Name: Shiqi Zhou

Reading Notes on "Do Better Schools Matter"

The quality of schools has been widely concerned. Understanding and estimating the value of better schools is helpful not only for parents in choosing schools, but also for policy makers in evaluating school reforms and improving social welfare. To estimate the value of batter schools, previous studies have proposed standard hedonic estimation. In this estimation, researchers use the price of houses around school as a proxy for the value of school quality placed by parents and use students' test scores as a proxy for school quality. But, in this estimation structure, the neighborhood characteristics are not sufficiently control, and the results may overestimate the value of better schools. Therefore, this paper revises the standard hedonic estimation, and focuses on houses located on opposite sides of attendance district boundaries. This revised estimation isolates the relationship between test scores and house price from variation in neighborhood and other variables. Moreover, the results with revised estimation are robust to several sensitivity checks.

The methodology in this paper is based on standard hedonic estimation. In standard hedonic estimation, the price of the house is decided by characteristics of houses, neighborhood and school district characteristics, and average test score in each attendance district. However, not all neighborhood and district characteristics would be observed. These unobserved neighborhood characteristics, as omitted variables, would result biased findings. To exclude other factors such as variation in neighborhoods, taxes and school spending, the author of this paper proposes a revised standard hedonic estimation. In this revised estimation, the author replaces the observed characteristics of neighborhood and districts with dummy variables that indicate houses that share an attendance district boundary. In this way, the author focuses on the mean house prices on opposite sides of attendance district boundaries. For houses on opposites sides of an attendance district, the neighborhoods characteristics are continuous variables. If the distance between two houses on opposites sides of an attendance district is closer enough, the neighborhoods characteristics could be considered consistent. While the test scores make a discrete jump because students attend different school around the attendance district boundaries, this methodology isolates the relationship between house prices and average test scores.

The author of this paper chooses Massachusetts's house pricing from 1993 through 1995 (Middlesex, Essex and Norfolk are chosen), and math and reading test score (MEAP)[1] data for 1988, 1990 and 1992. The small school districts in Massachusetts lead the population homogeneity within districts. Four school districts are excluded because children's schools could be chosen by parents not decided by the attendance boundaries. Also, attendance district divided by large rivers, parks or any large stretch of land are carefully omitted because of the lack of continuity of neighborhood characteristics. This study only keeps data with "single-family residences" for reasons of comparability and focuses on elementary schools because of enough within-district variation. The full sample consists of 22,679 single-family residences within 39 school district and 181 attendance district boundaries. Each house in the data is assigned to the nearest attendance district boundary. Also, each house is matched to census block groups with 1990 census data, as well as the school-district-level data.

This paper presents the results used standard hedonic estimation and revised estimation. In Table II column (1), the results of standard hedonic estimation show that the average elementary

[1] Massachusetts Educational Assessment Program (MEAP) is a statewide assess- ment performed every two years on students in grades 4, 8, and 12. The MEAP test consists of five parts: reading, science, social studies, mathematics, and writing. Other work uses either the math, the reading, or the sum of the two as indicators of school quality. See Bradbury, Case, and Mayer [1998] for one example.

school test score increases 5 percent, the house price will increase 4.9 percent, or $9280 at the mean. For school characteristics, $500 increase in per-pupil spending leads to a 2.2 percent ($4136 at the mean of $188,000) increase in the house price. For house characteristics, bedrooms, bathrooms, lot size and the square footage of the house are positively correlated with higher house prices, while the age of building and the distance from the center city are both negatively correlated. Using revised estimation, the author represents results in Table II column (2)-(4) with different distances from the attendance district boundary. From Table III, the closer the houses are to the boundary, the less likely thar there are differences other than test scores on opposite sides of the boundary. All coefficient of test score in column (2)-(4) is approximately half of that in column (1). As the distance restricted to 0.15 miles (column (4)), 5 percent increase in test scores result in a 2.1 percent increase (approximately $3948 at the mean $188,000) in house prices. And if school scores move from 25 percentile to 75 percentile, the house price will increase 2.9 percent ($5452 at the mean). This result further indicates that one-standard-deviation increase in test score would lead to $69,192,900 jump in overall wealth in Massachusetts in 1985. Also, the author rules out that the decreasing coefficient is resulted from the decreasing sample size as the distance narrowed in Table II column (5).

Moreover, this paper run several specification tests to test the results' sensitivity. One concern is that the assumption that the neighborhood characteristics is continuous on the opposite sides of attendance district boundaries does not hold. There are several possible reasons lead to discontinuity of neighborhood characteristics. First, the boundaries are natural district boundaries, such as railroads highways. These natural boundaries lead to possible great differences in neighborhood characteristics on the opposite sides of the boundaries. To test this hypothesis, the author excludes these boundaries in the sample. From the results in Table V column (1), there is no significant difference in the coefficient of the test score from that in Table II column (2). The second hypothesis is that better schools lead to better neighborhoods. So, on the opposite of the boundaries, the test scores of the schools are different, then the neighborhood characteristics would be different. The author creates artificial attendance boundaries and artificial control group within each attendance districts to rule out this hypothesis. The third possible reason is the differences in census characteristics. In Table V column 4, the author includes variables such as racial and age and the new regression results of coefficient on test scores does not change significantly. Another concern is that house quality has unobserved differences. Then the value of the house prices is consisting of the value of the house quality and the value of school quality. The author regression the internal square footage and lot size of the house on the opposites of the boundaries. The results in Table V column (5) and (6) show that there are no significant differences in these observable house characteristics, which may indicate that there are no significant differences in unobservable house characteristics. Also, the existence of children in one family will affect the value of parents put on better schools. Author assumes that people who live in 3- or more bedroom houses are more likely to have children and they will put more value on better schools. To test this, author creates interaction variables includes dummy variables indicating numbers of bedrooms and test score. From the results in Table V column (7), coefficient of test score with 3- or more bedroom houses is significant.

To summarize, this paper evaluates better schools' value through the house price differences on opposite sides of attendance boundaries. The results are not only meaningful for school reform evaluations, but also house industries and politicians to improve overall wealth. However, this evidence is only provided with data in Massachusetts. More observations national widely are needed. Also, the factors that cause the differences in scores needs further investigation.