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A ticket to ride: The unintended consequences of school transport subsidies

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ABSTRACT

This paper provides evidence of the effects of a decrease in the cost of travelling to schools outside the neighbourhood on the choice of school among low income families. I examine a policy reform that occurred in England in academic year 2007/2008, which provided free transport to low socio-economic status (SES) students to schools between 2 and 6 miles away from home only, but not to closer schools. Using confidential panel school micro data, providing information on the postcode of both schools and students' residence, I find strong evidence of a decline in the probability of attending schools closer than 2 miles. Conversely, the decrease in the cost of travelling affects negatively the quality of the school attended. Consistent with the predictions of a simple theoretical model, results suggest that the negative estimates on quality are driven by students who are willing to trade quality for savings in transport costs. This mechanism is reinforced by school over-subscription combined with distance-based admission criteria, which *de facto* limits choice to low quality institutions.

1. Introduction

Improving access to good schools among low income students seems to be a promising tool to decrease segregation and promote social mobility. Indeed, though pupils' innate ability and parental background explain a large share of academic achievement, the quality of the school attended is believed to be crucial in determining academic success and future labour market outcomes (Chetty et al., 2011; Dearden, Ferri, & Meghir, 2002; Kramarz, Machin, & Ouazad, 2009).[1]

Despite the admitted relevance of high quality education, a significant share of low income students still attends below average schools.[2] Most of the discussion on school segregation identifies in residential sorting the main determinant. House prices are significantly correlated with the quality of the local schools, implying that constrained families will be segregated in neighbourhoods detached from the best institutions (Gibbons, Machin, & Silva, 2012).[3] In addition, low rates of car ownership, along with the high cost of public transport, suggest that low income parents struggle to enrol their children at schools outside their neighbourhoods.[4,5]

A natural question then is whether lower costs of attending schools further away may improve the quality of the school attended among low income students by expanding their choice set to schools outside their district. The empirical analysis, however, involves a set of difficult challenges. In particular, the cost of travelling to school is typically

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[1] Compelling evidence comes from the newly introduced academy schools in England, which are showed to improve the share of pupils achieving at least five grades in range A*–C in their GCSE/GNVQ (Machin & Vernoit, 2010; Machin & Wilson, 2009). More recent literature focuses on the impact of the newly introduced charter schools in the US. These schools aim at promoting teaching quality emphasizing traditional reading and math skills, extended instruction time and selective teachers hiring. Abdulkadiroglu, Angrist, Dynarski, Kane, and Pathak (2011) show that oversubscribed charter schools in Boston increase the test scores of low income students by a third of a standard deviation per year -enough to eliminate the black-white test score gap in a few years of attendance. In a follow-up of this paper, Abdulkadiroglu, Angrist, Hull, and Pathak (2014) show that Boston charter attendance boosted SAT scores sharply, along with the probability of taking an Advanced Placement examination. Similar effects have been found in New York City (Dobbie & Fryer, 2011). For additional evidence on the benefits on charter schools see also Hoxby and Murarka (2009), Dobbie and Roland G. Fryer (2013) and Abdulkadiroglu et al. (2011). However, the literature on charter schools is not completely unanimous. Both Ravitch (2010) and Rothstein (2004) criticize the external validity of studies on charter schools, pointing out that those schools are more likely to select students from the top of the ability distribution those children with innate intelligence and well motivated parents. Other studies using as a proxy of school quality by various observable indicators, such as teacher/pupil ratio, teachers' educations and per-pupil expenditures, find mixed results on the link with students' achievement (Chetty, Friedman, & Rockoff, 2014; Hanushek, 1986; 2003; Krueger, 1999; 2003).

[2] Strikingly, in academic year 2004/2005, nearly 70% of disadvantaged students sorted in secondary schools performing below the national average. Own calculation based on the universe of first year enrollments in England.

[3] For additional evidence on the link between housing market prices and school quality see also Black (1999), Hoxby (2000), Rothstein (2006), Fack and Grenet (2010) and Machin and Salvanes (2010). See also Black and Machin (2011) for a review of the literature on the topic.

[4] According to the National Transport Survey (NTS), in 2009 more than 50% of British households in the bottom quintile of the income distribution did not own a car or van, compared with only 10% in the top income group.

[5] On average, tickets fares for children aged under 16 are £1 for a single short journey, £1.20 for a medium length journey and £1.40 for a long journey.

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endogenous: it depends on families' residential choices, which presumably are correlated with school preferences. This paper circumvents the issue by focusing on an arguably exogenous policy innovation which occurred in England ad the start of academic year 2007/2008 (free transport policy) and lowered the cost for disadvantaged students to attend schools further away. Although transport subsides have always existed in the UK, in 2007/2008 they became particularly generous for low SES students –i.e. those eligible for free school meals (FSME) or whose parents are in receipt of benefits.[6] Specifically, before the policy was implemented, FSME students were granted free transport only to the nearest school if this was more than 3 and less than 6 miles walking from home. The programme lowered the threshold for the nearest school to 2 miles and extended the right to free transport to the second and the third nearest schools between 2 and 6 miles.

Using a unique dataset on the universe of England's public schools' students providing information on both pupils' postcode of residence and school history, I identify the effect of a decrease in transport cost on school choice through a differences-in-differences approach, comparing low SES students eligible for free transport to more distant schools (the second and the third) with those ineligible before and after the policy implementation. To avoid confounding effects, I restrict my analysis to students living less than 2 miles from the nearest school, that is, to those who were never eligible for free transport to their nearest school. A simple model shows that, while such policy should create incentives for low SES student to attend schools further away, the effect on the quality of the school attended is ambiguous. Specifically, some students might be induced to enrol at further away schools in order to benefit from the subsidy, even if this comes at the cost of quality. Consistent with the intended objectives of the policy, I find strong evidence of an increase in the probability of FSME students enrolling at more distant schools, in the order of 2 percentage points. This, however, does not result in an improve in quality, with eligible students choosing schools between 0.02 and 0.03 standard deviations lower in quality than ineligible ones. Results suggest that the negative estimates are indeed driven by students who are willing to trade quality for savings in transport costs, the effect being larger the more constrained families are. The mechanism is further reinforced by school rationing combined with distance-based admission criteria, which *de facto* limit students' choice to lower quality institutions. Indeed, though in principle school admission is based on free parental choice, in case of over-subscription priority is given to students living closer, implying that isolated families will have low chances of gaining access to popular institutions.[7] I show that, consistently, students responding to the policy are only those whose distant school is not oversubscribed and are less affected by school rationing.

This paper contributes to two strands of the existing literature: school choice and school segregation.

With respect to the school choice literature, there is plenty of evidence showing how English pupils from disadvantaged families disproportionally sort into poor performing institutions (Allen, 2007; Allen & Vignoles, 2006; Burgess, Johnston, & Wilson, 2008; Burgess, McConnell, Propper, & Wilson, 2004; Burgess et al., 2010; Fitz, Gorard, & Taylor, 2003; Gibbons & Telhaj, 2007), though little is known on whether improved school choice would help promoting access to high performing schools. Past literature exploring parents' preferences revealed that families do value academic attainment as one of the most important school characteristics (Burgess, Greaves, Vignoles, & Wilson, 2009; Gibbons & Silva, 2011; Hastings, Kane, & Staiger, 2005), suggesting that expanding families' choice set should translate into a higher fraction of students attending high quality institutions.[8] Empirical evidence, however, is mostly limited to the US context. Among others, Cullen, Jacob, and Levitt (2005) explore the impact of introducing open enrolment within the Chicago Public Schools (CPS). Roughly half of the students opt out of their assigned high school to attend career academies and other high-achieving schools.[9] Similarly, Deming, Hastings, Kane, and Staiger (2014) explore the effect of winning an admissions lottery to attend a public high school in Charlotte-Mecklenburg (CMS), showing that lottery winners are more likely than lottery losers to graduate from high school and to attend college, and that the positive impacts of choice are strongly predicted by gains on several measures of school quality.[10,11] Nonetheless, the literature is not unanimous: in one of the few studies on UK, Gibbons, Machin, and Silva (2008) show that pupils who have a wider choice of schools at their place of residence perform no better than those with more limited choice. This work contributes to the existing literature by explicitly focusing on the choice of school of low income families in the UK. This subgroup of the population is of particular interest as it is disproportionally segregated in poor quality institutions. Moreover, the choice problem faced by disadvantaged families may differ from the one of wealthier households, as the constraints imposed by distance and transport cost are more likely to be binding. Consistently, I show that as a result of a decrease in the cost of attending schools further away, low SES students are more likely to enroll in institutions outside their neighbourhood. However, the higher weight placed on distance relative to school quality, imply that families are willing to trade some quality for savings in travel costs.

The literature on school segregation typically explores the effect of policies aiming at balancing the race composition across schools by reassigning minority students to schools outside their neighbourhood. Though strongly criticized and eventually banned, these policies are related with a number of positive outcomes, including academic achievement and improvement in non-cognitive skills. (Billings & Rockoff, 2014; Guryan, 2004; Reber, 2010). Among the others, Guryan (2004) finds a 3 percentage points reduction in drop out rates for black students, while no effect is found for white students. Similarly, Reber (2010) shows that schools desegregation increased graduation rates among black students by 15 %.[12] Nonetheless, the literature is not

[6] Benefits include: income-based Job-seekers Allowance, Income-related Employment and Support Allowance, Support under Part VI of the Immigration and Asylum Act 1999, Child Tax Credit (provided one is not also entitled to Working Tax Credit and has an annual gross income of no more than £16,190) and the guaranteed element of State Pension Credit.

[7] Compelling evidence on the relevance of the proximity criterion is provided by Burgess, Wilson, and Worth (2010), showing that it accounts for up to two thirds of the overall observed difference in the quality of the school attended.

[8] Families also value pupils' composition and distance, the latter being generally more relevant for students with lower socio-economic backgrounds.

[9] Cullen and Jacob (2007) examine whether expanded access to sought-after schools in the CPS can improve academic achievement. Using lottery data, they find that winners attend on average higher quality schools than lottery losers. However, they do not find that winning the lottery systematically confers any evident academic benefit.

[10] For additional evidence on the effects of CMS open enrolment see, among the others, Hastings, Kane, and Staiger (2006) and Hastings, Weelden, and Weinstein (2007).

[11] A different strand of the literature examines the impact on school choice of school vouchers, which decrease the cost of attending private schools. In 1990 Wisconsin began providing a small number of low income families with vouchers to attend non sectarian private schools. Greene, Peterson, and Du (1997); Greene, Peterson, Du, Boeger, and Franzier (1996) and compare the test scores of students who won the lottery with those who lost, finding significant gains in both math and reading scores. Rouse (1998) compares the test scores of students selected to attend a private school with those of all other students from Milwaukee public schools. She finds that the program had a positive impact on math score gains of selected students. Other studies on the effects of the Milwaukee Voucher Program include: Witte (1992), Witte, Sterr, and Thorn (1995), Witte and Thorn (1996), Witte (1997). Finally, Angrist, Bettinger, Bloom, King, and Kremer (2002) explore the effects of a voucher programme in Columbia, offering vouchers which partially covered the cost of private secondary school for students who maintained satisfactory academic progress. Three years after the lotteries, winners were about 10 percentage points more likely to have finished 8th grade, primarily because they were less likely to repeat grades, and scored 0.2 standard deviations higher on achievement tests.

[12] Ashenfelter, Collins, and Yoon (2005) report a positive effect of desegregation on long term outcomes of black students, finding that blacks who finished their schooling just before effective desegregation occurred fared poorly compared to blacks who followed just a few years behind them at school. Finally, Billings and Rockoff (2014) show that the rezoning following the end of busing sensibly widened racial inequality despite the effort of local schools to mitigate the impacts of increased segregation through an