READING NOTES: SE BLACK (1999)

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Understanding and measuring school qualities is critical to meaningful discussions on education policies and reforms, which not only concerns parents, but also impacts the future of this country. Conventional methods of measuring school qualities by establishing a causal relationship between metrics of school quality and outcomes, such as test scores or earnings, have yielded inconclusive results. For example, traditional metrics of school quality (class sizes, teachers' experience profiles and etc) fail to capture the impact that different schools have on students' future earnings[1]. Various studies have attempted to circumvent this conundrum by looking at how much more parents are willing to pay for houses located in areas with better schools. This approach is complicated by a potentially positive correlation between school quality and unobserved neighborhood characteristics. In this seminal paper, Black introduces boundary fixed effects as controls for neighborhood unobservables that might be correlated with school quality. Using boundary fixed effects, Black identifies that a 5% increase in elementary school test scores increases marginal resident's willingness to pay about 2.1% , which is half the effect estimated in previous studies.

Boundary fixed effects help correct for omitted variable bias (OVB) in various hedonic price regressions previously estimated on the relationship between school quality and house prices. Hedonic price regressions try to estimate the impact of school quality on price with a rich set of controls of both house and neighborhood characteristics. They suffer from two sources of OVB . First, across school districts, property tax rates and public goods provision may vary. The second source of OVB is variation within school districts. When a school district has multiple schools each with their own attendance district, neighborhood characteristics may change across attendance districts. The idea of boundary fixed effect is to compare prices of houses that are within the same school district, and are close to but on opposite sides of attendance district boundaries. Limiting comparison to among houses within the same school district removes the first source of OVB. Supposing houses that are physically close to each other share similar neighborhood characteristics removes the second source of OVB. Thus boundary fixed effects would allow researchers to control for unobservable neighborhood characteristics.

To implement hedonic regressions with boundary fixed effects, an analyst needs data on housing prices, housing characteristics, school districts, attendance districts and school qualities. Black obtains housing price data from 1993 to 1995 for three counties in the suburb of Boston from Bankers and Tradesman, a data products group. For these three counties, Black obtains primary school attendance district boundaries from individual school districts themselves. Each single-household home is assigned to the nearest boundary and

only houses within a certain distance of boundaries are kept in the analysis. For each attendance boundary, Black assigns a good side and a control side based on school quality, which is measured by fourth grade Massachusetts Educational Assessment Program scores averaged over three years. Black also uses census data to obtain neighborhood characteristics so she can replicate traditional hedonic price regression for comparison.

With the above described data, Black estimates hedonic price regressions both with boundary fixed effects and with neighbourhood characteristics. While all regressions give qualitatively consistent results for the effect of school quality and housing characteristic on price, using boundary fixed effects in place of neighborhood characteristic reduces the estimated effect of school quality by one half. This result suggests that traditional methods of using a rich set of neighborhood characteristics controls would significantly overestimate the marginal parent's willingness to pay for higher school quality, in line with the expectation of a positive correlation between unobserved neighborhood characteristics and school quality.

Black concludes that, with boundary fixed effects as better controls for neighborhood quality, parents do value school quality although less so compared to previous estimates. Parents are willing to pay about 2.1%-or $3948-more for houses associated with test scores that are 5% higher at the mean. She suggests that these numbers can be used to conduct quantitative analysis on educational policies.

One limitation of this approach comes from sample selection. Suppose there is an expensive and high amenity neighborhood that spans across an attendance boundary and the two sections of the neighborhood on different sides of the attendance district boundary differ only in quality of the public primary school. The households who buy house on the control side of the neighborhood probably value school quality less than average household. Because they could afford better school quality in a community that provides less amenities on other dimensions. If households of this type drive the demand for houses on the control side of the neighborhood, Black's estimate of the willingness to pay for school quality would not be representative because of heterogeneous demand.

Another limitation comes from the availability of private schools. We can see this by further analyzing the example in the previous paragraph. Suppose parents buy into the control side of a nice neighborhood not because they value education less, but because they plan to send their children to expensive private schools. Under Black's framework, these parents would appear to be less concerned with school quality. Consequently, I suspect that this would bias the estimates toward underestimating social demand for school quality.

Despite these limitations, the paper still makes significant contribution for it's innovative approach and solid execution.

References

[1] Julian R Betts. "Does School Quality Matter? Evidence from the National Longitudinal Survey of Youth". In: *The Review of Economics and Statistics* 77.2 (1995), pp. 231–50.