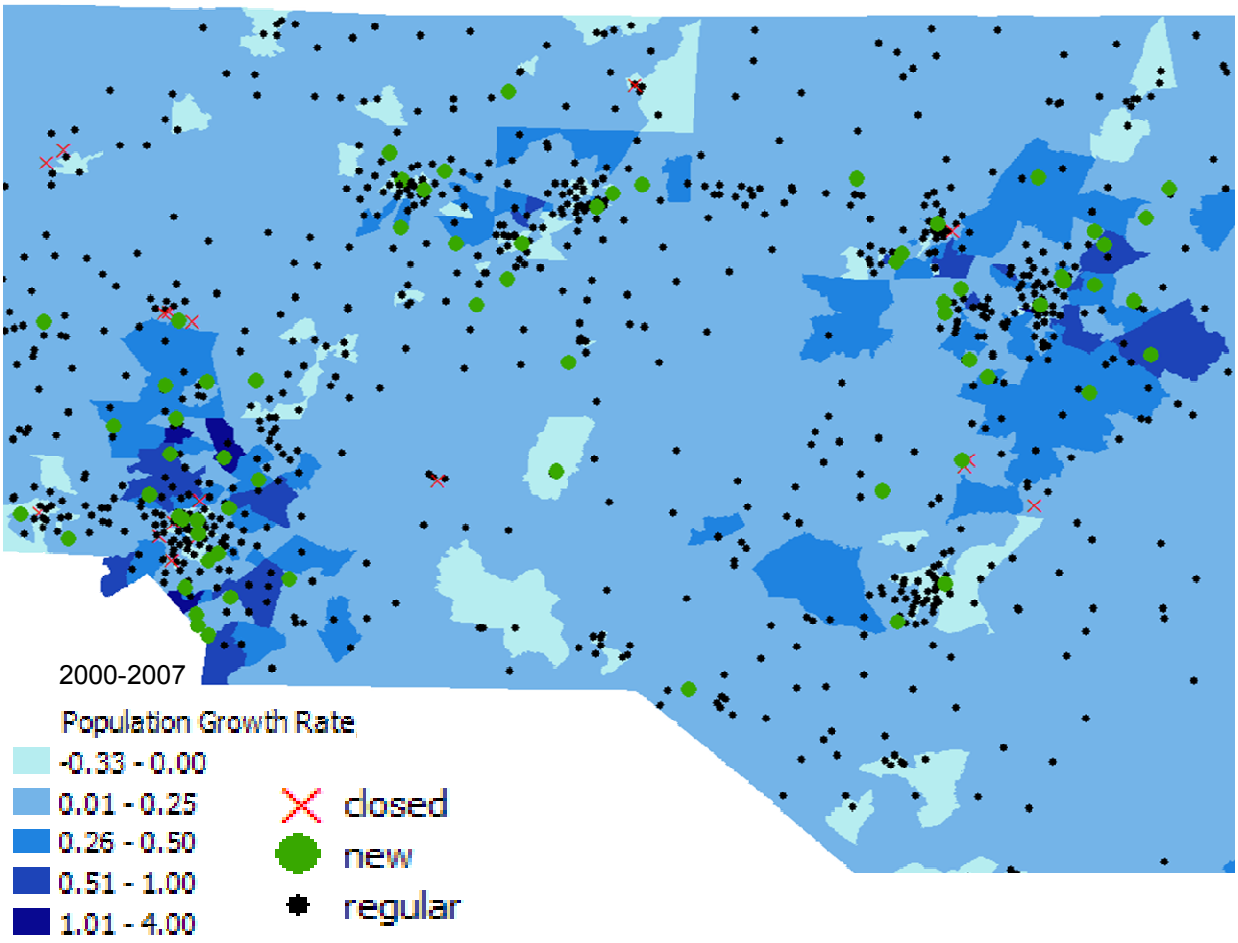
Sara Pilzer
Duke University – Public Policy

"What Are the Effects of School Openings and Closings on the Educational Outcomes of Nearby Students?"

The overarching goal of this project is to detail the effects of major structural changes—particularly through school openings, closings, and mergers—on a variety of student outcomes. Of primary concern are the changes in resource distribution, student and school demographics, and student achievement not only among the students and schools directly influenced by the school changes, but also on the nearby schools that likely gain or lose teachers, students, and resources in response to the proximate school opening or closing. Some mechanisms underlying the potential impacts on nearby schools include resource skimming, student/parent selection, scar effects, and shock effects.

To address these objectives, I use the rich school-, student-, and teacher- level panel data available through the North Carolina Education Research Database Center, spanning from 1995-1997 for all NC public schools. In addition, the United States Department of Education provides school-level information on all U.S. public schools, and these data can be merged with the individual-level data from North Carolina for the same time period. Census data can also be merged using latitude and longitude coordinates to place schools into census tract to provide more detailed contextual information.



In each year between 1995 and 2007, there are both school openings and closings in North Carolina. Overlaying school locations on a map with census characteristics, we begin to visualize where public schools in North Carolina are located. Interestingly, new schools are not only located in areas of rapid population growth and closed schools in areas of population decline. The following map zooms into about the central third of the state: Charlotte is the cluster to the Southwest and contains many openings and closings. Northeast of Charlotte we find several school openings in Forsyth and Guilford Counties (Winston-Salem and Greensboro). Moving to the East are Durham, and Raleigh. These are the five largest cities in North Carolina (2000 US Census) and areas I plan to study first given that they contain large numbers of school openings and closings.

For example, in Charlotte, we can compare the characteristics of new and regular schools from 2003 to 2006. Given the small number of school openings each year, the characteristics of new and regular schools often are not statistically different from each other (t-tests compare means of new versus regular schools). Still, there do appear to be differences in the racial compositions, SES, and percent of students at grade level. New schools each year have fewer minority students, fewer students who qualify for free and reduced lunch, and a larger percentage of students at grade level than the district as a whole. (Future analysis will take advantage of the individual, panel-level nature of the data.)

Sample Case: Charlotte Elementary Schools, 2003-2006

Year	District	# New	New Only	std dev	# Regular	Regular Only	std dev	
2003	**0.436**	5	**0.394**	0.396	82	**0.486**	0.235	
2004	**0.435**	2	**0.413**	0.419	87	**0.486**	0.250	
2005	**0.433**	2	**0.389**	0.487	89	**0.487**	0.251	
2006	**0.441**	3	**0.259**	0.296	90	**0.496**	0.246	

Percent Latino

Year	District	# New	New Only	std dev	# Regular	Regular Only	std dev	
2003	**0.082**	5	**0.024**	0.016	82	**0.104**	0.096	*
2004	**0.093**	2	**0.082**	0.075	87	**0.115**	0.110	
2005	**0.108**	2	**0.067**	0.059	89	**0.132**	0.124	
2006	**0.124**	3	**0.020**	0.003	90	**0.150**	0.135	+

Percent Free/Reduced Lunch

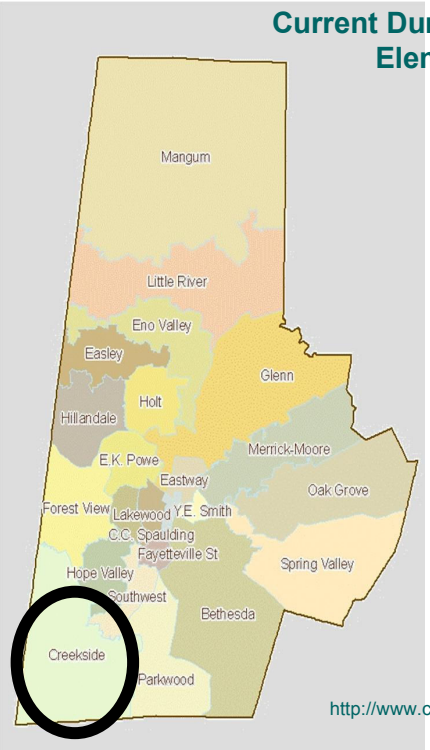
Year	District	# New	New Only	std dev	# Regular	Regular Only	std dev	
2003	**0.458**	2	**0.129**	0.145	80	**0.550**	0.285	*
2004	**0.499**	2	**0.395**	0.466	87	**0.567**	0.309	
2005	**0.510**	1	**0.641**	.	86	**0.593**	0.306	
2006	**0.493**	2	**0.120**	0.051	88	**0.568**	0.290	*

Percent at Grade Level

Year	District	# New	New Only	std dev	# Regular	Regular Only	std dev	
2003	**83.7**	4	**87.5**	14.655	81	**82.6**	9.587	
2004	**86.2**	2	**94.3**	7.495	85	**85.3**	8.887	+
2005	**84.5**	0			87	**84.7**	8.256	
2006	**72.0**	1	**85.6**	.	87	**70.8**	12.709	

* = 5%, + = 10% significance level

Even more specific is the case of a specific school opening in southwest Durham. In the 2004/5 school year, Creekside Elementary School opened. Using (spherical) distance from the Creekside school building to all nearby schools in the district, it is possible to see if and how this opening may have affected (or at least might be associated with) nearby school changes. In particular, I look at the change in the total number of students in nearby schools as well as school-level test scores. There are 8 schools within 6 miles of Creekside, but the changes associated with the school opening do not only appear to be based on geographic proximity to the new school. If seemingly sharp changes occur immediately following the 2004/5 opening, these visual depictions express a potential circumstance in which a regression discontinuity design might be appropriate.



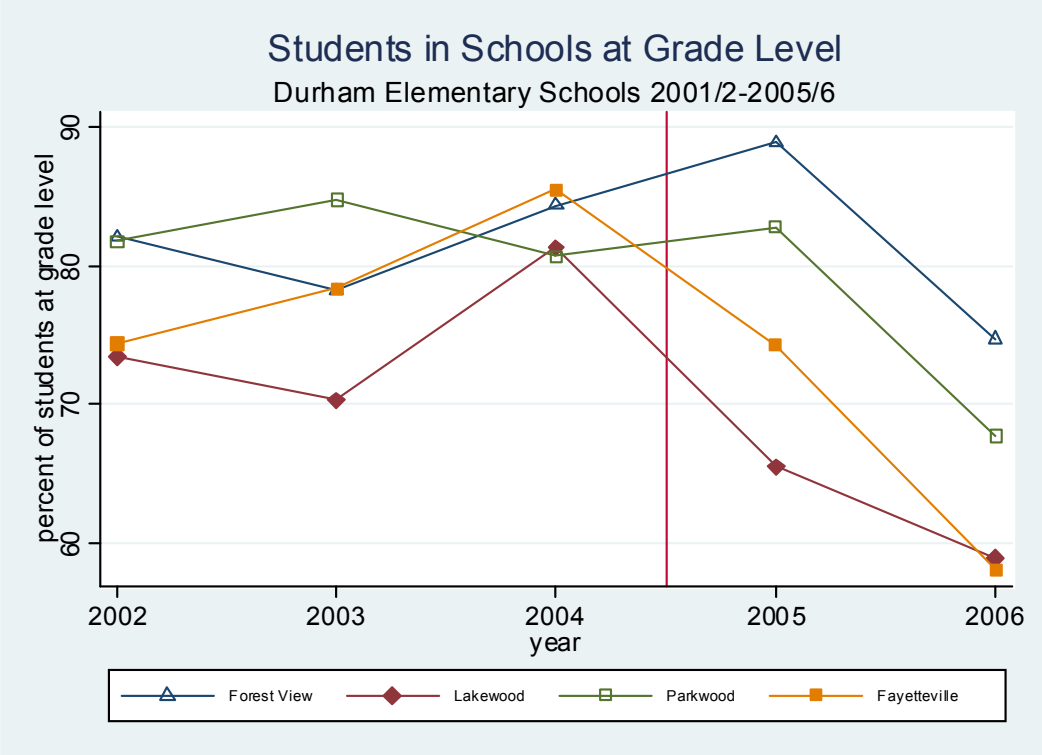
Closest Elementary Schools to Creekside Elementary School	
Distance (mi)	School
4.0	Southwest Elementary
4.0	Hope Valley Elementary
4.2	Forest View Elementary
4.7	Pearsontown Elementary
4.9	Lakewood Elementary
5.4	Parkwood Elementary
5.5	Fayetteville Street Elementary
6.0	C C Spalding Elementary

There are a few schools in this sample with large changes in the number of students, seemingly in response to the nearby school opening. Interestingly, some nearby schools increase in size whereas other close schools decrease in size. More interestingly, these population changes do not appear to be solely determined by proximity to the new school (see table below, details omitted for brevity).

Closest Elementary Schools to Creekside Elementary School			
Distance (mi)	School	Pop Change	
4.0	Southwest Elementary		
4.0	Hope Valley Elementary		
4.2	Forest View Elementary	↓	
4.7	Pearsontown Elementary		
4.9	Lakewood Elementary		↑
5.4	Parkwood Elementary	↓	
5.5	Fayetteville Street Elementary		↑
6.0	C C Spalding Elementary		

As we can see, the changes in overall school size do not only occur in the closest schools to the Creekside, as the closest two schools remained at near-identical sizes whereas others that are farther away grew or shrank sizably. More specifically, the proportion of nonwhite students in the two schools with the largest percent increases in students—Lakewood and Fayetteville—were .959 and .997 (with 84 and 86 percent of students eligible for free and reduced lunch). On the other hand, the other nearby schools which either remain stagnant or shrank in size had fewer minority and free and reduced lunch eligible students. These constant/shrinking schools ranged from two-thirds to three-quarters nonwhite (and 38 to 48 percent of students eligible for free and reduced lunch). Again, not conclusive evidence, these findings do suggest that there may be disparities in the characteristics of schools and students that are most affected by nearby openings and closings. Continuing to motivate this study, then, is an attempt to parse out whether these macro-level school changes serve as socially- or racially- stratifying agents.

Since we tend not to be solely concerned with issues of school size, but rather on student achievement, I investigate whether average test scores change among the schools that experienced large student population changes. Looking specifically at the schools that had large gains or losses in students accompanying the Creekside opening, it again appears that the two schools that increased in size also began to see reductions in test scores following the change. On the other hand, the schools that decreased in size had test scores trend up, at least for one year following the school opening. Moreover, since the demographic characteristics of students vary in these schools, this finding is substantively valuable if we think policies on school openings potentially concentrating disadvantage.



Preliminarily, it does seem quite clear that there are substantial changes at the school level that accompany school openings and closings. What remains to be determined is the extent to which student demographics predict likelihood of being affected by these large school-level changes.