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Commuting to educational opportunity? School choice effects of mass transit expansion in Mexico City

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ABSTRACT

School choice policies aim to increase educational access by weakening the link between a student's residence and his choice set, but long commutes and other barriers may constrain families from selecting otherwise-desirable schools. Leveraging a mass transit expansion in Mexico City's suburbs as a natural experiment, we find that a new train raised demand for elite and more distant schools, but only among high-achieving students with highly-educated parents. These students were also more likely to be assigned to elite and more distant schools under the test-based assignment mechanism. In contrast, we find little effect on the choices or assignments of low-achievers or those with lower-education parents. These results highlight the complementarities between transit access and school choice as well as the potential limitations of choice policies in large urban areas.

1. Introduction

School choice policies are broadly aimed at improving educational outcomes by allowing students to access options that outperform their neighborhood schools or to select schools with attributes that best match their individual needs. Such policies have the potential to increase equity and efficiency and have been introduced in a wide variety of contexts throughout both the developed and developing world.[1] When the geographical distribution of school quality and other attributes is uneven, the success of a choice system requires that students can and will travel farther to attend high-quality, good-match schools (Hastings, Kane, & Staiger, 2008). Moreover, similarities or differences in students' ability and willingness to travel will determine whether or not choice policies expand effective access to high-quality schools for all types of students, a debate that is ongoing and relevant to contemporary policy discussions (Hoxby, 2003).

In studying the many factors that constrain school access, the literature consistently shows that students highly value proximity.[2] Therefore, distance may continue to limit access to schools that students would otherwise prefer. This is of particular concern for equitable access when distance constrains students differentially with respect to their socioeconomic status (SES). Burgess, Greaves, Vignoles, and Wilson (2015) suggest that one avenue to increase educational access is "reducing the link between home postcode and the set of schools to which access is feasible in practice" (page 1288). One potentially attractive avenue for achieving this is the expansion of transit services between where students live and where they might like to attend school, since this may expand access without the difficulties of actively reshaping the geographical distribution of school characteristics.

This paper examines the effects of transit expansion on school choice behavior, using the introduction of the Suburban Train in the Mexico City metropolitan area as a natural experiment. As one of the largest, most populous metropolises in the world, Mexico City offers a unique opportunity to understand choice in an expansive urban area. The Suburban Train was introduced in 2008 and expanded transit access to the relatively poor northern suburbs of the city. It resulted in a substantial change in commuting access to the city center for approximately five million commuters, reducing daily one-way travel times by over fifty percent from 1.5 to two hours before the train to 25 to 45 min after (Ferrorcarriles Suburbanos, 2008b; Pantoja, 2008; Pantoja & Montaño, 2007). The new line represented lower transportation costs for students, parents, and neighbors in areas surrounding the new line, potentially causing changes in job location, peer information, and community development and crime patterns. This large shock, coupled

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[1] See Dustan (2017) for an incomplete list of studies covering school choice in various settings. These include studies of choice policies in primary, secondary, and tertiary school systems in Ghana, Kenya, Malawi, Trinidad and Tobago, Romania, China, the United Kingdom, and the United States.

[2] For example, this is a finding in Hastings et al. (2008), Alderman, Orazem, and Paterno (2001), Gallego and Hernando (2010), and Glick and Sahn (2006), reviewed in more detail in the next section.

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with a unified choice process and a large number of heterogeneous school options, provides a good context to observe if and how students' choices respond to an expansion in the feasible choice set caused by a new transit line. Notably, the vast majority of Mexico City's "elite" public high schools are situated in the city center and there are none located in the region primarily impacted by the expansion, so students in these areas potentially experienced much greater access to high-quality schools.

We estimate a difference-in-differences model to identify the causal effect of the Suburban Train on school choice behavior and resulting assignment outcomes. We use a rich dataset of the full school rankings for all public high school applicants in Mexico City for each year from 2005 through 2011. The existence of multiple pre-treatment time periods allows us to relax the parallel trends assumption by introducing location-specific linear time trends. The key identifying assumption is that, net of any aggregate temporal shocks, any deviation of treatment area outcomes from their trends in the post-expansion period is due to the existence of the Suburban Train. We identify treatment areas as postal codes close enough to new stations that students may access them and perform the analyses using two sets of control areas. The first draws control areas from the rest of the suburban ring, composed of regions that are comparable distances from the city center and from public transit prior to the Suburban Train. The second uses areas around planned but unbuilt transit lines as control regions.

In our preferred specification, we use the distance reduction to a transit station induced by the train as a measure of treatment intensity, to allow for differential effects between central and remote areas. We use subcluster wild bootstrapped *p*-values to account for geographical clustering in the presence of a small number of treated clusters, as suggested by MacKinnon and Webb (2017). We also present various robustness checks and show that the results are robust to the empirical specification, varying criteria for identifying the treatment and control areas, and the pre-treatment period used.

We find two main results. First, the train causes some types of students to choose schools that are farther away from home and increases their likelihood of listing elite schools as their first choices. While evidence for the average effect of the expansion on the affected population is weak, we find consistent, statistically significant positive effects concentrated among high-achieving, high-SES students. Following these choice changes, these students are also more likely to be assigned to elite schools and to more distant schools under the exam-based school assignment mechanism.

For a high-scoring, high-SES student experiencing the mean reduction in distance to nearest station (9 km, or a 75% decrease), the implied effects are a 5% increase in distance to first choice, a 2% increase in distance to assigned school, and a 3%–4% increase in elite first choice and elite assignment. For high-scoring, high-SES students at the end of the Suburban Train (with a reduction in distance to nearest station of 18 km), the implied effects are a 10%–11% increase in distance to first choice, a 4%–5% increase in distance to assigned school, and a 7%–8% increase in elite first choice and elite assignment.

Second, the transit introduction has little effect for other student types, and there is little evidence of substitution toward high-quality nonelite schools. Specifically, we can rule out large effect sizes on distance to chosen schools for low-achieving students and for low-SES students.

Taken together, the findings suggest that the newly constructed stations allowed high-ability students from high-SES backgrounds to access elite high schools that were previously out of reach. Outcomes for other groups remained mostly unchanged either because latent demand for elite schools was low, commuting costs remained too high, or because the train did not dramatically change commute times (in the case of stations near the city core).

Our paper contributes to the literature on school choice policies. While other studies have identified strong preferences for nearby schools in descriptive cross-sectional analyses, we are among the first to identify the causal effects of increased transit access on school choice.[3] This is important because endogeneity issues associated with residential location and school choice suggest that cross-sectional analyses may not accurately predict the effects of policies directed at changing the effective proximity to high-quality schools.

In using this natural experiment, we more narrowly identify the causal effects of constructing new transit stations on school choice. The results suggest that similar policies that cause large changes in transit patterns for students and the broader population can be effective at raising demand for more distant, high-performing schools for certain student groups. Despite the small outcome elasticities with respect to reduction in distance to nearest station, the magnitude of effects on elite choice are comparable to policies directly designed to change students' choices.[4]

However, similar transit policies may not cause a majority of students to substitute away from neighborhood schools toward more distant higher-quality options for a variety of reasons. Students may continue to be constrained by costs, admissions policies and enrollment constraints, or a lack of information. This suggests that additional contextualized policies may be necessary to achieve effective access for all students. Moreover, low-achieving and low-SES students may have strong preferences for convenience and neighborhood peers and may choose proximate schools even after some constraints are relaxed. In this case, increasing access may require locating high-quality schools close to targeted students rather than moving students to high-quality schools.

The rest of the paper is organized as follows. Section 2 gives a summary of the relevant literature. Section 3 provides detailed overviews of the institutional contexts in Mexico City, describing the geographical setting, the introduction of the Suburban Train, and the system of school choice. Section 4 sets forth the method for identifying the effects of the transit introduction on outcomes. Section 5 describes the data and Section 6 gives the empirical results. Section 7 concludes.

2. Literature review: school choice, willingness to travel, and transit

There is a large body of research describing student preferences for school characteristics. This literature consistently shows that families strongly value proximity in choosing schools. Proximity is an important determinant of choice throughout both the developing and developed world (Alderman et al., 2001; Burgess et al., 2015; Chumacero, Gómez, & Paredes, 2011; Hastings et al., 2008). The preference for close schools appears at all grade levels and regardless of whether students are choosing among traditional public schools or among non-traditional options.

Studies also cite transportation convenience as an important determinant of school choice. In Charlotte, North Carolina, Hastings et al. (2008) find that families are more likely to choose schools within a zone of assured school bus transportation. Outside of the U.S., public transit is particularly important, accounting for a moderate to large mode share of trips to schools (Müller, Tscharaktschiew, & Haase, 2008). It is more important in urban settings and in areas where public transit is more available (Schwanen & Mokhtarian, 2005). For example, transit access is important in Santiago, Chile, where families are more likely to choose schools that are close to subway stations (Gallego & Hernando, 2010). Similarly, in Tel Aviv, Lavy (2006) finds that students who reside along public bus lines leading directly to their district schools are more likely to choose those schools compared to students

[3] Working papers by Herskovic (2017) and Asahi (2015) study the effects of a subway expansion in Santiago, Chile.

[4] Hastings and Weinstein (2008) find that providing families with information about school academic performance causes a 5–7 percentage point increase in the fraction of students choosing nonguaranteed schools and a 0.05–0.10 standard deviation increase in the average test scores of chosen schools.