacuees in primary school are 0.15 and 0.13

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<sup>6</sup> Science and social studies are tested in grades 4, 8 and 11, however we only consider math and reading.

<sup>7</sup> Grades 3, 5, 6, and 7 were also added for science and social studies

of a standard deviation lower than those of non-evacuees. In middle-school and high-school, test scores of evacuees are 0.11 and 0.10 standard deviations lower than those of non-evacuees.

#### **4.2. LUSD-SW Data**

LUSD provided us with student-level administrative records from 2003 to 2006. The data include basic demographic characteristics, including race, gender, free or reduced-price lunch status, and immigration status, and whether they qualify as gifted and talented, as having limited English proficiency, or as requiring special education. In addition, we have information on math and reading scores from the state criterion-referenced exam, which is the exam used in LUSD's state for accountability purposes. Moreover, we have information for each student on the number of disciplinary infractions and the absence rate. In addition, each student is assigned to a school, grade and teacher, and we have basic demographic characteristics for the teachers.

Table 3 presents descriptive statistics for evacuees and non-evacuees in elementary schools and in middle and high schools in LUSD in 2005. As in Louisiana students are fairly balanced by gender. However, in both elementary and upper-level schools, the majority of non-evacuee students are Hispanic and African-American, with these two groups accounting for 88% of the student population and White and Asian students accounting for the remainder. By contrast, about 90% of the evacuees are African-American, and only 10% White, Hispanic and Asian combined. This is important to keep in mind if one believes that displaced students are more likely to interact and generate peer effects on non-evacuees of their same race/ethnicity. About 80% of the LUSD native students are identified as receiving free or reduce-priced lunch. This

fraction contrasts with about 95% of the evacuees who qualify for free lunch and are identified as being at risk.<sup>8</sup> Also, about 27% of native students are identified as having limited English proficiency. By contrast, limited English proficiency is not an issue among the evacuees. However, only about 10% of native students are identified as requiring special education and only 12% of native students are identified as gifted and talented. Among non-evacuees there are hardly any students who qualify as G&T and only a little over 6% as needing special education. Thus, displaced students were much more likely to be African-American and to be economically disadvantaged compared to the non-evacuee student population.

Students in LUSD take a state criterion-referenced exam given in grades 3 - 11 in math and reading and students must achieve proficiency in both subjects to advance to the next grade, thus it is a “high stakes” exam. Test scores are measured in standard deviations within grade and year using information on all non-evacuee test-takers during that year and cover grades 3 through 11. Both reading and math test scores are substantially below those of natives. Similarly, the absence rates of natives are around 5% in primary and secondary students, while the absence rates of evacuees is in excess of 16%. We can also look at disciplinary infractions, which are the number of infractions resulting in an in-school suspension or a more severe punishment. As with absences, disciplinary infractions are considerably higher amongst evacuees. Table 4 presents formal tests of whether evacuees had significantly lower academic performance,<sup>9</sup> higher absenteeism and more disciplinary problems, after controlling for observable

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<sup>8</sup> At risk status is defined as being over-aged for your grade, having a difficult situation at home (e.g., pregnant, foster child) or having low academic performance (below 40%).

<sup>9</sup> It is interesting to point out that the differences between evacuee and non-evacuee test scores were substantially bigger in LUSD than in Louisiana.

characteristics and school effects. These results show that the test scores of evacuees are one-fifth to two-fifths of a standard deviation lower in elementary and about half a standard deviation lower in middle and high school. Controlling for school effects and observables, the absence rate is 6 percentage points and 13 percentage points higher among primary and secondary evacuee students, respectively. In terms of disciplinary infractions, evacuees tend to do better initially but worse the subsequent year. This is likely due to school officials initially being more lenient with students who were viewed as going through a process of adaptation in 2005-2006.

## **5. Effects on Academic Performance**

We begin by examining the effect of the influx of Katrina and Rita students on the academic performance of their peers. There are three main reasons why the academic performance of the non-evacuees may be affected by the arrival of evacuees. The first is a peer effect story, where the quality of one's classmates influences the learning process of each student. The second is that the entry of new kids may take resources away from the non-evacuee kids. However, we find that for every 100 additional Katrina student that entered an LUSD school the student/teacher ratio increased on average by only 1 student. In addition, from our interviews we know that schools received additional resources and hired new teachers. However, we find that expenditures per student increased by \$6 for every additional evacuee, though the effect is not statistically significant.<sup>10</sup> It is important to note then, that the results below cannot be attributed to reduced resources at the

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<sup>10</sup> These figures are estimates from school-level regressions for 2003-04 - 2005-06 of teacher-student ratios, per-student operating expenditures, and average teacher experience on the number of Katrina and Rita evacuees in a school. The regressions include as covariates racial composition, % of school economically disadvantaged, grade composition, year indicators, year indicators interacted with grade composition, and school fixed effects. These results are available upon request.

schools receiving evacuees. Finally, it could be that the teachers hired in schools receiving evacuees were different from those in schools not receiving evacuees. However, we find no impact of the fraction of Katrina evacuees on average teacher experience. Since school resources and teacher quality did not seem to be greatly affected by the influx of Katrina students, we interpret the results below as reflecting peer effects.

### **5.1. Overall Results and Results by Race**

We use both the LUSD and the Louisiana data to estimate equation (1). Table 5 presents the estimates of the evacuee share on the math and language scores of non-evacuee students. Panel A presents the results for Louisiana and Panel B presents the results for LUSD. The results for Louisiana show that the evacuees have a negative effect on the English, Language and Arts test scores of both elementary and middle-school and high-school students. The results in Columns (1) and (4) which examine the impact on all non-evacuees imply that an increase of 10% in the fraction of Katrina kids reduced the ELA test scores of non-evacuees by close to 0.02 and 0.03 of a standard deviation for primary and secondary school, respectively. For math, we only find a reduction in test scores of 0.02 of a standard deviation for middle-school and high-school, but a positive although only marginally significant effect on elementary school kids. We also report results of fully saturated models for African-American and Hispanic non-evacuee students in Columns (2), (3), (4) and (5). The results do not show bigger effects on African-American children in Louisiana.<sup>11</sup>

The results for LUSD, reported in Panel B, show effects which are less widespread but larger in magnitude. The results in Column (1) for the elementary schools

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<sup>11</sup> The number of Hispanic students in Louisiana is very small, thus we do not include estimates for these students.

show that an increase of 10% in the influx of Katrina students reduced math test scores for all non-evacuee children by 0.09 of a standard deviation. Similarly, the language test scores of non-evacuee elementary school children decrease with the influx of Katrina children but the decrease is not significant. By contrast, the results in Column (4) show that the test scores of middle- and high-school students are not affected by the entry of evacuees into their schools. Interestingly, the reduction of math test scores for elementary school children is driven by the effects on African-American children, which is what we would expect if African-American native kids have more interaction with the evacuee kids. Column (2) shows that an increase of 10% in Katrina evacuees reduces the math test scores of African-American elementary school children by over a tenth of a standard deviation, while Column (3) shows that there is no effect on Hispanic children.

In both locations, the magnitudes of the peer effects are smaller than we anticipated given the large inflow of new and on average less well prepared students.

## **5.2. Results by Gender**

Table 6 presents the results for fully saturated models for boys and girls. Panel A presents the results for Louisiana and Panel B present the results for LUSD. The results show that the estimates for academic performance at the elementary school level are driven by the effects on girls. Column (2) of Panel A shows that the negative effect on girls' ELA test scores is greater than the effect found in Table 5 for the overall sample. In particular, a 10% increase in Katrina kids reduces ELA test scores for girls by 0.03 of a standard deviation compared to 0.02 for the entire sample. Similarly, we find that the reduction in math test scores in LUSD is driven by the large effect on girls. Column (2) of Panel B shows that an increase of 10% in the share of Katrina and Rita children in

LUSD reduces math test scores by a tenth of a standard deviation for girls, in comparison to a reduction of 0.09 of a standard deviation for the entire sample. By contrast, the results for Louisiana boys in Column (1) of Panel A would seem to suggest positive peer effects on math test scores at the elementary school level, though these are only significant at the 5% level.

In middle and high-school, the influx of Katrina evacuees affects the academic performance of both boys and girls in Louisiana, though the effects on boys are much stronger. The results for boys in Column (3) in Panel A shows that an increase of 10% in the influx of Katrina evacuees reduces language and math test scores by 0.03 and 0.04 of a standard deviation. By contrast, Column (4) in Panel A shows that the increase in Katrina evacuees in middle-school and high-school has no effect on language test scores for girls and math test scores for girls fall by only 40% of the fall in boys' test scores. As before, there are no effects on academic performance for secondary schooling in LUSD.

### **5.3. IV Results: LUSD**

Since there is some movement across schools after people move out of the shelters in LUSD and settle into more permanent residences, one may be concerned about the potential selection of evacuees into different schools. As mentioned in Section 3, we address this concern by exploiting the initial exogenous allocation and the fact that many people stayed in their initially assigned schools and some remained in shelters even almost 2 months after the hurricanes struck.

Table 7 reports first-stage results of equation (2), where the instruments used are the Katrina/Rita share on September 13, 2005 excluding students from the stadium complex and convention center and the fraction still living in shelters at the end of

October. The first-stage shows that the Katrina/Rita share on September 13, 2005 and the share in shelters are individually and jointly significant at the 1% level. An increase in Katrina/Rita children of 10% on September 13, 2005 increases the share Katrina/Rita on October 28, 2005 by 7.9% in elementary and by 7.6% in middle-school and high-school. Similarly, an increase in the share of Katrina children in shelters of 10% increases the share on October 28, 2005 by 8.7% in elementary schools and by 6% in Secondary schools.

Tables 8A and 8B show the second-stage results for math and reading, respectively. As with the difference-in-difference results presented above, we only find a negative effect of the influx of Katrina children on the math test scores of elementary school children in LUSD. The estimate for the full sample is smaller in magnitude and, not surprisingly, less precise, but the effect is not significantly different from the difference-in-difference result reported in Table 5. Similarly, the IV estimate for women is almost identical to the differences-in-differences estimate and it is significant at the 1% level. On the other hand, the IV estimate for African-Americans is close to zero. Overall, the IV results are less precise but tend to be qualitatively similar to the difference-in-difference results, suggesting that selection bias in our original estimates is not a big concern.

## **6. Behavioral Effects**

Aside from the impact that kids may have on peers' academic performance, they may also affect peers' behavior and their willingness to accept and follow rules. Our interviews with Principals and teachers in LUSD, indicated that even basic rules such as

showing up to school on time or at all were problematic with some of the evacuees. News reports at the time indicated that while many evacuee students may have been enrolled in schools, they may not have been attending regularly (Garza, 2006) and, indeed, our results in Tables 3 and 4 confirm this. Moreover, news reports as well as our own interviews pointed to bigger behavioral problems related to the evacuees. For example, in our interviews with elementary school teachers, some indicated that the evacuees were more likely to “talk back to the teachers” and that some of the non-evacuee children were likely to imitate this behavior. At the secondary school level, the differences in behavior between evacuee and non-evacuee students, according to the teachers, manifested more in terms of truancy, fighting and engaging in risky behaviors.

LUSD Data indeed allows us to measure some of the behavioral responses. Tables 9 and 10 present difference-in-differences well as IV results of the effects of the influx of Katrina students on the absentee rate and on the number of disciplinary infractions. Panel A presents results for elementary students and Panel B presents the results from middle and high school students. The results in Table 9 show a clear increase in absenteeism both in elementary school as well as in middle and high-school. An increase in the influx of Katrina students increases absenteeism in primary schools by 0.2 percentage points and in secondary schools by 0.7 percentage points. Interestingly, contrary to the results on academic performance, these results are driven by boys in elementary school and by girls in middle- and high-school. In addition, absenteeism becomes more of an issue for African-American native students after the influx of Katrina students, with a 10% influx of Katrina students generating an increase in absentee rate of 1.4% to 1.7% in middle and high-schools. All these results are robust to the use of an instrumental variable strategy.

Table 10 shows similar results for disciplinary infraction counts. In spite of the anxiety at the time about fights between LUSD and New Orleans students, we do not find evidence of a change in disciplinary infractions following the influx of Katrina students for the overall sample. However, when we estimate fully saturated models by gender and race, we do find marginally significant increases in disciplinary problems among girls and African-American students in secondary schools. A 10% increase in fraction of Katrina evacuees raises the number of disciplinary infractions by between 0.2 and 0.3 for girls and by between 0.2 and 0.6 for African-Americans.

## **7. Conclusion**

In this paper we examine the impact of an exogenous influx of low-socio-economic background students on the academic performance and behaviors of their peers. We exploit the influx of Louisiana students into non-affected school districts of Louisiana and into a large urban school district in the southwest (LUSD-SW) to estimate their impact on non-evacuee (native) students.

We use student-level data from Louisiana's Department of Education and from LUSD to estimate the impact on math and language test scores and also on absenteeism and disciplinary infractions in the case of LUSD. The results show negative and significant effects of the influx of Katrina students on language test scores for primary and secondary schooling and on math test scores for secondary schools in Louisiana. In addition, we find negative effects on math test scores in primary schools in LUSD. Interestingly, these results seem largely driven by the effect on African-American non-evacuee students. There are also interesting differences by gender. Girls seem more

susceptible to experiencing negative peer-effects in terms of academic outcomes at the elementary school level but boys seem more susceptible to experiencing negative peer-effects in terms of their academics in secondary schooling.

For LUSD, we can also examine effects on absenteeism and disciplinary measures. The influx of Katrina evacuees increases absenteeism in both primary and secondary schools, with the results for secondary schooling being driven mainly by African-Americans. Contrary to the results on academic outcomes, the results for absenteeism show that elementary school boys are more likely to be influenced in terms of attendance by their Katrina peers, while secondary school girls are more likely to have their attendance affected by the presence of Katrina students. In accordance with this, there is also some evidence of increased disciplinary problems among girls and African-Americans in middle-school and high-school.

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## Data Appendix

### Louisiana Data:

The Louisiana data set consists of student level test scores and demographics for Louisiana public school students during 2003-2007. Under Louisiana's accountability program, students in grades 4, 8, and 10 are tested in March of each year. These tests are known as the LEAP or Louisiana Educational Assessment Program (grades 4 and 8) and the GEE or Graduation Exit Examination. The subjects tested include math and English language arts (ELA) for grades 4, 8 and 10. Science and social studies are tested in grades 4, 8 and 11.

In spring 2006 tests known as the ILEAP (Integrated Louisiana Educational Assessment of Progress) were added for grades 3, 5, 6, 7, and 9. While the Iowa Test of Basic Skills was previously used for these students, we do not have the Iowa test scores. Students in these five grades are tested in both math and English language arts. Students in grades 3, 5, 6, and 7 are tested in science and social studies. Unlike LEAP, the tests in the ILEAP grades do not have a high stakes component at the student level.

We have randomly generated ID numbers which allows us to link a given student across years in the data set. For the spring of 2006, we also have a field which tells us which students are evacuees and whether they were displaced from a public school or private school and whether they were displaced by Katrina or Rita. This was collected by teachers and principals and then reported to the state at the time the exams were taken. For each year, we have information on the student's school and district, race, gender, and free lunch status.

The sample is limited to data for students observed in the school year 2005-2006 since that is the year during which the Louisiana required schools to provide information on a student's evacuee status. Student evacuees are classified as displaced by Katrina or Rita and also as displaced from a public or private school or out of state school. This reduces the number of observations from 1.3 million to 1.0 million.

The parishes most affected by Hurricane Katrina are Orleans, Jefferson, Plaquemines, and Saint Bernard. These parishes comprise most of the Greater New Orleans Metropolitan Statistical Area. There are 135,316 students in grades 4, 8 and 10 in the analysis sample, 14,400 of whom were in one of the affected parishes in the school year 2004-2005. Ninety percent of the students in the affected parishes become evacuees. And, of the Katrina evacuees, ninety-three percent come from the most affected parishes.

Even after the hurricanes, the bulk of Katrina evacuees who remain in Louisiana remain in a school in one of the four most affected parishes. The percentage of eventual evacuees who attend school in one of the affected parishes is 93 percent in 2003-2004 and 2004-2005 school years. This dips to 68% in the spring following Katrina but rises back to 76% by 2006-2007. Many of the evacuees move from Orleans Parish to Jefferson.

Not surprisingly, Katrina evacuees are more likely to disappear from the Louisiana public school sample relative to non-evacuees. If we take the set of evacuees from Orleans Parish who was in the 8th grade in 2004-2005, we find that only roughly 50% of the evacuees remain in the sample versus roughly 80% for all other students.

Pre-hurricane, the vast majority of eventual evacuees were located in Jefferson and Orleans Parishes, with an additional 700-800 evacuees in each of St. Tammany, Plaquemines, and St. Bernard in 2005. Post-hurricane, the count of evacuees (in grades 4, 8 and 10) in Jefferson Parish grows by about 1200 evacuees and East Baton Rouge School District gains about 1,000 of these evacuees. Since we are only counting three grades, this implies that East Baton Rouge gained roughly 3300 student evacuees in all grades. The remaining school districts in the state each gain 0-150 evacuees. The number of evacuees in Orleans itself shrinks dramatically post-Katrina. The Recovery School District (RSD) in Orleans was set up to administer most of the schools in the former Orleans Parish School District. The RSD has roughly 1100 4th ,8th ,and 10th graders by 2007.

#### LUSD Data:

Data for LUSD comes from student records from the 2003-04 through the 2006-07 school year and includes demographics, test scores, attendance, and discipline records for all students in LUSD. The data covers all grades, however we only consider grades 1 - 12 since testing does not begin until first grade.

Demographic data and the school the student attends is identified in the data as of the last Friday in October each year, thus the data is restricted to students who are enrolled in LUSD as of that date. Demographic information includes race, gender, whether the student is a recent immigrant, whether the student's has a parent who is a migrant worker, free lunch status, reduced-price lunch status, and whether a student does not qualify for free/reduced lunch but qualifies for another anti-poverty program. The data also includes indicator for whether a student participates in LEP, bilingual education, ESL, gifted & talented education, special education, and career and technology education. Each student enrolled in LUSD at some point in 2005-06 is also given an indicator for whether he or she is an evacuee due to Hurricanes Katrina or Rita. Overall, 5,717 evacuees (2.7% of all students) were enrolled as of October 28, 2005. In all, we have demographic information on 833,267 student-year observations from 2003-04 through 2006-07.

Testing data covers both the Stanford Achievement Test 10 and a state administered criterion-referenced exam. In this paper we focus on the state exams. Stanford exams are administered by LUSD and given in math, reading, and language in grades 1 - 11, and in science and social studies in grades 3 - 11. The math and reading exams in grades 1 - 8 are "medium stakes" in that students need to score above a certain level to advance to the next grade but the exams do not contribute to the schools' accountability requirements. All other Stanford exams are "low stakes" and thus do determine grade placement and do

not contribute to accountability rules, although the average scores by grade and school are reported to the public.

State exams are administered by LUSD's state to students in grades 3 - 11. Each year students must take a reading/English Language Arts and a math exam while writing is given in grades 4 and 7, science in grades 5 and 11, and social studies in grades 8 and 11. The math and reading portions are "high stakes" in that they count towards accountability in all grades and towards grade advancement in grades 3 - 8. In grade 11 the state exam is an exit exam where student must pass all 4 subjects to graduate. In this paper we only consider the math and reading tests as these give the widest coverage across grades. Since students who fail the exam take it a second time and we do not know which score was first, we assume that the lowest score is the students' first score and thus we use that one. After compiling each student's lowest score in a given academic year we standardize the scale scores within grade and year to have mean zero and standard deviation one. We exclude Katrina and Rita evacuees from the standardization. In total we have 460,804 observations for math and 464,448 observations for reading.

Our behavioral measures include both attendance and disciplinary records. For attendance we divide the percent of days a student is present by the percent of days the student is enrolled to get an attendance rate. In regressions we report the negative of the coefficients to provide an absenteeism rate for easier interpretation. For discipline, our data includes records on any disciplinary incidence that results in an in-school suspension, out-of-school suspension, and referral to disciplinary alternative education, referral to court for truancy proceedings, or placement in juvenile detention. Our measure of discipline is the number of incidences each student has resulting in one of these punishments. In total we have 831,651 observations with attendance data and 833,267 observations with discipline data.

**Figure 1: Louisiana Hurricane Evacuees by School in 2005-06**

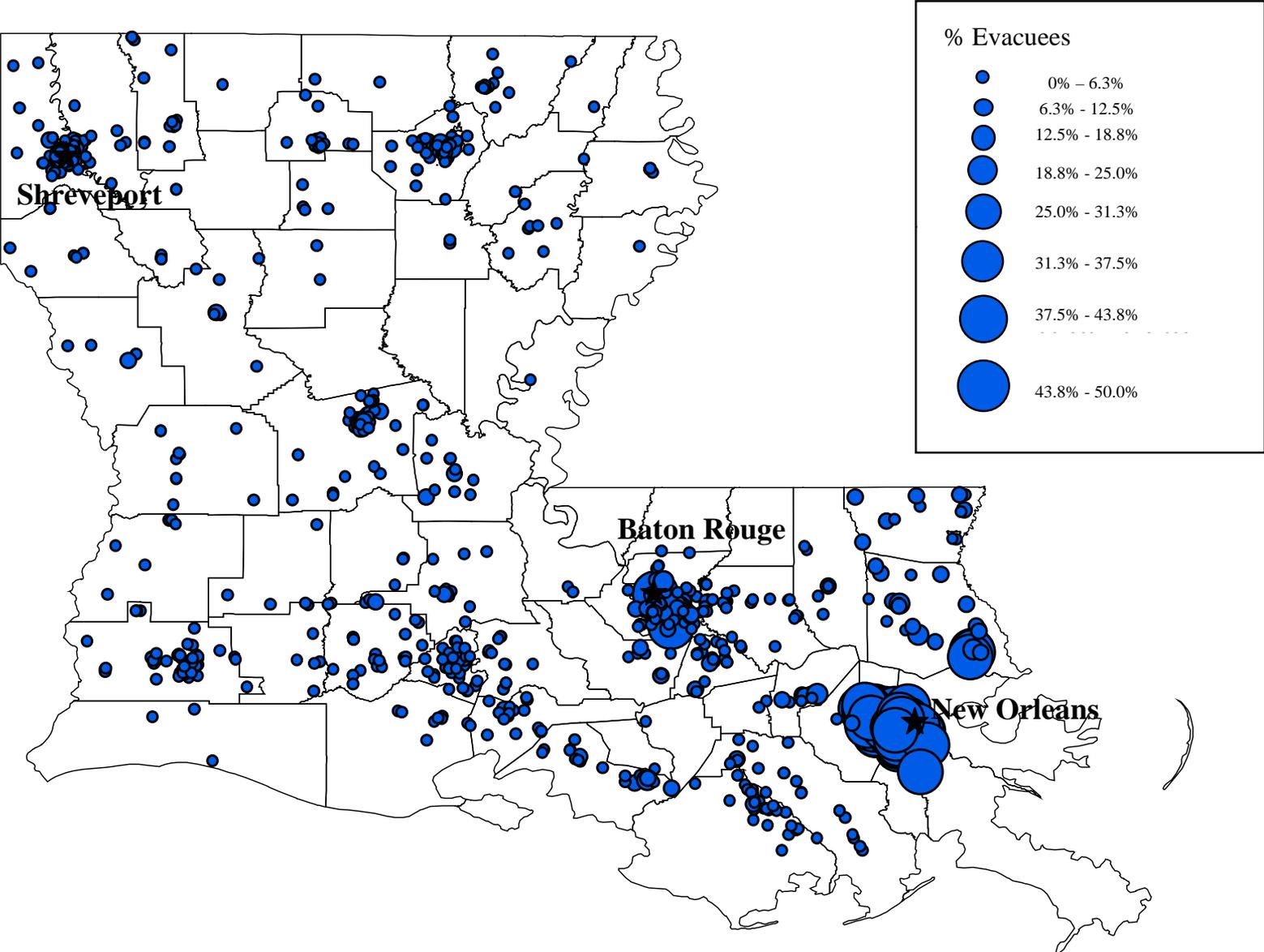
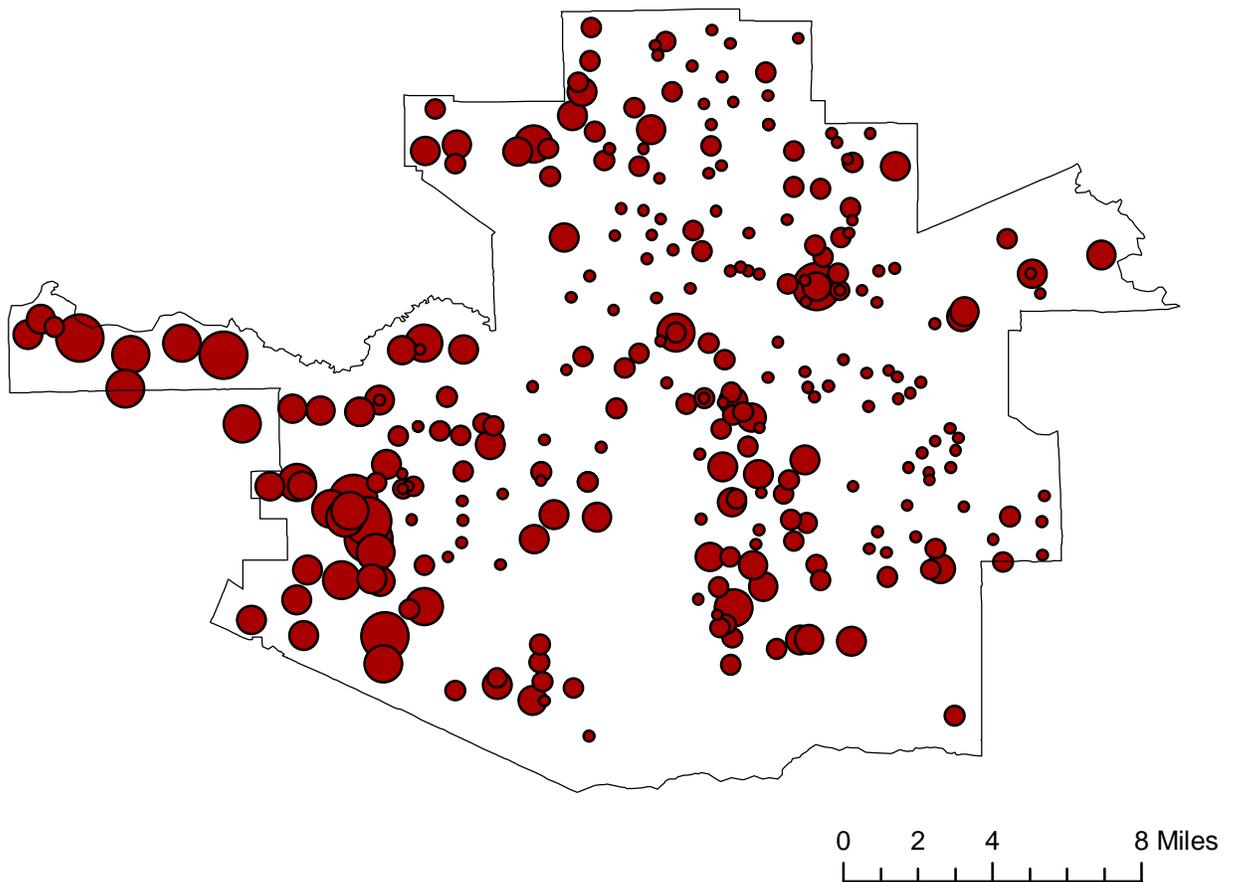


Figure 2: LUSD-SW Hurricane Evacuees by School in 2005-06



**% Evacuees on 10/28/05**

- 0.0% - 1.0%
- 1.0% - 2.8%
- 2.8% - 5.5%
- 5.5% - 11.2%
- 11.2% - 24.7%

Table 1: Characteristics of Evacuees and Native LA Students - 2005-06

	Natives	Evacuees
A. Demographics		
Female	0.499 (0.500)	0.499 (0.500)
White	0.541 (0.498)	0.331 (0.471)
Hispanic	0.011 (0.106)	0.054 (0.227)
Black	0.438 (0.496)	0.577 (0.494)
Asian	0.009 (0.096)	0.037 (0.189)
Free Lunch Status	0.583 (0.493)	0.639 (0.480)
<i>Observations</i>	120,869	14,447
Fraction Katrina Evacuee in School	0.038 (0.075)	0.883 (0.230)
<i>Observations</i>	119,572	9,994
B. Louisiana Educational Assessment Program (LEAP) Exam		
Math (Standard Deviations)	0.026 (0.994)	-0.217 (1.022)
<i>Observations</i>	113,213	13,525
English & Language Arts (Standard Deviations)	0.025 (0.989)	-0.211 (1.022)
<i>Observations</i>	111,993	13,377

Standard deviations in parentheses. Elementary includes all students in grade 3 - 5, middle and high grades 6 - 10.

Table 2: Regressions of Test Scores on Evacuee Status - Louisiana

Outcome		Elementary		Middle / High	
		2005	2006	2005	2006
		(1)	(2)	(3)	(4)
LEAP Exams (standard deviation units)	Math	-0.15*** (0.02)	-0.10*** (0.02)	-0.11*** (0.01)	-0.011*** (0.01)
	Observations	128,278	79,386	205,788	186,680
	English Language Arts	-0.13*** (0.02)	-0.09*** (0.02)	-0.10*** (0.01)	-0.09*** (0.01)
	Observations	128,279	79,389	206,431	186,571

Standard errors are provided in parentheses and clustered by school. Regressions include student's race, gender, free/reduced price lunch status, and school fixed-effects. LEAP scores are standard deviations of scale scores within grade and year for all students. For Louisiana we use only the evacuees from Hurricane Katrina. The Houston data does not differentiate between Katrina and Rita evacuees and thus we use both categories in our evacuee measures. \*, \*\*, and \*\*\* reflect significance at the 10%, 5%, and 1% levels, respectively.

Table 3A: Demographics of Evacuees and Native LUSD Students - 2005-06

	Native	Evacuees
Female	0.490 (0.500)	0.493 (0.500)
White	0.093 (0.290)	0.039 (0.195)
Hispanic	0.590 (0.492)	0.039 (0.195)
Black	0.285 (0.451)	0.903 (0.297)
Asian	0.033 (0.177)	0.018 (0.135)
Limited English Proficiency	0.268 (0.443)	0.009 (0.095)
Gifted & Talented	0.124 (0.330)	0.003 (0.058)
At-Risk	0.675 (0.468)	0.942 (0.234)
Special Education	0.102 (0.303)	0.063 (0.243)
Free Lunch	0.693 (0.461)	0.968 (0.176)
Reduced Price Lunch	0.097 (0.297)	0.001 (0.031)
Fraction Katrina/Rita Evacuee in School	0.027 (0.031)	0.067 (0.054)
Observations	188,194	5,408

Standard deviations in parentheses. Elementary includes all students in grade 1 - 5, middle and high grades 6 - 12. TAKS exams cover grades 3 - 11.

Table 3B: Outcomes for Evacuees and Native LUSD-SW Students - 2005-06

	Native	Evacuees
A. State Criterion-Referenced Exam		
Math (Standard Deviations)	0.000 (1.000)	-0.743 (1.026)
<i>Observations</i>	112,254	2,151
Reading (Standard Deviations)	0.000 (1.000)	-0.582 (1.063)
<i>Observations</i>	113,989	2,307
B. Discipline & Attendance		
Absence Rate (%)	5.36 (8.64)	16.47 (17.88)
<i>Observations</i>	188,140	5,408
Disciplinary Infractions	0.577 (1.634)	0.828 (1.924)
<i>Observations</i>	188,194	5,408

Standard deviations in parentheses. Elementary includes all students in grade 1 - 5, middle and high grades 6 - 12. Exams cover grades 3 - 11.

Table 4: Regressions of Student Outcomes on Evacuee Status - LUSD-SW

Outcome		Elementary		Middle / High	
		2005	2006	2005	2006
		(1)	(2)	(3)	(4)
State Exams (standard deviation units)	Math	-0.41*** (0.05)	-0.19*** (0.05)	-0.49*** (0.06)	-0.29*** (0.04)
	Observations	43,890	42,357	70,515	67,984
	Reading	-0.22*** (0.05)	-0.22*** (0.07)	-0.53*** (0.08)	-0.42*** (0.07)
	Observations	45,077	43,339	71,219	68,796
Absences	Rate (%)	6.00*** (0.33)	2.46*** (0.27)	12.90*** (1.17)	5.26*** (0.59)
	Observations	83,455	80,981	93,190	89,319
Discipline	Disciplinary Infractions	-0.03 (0.03)	0.05* (0.03)	-0.12* (0.07)	0.40*** (0.11)
	Substance Abuse	-0.0002 (0.0001)	0.0000 (0.0001)	0.0070 (0.0045)	0.0031 (0.0061)
	Criminal Infractions	-0.0008 (0.0006)	-0.0007*** (0.0003)	0.0148*** (0.0050)	0.0141* (0.0084)
	Fighting	-0.007 (0.006)	-0.003 (0.005)	0.014* (0.008)	0.053*** (0.013)
	Observations	83,465	81,020	93,232	89,626

Standard errors are provided in parentheses and clustered by school. Regressions include student's race, gender, free/reduced price lunch status, and school fixed-effects. State exam scores are standard deviations of scale scores within grade and year excluding evacuees. When students have multiple scores for a single subject in a given year we use the lowest score. For Louisiana we use only the evacuees from Hurricane Katrina. The LUSD data does not differentiate between Katrina and Rita evacuees and thus we use both categories in our evacuee measures. \*, \*\*, and \*\*\* reflect significance at the 10%, 5%, and 1% levels, respectively.

Table 5: Difference in Differences Estimates of Native Test Scores on Evacuee Share of Enrollment All Students and By Race

	Elementary			Middle / High		
	All	Black	Hispanic	All	Black	Hispanic
	(1)	(2)	(3)	(4)	(5)	(6)
A. Louisiana - LEAP Exams						
Math	0.16*	0.16	-	-0.18**	-0.04	-
	(0.08)	(0.12)	-	(0.08)	(0.11)	-
<i>Observations</i>	321,743	142,303	-	659,623	274,230	-
English & Language Arts	-0.18**	0.19	-	-0.30**	-0.30**	-
	(0.09)	(0.12)	-	(0.08)	(0.11)	-
<i>Observations</i>	321,763	142,303	-	657,048	271,925	-
B. LUSD-SW - State Exam						
Math	-0.87**	-1.19*	-0.07	0.61	0.03	0.41
	(0.43)	(0.71)	(0.50)	(0.55)	(0.61)	(0.39)
<i>Observations</i>	174,603	47,429	106,735	282,774	84,261	158,889
Reading	-0.37	-0.68	-0.02	0.59	-0.28	-0.16
	(0.28)	(0.51)	(0.39)	(0.47)	(0.49)	(0.47)
<i>Observations</i>	175,569	49,507	105,224	285,252	84,770	160,564

Standard errors are provided in parentheses and clustered by school. Regressions cover 2003-04 - 2006-07 for Houston and 2003-04 - 2007-08 for Louisiana and include student's race, gender, free/reduced price lunch status, and school fixed-effects. State exam scores are standard deviations of scale scores within grade and year excluding evacuees. When students have multiple scores for a single subject in a given year we use the lowest score. LEAP scores are standard deviations of scale scores within grade and year for all students. For Louisiana we use only the evacuees from Hurricane Katrina. The LUSD data does not differentiate between Katrina and Rita evacuees and thus we use both categories in our evacuee measures. Elementary is defined as any student in grades 3 - 5. Middle/High is any student in grade 6 - 11 for Houston or 6 - 10 for Louisiana. Prior to 2005 only grades 4, 8, and 10 were tested in Louisiana. \*, \*\*, and \*\*\* reflect significance at the 10%, 5%, and 1% levels, respectively.

Table 6: Difference in Differences Estimates of Native Test Scores on Evacuee Share of Enrollment, By Gender

	Elementary		Middle / High	
	Boys (1)	Girls (2)	Boys (3)	Girls (4)
A. Louisiana - LEAP Exams				
Math	0.24** (0.12)	0.06 (0.12)	-0.27** (0.11)	-0.11 (0.11)
<i>Observations</i>	165,123	156,620	327,135	332,488
English & Language Arts	-0.09 (0.12)	-0.27** (0.12)	-0.44*** (0.11)	-0.18* (0.11)
<i>Observations</i>	165,126	156,637	327,389	329,659
B. LUSD-SW - State Exam				
Math	-0.68 (0.45)	-1.03** (0.45)	0.42 (0.46)	0.13 (0.33)
<i>Observations</i>	87,593	87,010	140,286	142,488
Reading	-0.36 (0.35)	-0.39 (0.28)	0.04 (0.45)	-0.06 (0.32)
<i>Observations</i>	88,797	86,772	141,505	143,747

Standard errors are provided in parentheses and clustered by school. Regressions cover 2003-04 - 2006-07 for Houston and 2003-04 - 2007-08 for Louisiana and include student's race, gender, free/reduced price lunch status, and school fixed-effects. State exam scores are standard deviations of scale scores within grade and year excluding evacuees. When students have multiple scores for a single subject in a given year we use the lowest score. LEAP scores are standard deviations of scale scores within grade and year for all students. For Louisiana we use only the evacuees from Hurricane Katrina. The LUSD data does not differentiate between Katrina and Rita evacuees and thus we use both categories in our evacuee measures. Elementary is defined as any student in grades 3 - 5. Middle/High is any student in grade 6 - 11 for Houston or 6 - 10 for Louisiana. Prior to 2005 only grades 4, 8, and 10 were tested in Louisiana. \*, \*\*, and \*\*\* reflect significance at the 10%, 5%, and 1% levels, respectively.

Table 7 - 2SLS First Stage Estimates for LUSD-SW

	Elementary	Middle/High
Share of Enrollment on 9/13/05 from Katrina/Rita Evacuees	0.79*** (0.16)	0.75*** (0.14)
Share of Enrollment on 10/28/05 from Katrina/Rita Evacuees Living in Shelters	0.86*** (0.23)	0.62*** (0.23)
F - Test of Joint Significance of Instruments	30.4	48.1

Standard errors are provided in parentheses and clustered by school. These estimates are based off of the pooled state exam math sample and include 87,010 elementary and 142,488 middle/high school observations. For all other samples are similar. Regressions cover 2003-04 - 2006-07 and include student's race, gender, free/reduced price lunch status, and school fixed-effects. Katrina/Rita Share on 9/13/05 excludes students who were being sheltered at the stadium or convention center. Elementary is defined as any student in grades 3 - 5. Middle/High is any student in grade 6 - 12, though only grades 3 - 11 are tested. \*, \*\*, and \*\*\* reflect significance at the 10%, 5%, and 1% levels, respectively.

Table 8A - Instrumental Variables Estimates of Native Math Scores on  
Evacuee Share of Enrollment for LUSD-SW

A. Elementary				
	Diff in Diff (from tables 5 & 6) (1)	2SLS (2)	P-Value for Test of (1) vs. (2)	Observations
All	-0.87** (0.43)	-0.59 (0.45)	0.78	174,603
Boys	-0.68 (0.45)	-0.22 (0.58)	0.48	140,286
Girls	-1.03** (0.45)	-0.99** (0.46)	0.84	87,010
Black	-1.19* (0.71)	0.04 (0.88)	0.05**	47,429
Hispanic	-0.07 (0.50)	0.19 (0.75)	0.67	106,735
B. Middle/High				
	Diff in Diff (from tables 5 & 6) (1)	2SLS (2)	P-Value for Test of (1) vs. (2)	Observations
All	0.61 (0.55)	0.29 (0.37)	0.39	282,774
Boys	0.42 (0.46)	0.80 (0.67)	0.42	140,286
Girls	0.13 (0.33)	0.42 (0.49)	0.34	142,488
Black	0.03 (0.61)	1.18 (0.98)	0.22	84,261
Hispanic	0.41 (0.39)	0.29 (0.52)	0.98	158,889

The outcome measure is the standardized score on the math exam. Standard errors are provided in parentheses and clustered by school. Regressions cover 2003-04 - 2006-07 and include student's race, gender, free/reduced price lunch status, and school fixed-effects. 2SLS estimates use the following instruments: (i) Katrina/Rita share on 9/13/05 excluding students living at the stadium complex or covention center and (ii) share of students on 10/28/05 who were evacuees living in shelters. Elementary is defined as any student in grades 3 - 5. Middle/High is any student in grade 6 - 11. \*, \*\*, and \*\*\* reflect significance at the 10%, 5%, and 1% levels, respectively.

Table 8B - Instrumental Variables Estimates of Native Reading Scores on  
Evacuee Share of Enrollment for LUSD-SW

A. Elementary				
	Diff in Diff (from tables 5 & 6) (1)	2SLS (2)	P-Value for Test of (1) vs. (2)	Observations
All	-0.37 (0.28)	0.20 (0.40)	0.03**	175,569
Boys	-0.36 (0.28)	0.34 (0.49)	0.07*	88,797
Girls	-0.39 (0.28)	0.07 (0.44)	0.09*	86,772
Black	-0.68 (0.51)	0.53 (0.58)	0.03**	49,507
Hispanic	-0.02 (0.39)	0.57 (0.73)	0.13	105,224
B. Middle/High				
	Diff in Diff (from tables 5 & 6) (1)	2SLS (2)	P-Value for Test of (1) vs. (2)	Observations
All	0.59 (0.47)	0.01 (0.37)	0.08*	285,252
Boys	0.04 (0.45)	0.61 (0.55)	0.12	141,505
Girls	-0.06 (0.32)	0.56 (0.44)	0.06*	143,747
Black	-0.28 (0.49)	0.60 (0.65)	0.15	84,770
Hispanic	-0.16 (0.47)	0.23 (0.57)	0.17	160,564

The outcome measure is the standardized score on the reading exam. Standard errors are provided in parentheses and clustered by school. Regressions cover 2003-04 - 2006-07 and include student's race, gender, free/reduced price lunch status, and school fixed-effects. 2SLS estimates use the following instruments: (i) Katrina/Rita share on 9/13/05 excluding students living at the stadium complex or covention center and (ii) share of students on 10/28/05 who were evacuees living in shelters. Elementary is defined as any student in grades 3 - 5. Middle/High is any student in grade 6 - 11. \*, \*\*, and \*\*\* reflect significance at the 10%, 5%, and 1% levels, respectively.

Table 9 - Estimates of Native Absenteeism Rates on Evacuee Share of Enrollment for LUSD-SW

A. Elementary				
	Diff in Diff (1)	2SLS (2)	P-Value for Test of (1) vs. (2)	Observations
All	1.79* (0.96)	0.63 (1.10)	0.24	332,010
Boys	2.68** (1.31)	1.27 (1.37)	0.19	170,601
Girls	0.82 (0.83)	-0.17 (1.06)	0.40	161,409
Black	2.91 (2.00)	-1.08 (2.52)	0.03**	91,689
Hispanic	0.54 (0.86)	0.19 (1.55)	0.70	202,586
Middle/High				
	Diff in Diff (1)	2SLS (2)	P-Value for Test of (1) vs. (2)	Observations
All	7.36** (3.73)	6.12 (5.69)	0.76	363,140
Boys	6.94 (4.58)	7.04 (5.89)	0.98	183,658
Girls	7.64** (3.27)	4.92 (6.11)	0.47	179,482
Black	14.19*** (4.18)	17.41** (7.42)	0.37	112,673
Hispanic	3.66 (6.21)	0.27 (7.28)	0.53	200,457

Outcome measure is the percent of enrolled days a student attends school. For ease of interpretation we convert the estimates for attendance to absenteeism rates by multiplying all coefficients by -1. Standard errors are provided in parentheses and clustered by school. Regressions cover 2003-04 - 2006-07 and include student's race, gender, free/reduced price lunch status, and school fixed-effects. 2SLS estimates use the following instruments: (i) Katrina/Rita share on 9/13/05 excluding students living at the stadium complex or covention center and (ii) share of students on 10/28/05 who were evacuees living in shelters. Elementary is defined as any student in grades 1 - 5. Middle/High is any student in grade 6 - 12. \*, \*\*, and \*\*\* reflect significance at the 10%, 5%, and 1% levels, respectively.

Table 10 - Estimates of Number of Native Disciplinary Infractions on  
Evacuee Share of Enrollment for LUSD-SW

		Elementary			
		Diff in Diff	2SLS	P-Value for Test of	Observations
		(1)	(2)	(1) vs. (2)	
All		-0.04 (0.26)	0.21 (0.29)	0.31	332,101
Boys		-0.04 (0.44)	0.37 (0.45)	0.28	170,653
Girls		-0.05 (0.11)	0.02 (0.17)	0.59	161,448
African-Americans		-0.73 (0.57)	-0.84 (0.68)	0.68	91,734
Hispanics		0.22 (0.14)	0.55** (0.26)	0.02**	202,616
		Middle/High			
		Diff in Diff	2SLS	P-Value for Test of	Observations
		(1)	(2)	(1) vs. (2)	
All		1.69 (1.27)	3.29 (2.60)	0.52	363,550
Boys		1.42 (1.64)	3.09 (3.15)	0.64	183,885
Girls		1.89* (0.96)	3.37 (2.08)	0.40	179,665
African-Americans		2.94* (1.57)	6.01 (5.28)	0.46	112,820
Hispanics		0.95 (1.53)	2.49 (2.15)	0.32	200,665

Disciplinary infractions are the number of times in a year the student was given an in-school suspension or more severe punishment. Standard errors are provided in parentheses and clustered by school. Regressions cover 2003-04 - 2006-07 and include student's race, gender, free/reduced price lunch status, and school fixed-effects. 2SLS estimates use the following instruments: (i) Katrina/Rita share on 9/13/05 excluding students living at the stadium complex or covention center and (ii) share of students on 10/28/05 who were evacuees living in shelters. Elementary is defined as any student in grades 1 - 5. Middle/High is any student in grade 6 - 12. \*, \*\*, and \*\*\* reflect significance at the 10%, 5%, and 1% levels, respectively.