A silver lining to natural disasters:

what happened to student evacuees from Hurricane Katrina?

What would happen to educational achievement if failing schools were closed down and their students sent elsewhere? *Bruce Sacerdote* offers a glimpse of the possible impact in his research on the outcomes for student evacuees from Hurricane Katrina and for students in the schools where the evacuees ended up.

US Secretary of Education Arne Duncan made headlines in January with his public comment that Hurricane Katrina was 'the best thing that happened to the educational system in New Orleans'.

While Duncan's statement is controversial, there are many who believe that certain US school systems – such as Washington DC, Chicago and Los Angeles – are so broken that the only way to improve outcomes is to scrap them and either form new traditional public schools or allow charter schools to serve a large part of the market. Furthermore, a key component of the Bush-era 'No Child Left Behind' legislation is that failing schools that do not make annual progress will be shut down or reconstituted.

Hurricanes Katrina and Rita provide a glimpse into what might occur if entire failing school systems are shut down and the students sent elsewhere. My research studies the effects for the student evacuees themselves and the peer effects for 'native' students in the receiving schools.

Hurricane Katrina struck New Orleans in September 2005. The storm and resulting flooding killed nearly 2,000 people and caused at least $81 billion in damage. The insurance payments plus subsequent federal spending to mitigate the effects of the storm total in the hundreds of billions of dollars.

The experience of Katrina evacuees shows that leaving a very poor school system can significantly raise academic achievement

The vast majority of the damage and fatalities was caused by flooding that occurred when several levees in New Orleans were breached. Most schools in Orleans Parish (which is coterminous with the City of New Orleans) were flooded and closed for the year. Many schools in surrounding parishes – Jefferson, St Tammany, Plaquemines and St Bernard – were also closed for several months.

Roughly 66,000 students were evacuated from New Orleans. One third of these students left the state permanently. Another third relocated permanently to other districts in the state, including the East Baton Rouge Parish school district. The remaining third eventually returned to New Orleans after a period of six to 24 months.

My research suggests that Hurricane Katrina did indeed improve long-run outcomes for students from New Orleans, though perhaps in a different way than Secretary Duncan had in mind. From my analysis of data on test scores for all Louisiana students from Spring 2000 to Spring 2009, it seems that students who left New Orleans for good benefited the most.

Initially both Hurricanes Katrina and Rita had a large negative effect on maths and English scores for elementary, middle and high school students. This can be seen in Figures 1 and 2, which chart test scores for various groups of evacuees over time.

I standardise all test scores at the year and grade level. Hence Figures 1 and 2 show the performance of evacuees *relative* to the performance of all other students in Louisiana. The numbers in Figures 1 and 2 are coefficients from a set of regressions in which I calculate the coefficient on 'evacuee' controlling for race, gender and free lunch status.

Controlling for these demographics, the (eventual) evacuees from Orleans Parish are underperforming other Louisiana students by roughly .20 standard deviations in the pre-hurricane period. Following the hurricane, the performance of evacuees from Orleans Parish worsens by .12 standard deviations in Spring 2006. This negative effect of .12 standard deviations seems to be consistent across different groups of evacuees and across the two different hurricanes.

But one year later, the Orleans evacuees have made up the ground they lost due to the hurricane and associated

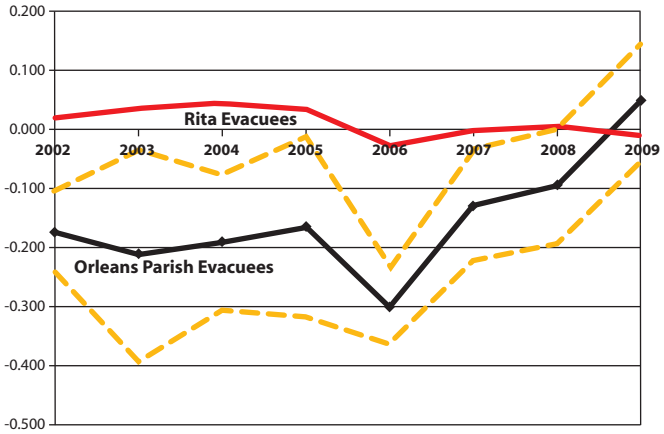

Figure 1: Repeated cross-sectional 'effects' on maths scores, New Orleans versus non-New Orleans evacuees

I regress maths scores (all grades) on dummies for eventual Katrina Evacuee Status. The latter is split by evacuees who are in Orleans Parish in 2004 or 2005 versus all others. The 2006 and 2007 scores are post-hurricane. Students are tested in March of each year.

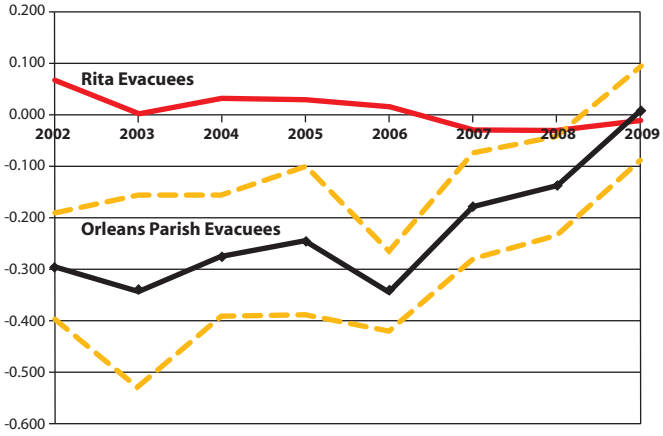

Figure 2: Repeated cross-sectional 'effects' on ELA scores, New Orleans versus Rita evacuees

I regress English Language Arts scores (all grades) on dummies for eventual Orleans and Rita Evacuee Status, race dummies, male, free lunch status. The latter is split by evacuees who are in Orleans Parish in 2004 or 2005 versus all others. The 2006 and 2007 scores are post-hurricane. Students are tested in March of each year.

disruption. In the subsequent two years (2008 and 2009), the Orleans evacuees have made substantial progress. By 2009, the evacuees are performing .20 to .25 standard deviations above where they started.

There are several possible explanations for this surprising finding. One sensible explanation is that the Orleans schools were so ineffective that the switch in schools had long-term positive effects on test scores. As one check of this hypothesis, I examine test score growth for evacuees conditional on where the evacuees settled.

Students with the lowest prior attainment and those who left the metro area entirely saw the greatest improvements

Evacuees who left the New Orleans metro area have much higher test score growth from 2005 to 2009 than evacuees who return. Those evacuees who return to the city of New Orleans itself and enter the Recovery School District do not experience any noticeable growth in their position in the test score distribution. In other words, test score growth for returning Orleans students is comparable to that experienced by all other Louisiana students.

A second question is whether the improvement in outcomes experienced by Orleans evacuees is concentrated in one part of the achievement distribution. Figure 3 addresses this question, showing the amount of test score growth from 2000 to 2009 stratified by initial quintile of achievement (test scores).

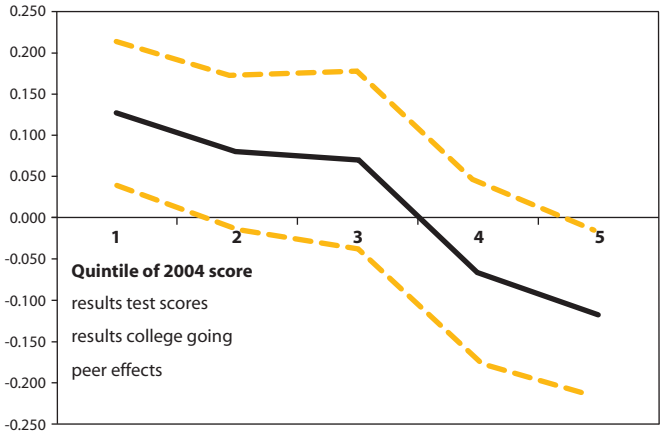

Figure 3: Effect by quintile of initial maths scores, Orleans 4th graders of 2004 in 2009

This runs the baseline specification by quintile (statewide) of initial maths score in 2004. I graph the coefficient of Orleans Evacuees 2009.

I find that evacuees who were in the bottom two quintiles of the Louisiana test score distribution benefit the most from the disruption induced by the hurricane. This suggests that the students who needed the most help received that help once they left the poorly performing Louisiana school system. (Again these effects are all relative to other students in Louisiana in the same year and grade. Thus a coefficient of 0 suggests growth that is in line with all other students.)

While the figures are a very simple way of examining the data, my research also makes use of more sophisticated specifications in which I am careful to limit the sample to particular cohorts of students who are observed throughout the sample period (for example, the fourth graders from 2004 and 2005.)

Test scores are only one outcome measure of interest. I also have data on eventual college attendance for every single Louisiana tenth grader from 2000 to 2005. When I analyse college attendance patterns for the evacuees, a different picture emerges than the results for test scores.

The hurricane had virtually no impact on the likelihood that an evacuee from Orleans enrols in a four-year college. One possible explanation is the fact that the test score effects take place in the lower part of the test score distribution and these students are the least likely to attend college, even with their improved scores.

When I consider effects on eventual enrolment in two-year (community) colleges, the hurricane had negative effects on enrolment. Students attending an Orleans Parish high school at the time the hurricanes strike are 3.5 percentage points less likely to enrol in community college compared with students who attended those same Orleans high schools but graduated one to three years before the hurricanes struck.

Schools where the evacuees went were able to absorb the inflow without causing much harm to their own students

The explanation for this finding is that there are very close 'feeder' relationships between high schools in a particular area and the local community colleges. Before the storm, two thirds of students from Orleans who attended a community college attended Delgado Community College. The evacuees' exit from New Orleans appears to have disrupted the natural flow of students from their high school to the local college.

Finally, in research conducted jointly with Scott Imberman and Adriana Kugler, I investigate whether students in the receiving schools see large effects from the influx of evacuees. On average, it appears that the receiving schools (in Houston, Texas, and East Baton Rouge and Shreveport, Louisiana) were able to absorb the inflow of evacuees without significant negative effects on their native students.

High- and moderately high-achieving 'native' students were helped by the arrival of high-achieving evacuees

But within this average effect of zero, there are large and interesting nonlinearities. In particular, low-achieving native students are harmed by the arrival of low-achieving evacuees. High- and moderately high-achieving 'natives' are helped by the arrival of high-achieving evacuees.

Overall this work suggests that we may able to learn from studying students who are forced to relocate due to a natural disaster. The experience of Katrina evacuees from New Orleans shows that leaving a very poor school system, such as the Orleans Parish School district, and entering a more typical US school district significantly raised academic achievement for those students.

The students who had the lowest baseline scores and who left the metro area entirely saw the greatest gains. And these gains were generated without causing any harm (on average) to students in the receiving schools. But there does not appear to be a positive effect on college attendance and, if anything, transitions from high school to community college seem to be hindered.

This article summarises 'When the Saints Go Marching Out: Can Hurricanes Katrina and Rita Teach us about Effects from Closing Unsuccessful Schools?' by Bruce Sacerdote of Dartmouth College.