



Contents lists available at ScienceDirect

Journal of Public Economics

journal homepage: www.elsevier.com/locate/jpube

Priorities in school choice: The case of the Boston mechanism in Barcelona[☆]

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ARTICLE INFO

Article history:

Received 29 April 2015

Received in revised form 19 April 2018

Accepted 19 April 2018

Available online xxxx

JEL classification:

C78

D63

I24

Keywords:

School choice

Enrollment

Boston mechanism

Priorities

Private schools

ABSTRACT

The Boston mechanism is a school allocation procedure that is widely used around the world and has been criticized for its incentive problems. In order to resolve overdemands for a given school, most often priority is given to families living in the neighborhood of the school. Using a very rich data set on school applications for the case of the Boston mechanism in Barcelona, we exploit an unexpected change in the definition of neighborhood. This change allows us to identify that a large fraction of families systematically ranks first high priority schools, neighborhood schools in this case. Additional data on school enrollment decisions and census data shows that some seemingly unsophisticated parents are high income families that can rank hard-to-get schools because they can afford the outside option of a private school in case they do not get in. This sheds light on important inequalities beyond parents' lack of sophistication found in the literature.

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[☆] This paper was previously circulated as "The Illusion of School Choice: Empirical Evidence from Barcelona". We are very grateful to Manel Blasco, Jordi Baró, and Francesc ñiguez for providing us with the school applications and enrollment data; to Manel Blasco, Eduard Vallory, and Frederic Udina for allowing us to merge the school application data with the census data under the CEB-BGSE-IDESCAT institutional agreement; to Miquel Delgado at IDESCAT for merging the data sets; and to Javier Asensio, Isaac Aparicio, Albert Esteve, Sabine Flamand, and Diego Puga for helping us with the street map data. Anna Muñoz provided outstanding research assistance. We also thank Guillermo Caruana, Antonio Ciccone, Doireann Fitzgerald, Guillaume Haeringer, Philipp Kircher, Laura Mayoral, Derek Neal, Mar Reguant, Sevi Rodríguez Mora, two anonymous referees, the Editor, Jonah Rockoff, and participants at numerous seminars and conferences for fruitful discussions and comments. We are grateful to Joan Gieseke for editorial assistance. Calsamiglia acknowledges financial support by the Fundación Ramón Areces, the Ramón y Cajal contract of the Spanish Ministry of Science and Technology, the Spanish Plan Nacional I+D+I (SEJ2005-01481, SEJ2005-01690 and FEDER), and the Grupo Consolidado de tipo C (ECO2008-04756), the Generalitat de Catalunya (SGR2005-00626), the Severo Ochoa program, the Barcelona GSE and the ERC Starting Grant 638893. Güell acknowledges the financial support from the projects MINECO-ECO2014-59225-P and ECO2017-89240-P from the Spanish Ministerio de Economía y Competitividad, the project and the hospitality of the University of Minnesota and the Federal Reserve Bank of Minneapolis, where part of this work was written. Our online appendix is available at <http://www.maiaguell.com/SchoolsBCN/OnlineAppendixChoiceBarcelona.pdf>.

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1. Introduction

During the last two decades, a large fraction of OECD countries have implemented different forms of public school choice that depart from residential-based assignment (see Musset, 2012). The aims of these school choice programs are to improve the matching between children and schools as well as to improve students' educational outcomes.¹ Yet, the concern is that disadvantaged families are less able to exercise choice, which leads to equity concerns.²

Under centralized school choice procedures, parents are asked to submit a list with their ranking of schools, and a set of rules determines the final allocation. A widely used procedure in school choice is the so-called Boston mechanism, henceforth the BM.³ This mechanism assigns all applicants to the school ranked first, and if there is overdemand for a school, ties are broken according to priority points based on criteria such as having siblings in the school, living near the school or a lottery number. Those rejected from their school ranked first can only opt for the seats that remain free after the first round. The procedure in subsequent rounds follows a similar logic. Cities worldwide differ in their actual implementation of the BM but a common key feature is that the assignment in every round is final. As the literature starting with Abdulkadiroğlu and Sönmez (2003) has emphasized, the optimal strategy for parents under the Boston mechanism depends on what other parents are doing, and telling the truth is rarely optimal. Parents may avoid overdemanded schools and rank only relatively *safer* schools. The risk involved in ranking a school for a given family depends on other applicants' behaviour and on priority points. However, in general, the literature has overlooked the role of priority points in shaping parents' behaviour. Given other families' behaviour, priorities induce a discontinuity in the admission probabilities for the different schools for different families. That is, having priorities or not increases crucially the admission probabilities faced by a family.

In this paper, we use a unique and rich administrative data set containing application, enrollment and socioeconomic information to explore a variation of the Boston mechanism used in the city of Barcelona where priority is given to residence. We exploit an unexpected change in the definition of *neighborhood* in Barcelona. This provides an exogenous change in the set of schools for which families have priority and allows us to analyze the impact that priorities have on school choice, independently of housing decisions. We find that many families change their behaviour after the neighborhood change by excluding any school that is not a neighborhood school anymore and incorporating the new neighborhood schools. While the previous theoretical literature had established that parents could be strategic under the BM, this is the first paper that provides evidence that not only parents are strategic by excluding some desired

school but that a large fraction of families exclude *all* schools that are not of high priority.⁴

A first contribution of this paper is to highlight the importance of priorities, overcoming large empirical challenges. Namely, (i) preferences are not observable, (ii) families choose what schools to rank as well as where to live, and (iii) some families may be able to opt for a school outside the public system.

One important concern in the debate regarding the BM is that unsophisticated parents, being unable to strategize, may be harmed by the system (see Pathak and Sönmez, 2008). In this paper, we merged our school application data with school enrollment data to provide novel evidence on the equity of the mechanism. Abdulkadiroğlu et al. (2006) report that in Boston, 19% of parents seem to be unsophisticated, playing a dominated strategy. A similar fraction of parents exhibit seemingly unsophisticated behaviour in Barcelona. However, enrollment data allow us to rationalize some of this behaviour. We find that some of these families do not enroll in the school that they were assigned to initially and enroll in a private school that we refer to as outside option. Among unsophisticated families, 13% has an outside option. That is, if they are not allocated their first choice, they enroll in their outside option. Not surprisingly, these families have higher socioeconomics while families that are particularly harmed by the mechanism display lower socioeconomics. A second contribution of this paper is that using enrollment data allows us to quantify how many of the unsophisticated families have in fact an outside option.

The rest of the paper is organized as follows. In Section 2 we describe the school allocation mechanism in the city of Barcelona. In Section 3 we discuss the empirical challenges involved in trying to identify what drives parents' school choice and our empirical strategy. In Section 4 we describe our data. In Section 5 we analyze what drives parents' choices. In Section 6 we analyze the rationality behind parent's choices and inequalities of the system. Finally, Section 7 concludes.

2. School allocation mechanism in Barcelona

In Spain all children age 3 and above have universal access to a seat in the public system. This implies that even if compulsory primary education starts at the age of 6, de facto almost every child starts school at the age of 3.

In Spain families have the right to choose their children's school (see Section 1 of our Online appendix for more details on the education system in Spain.) Parents submit their application for the primary school for their children in March of the natural year that their children turn 3. In general, this school will be the one that they attend until they are at least 12 years old and possibly until they finish secondary education.⁵

¹ A literature explores the impact of school choice on elementary and secondary achievement, high school graduation, and college attendance. Results are mixed, finding positive or non significant effects. Some examples are Rouse (1998), Howell and Peterson (2002), Hoxby and Rockoff (2005), Cullen et al. (2006), Hoxby (2003), Hastings et al. (2008), Gibbons et al. (2008), Hoxby and Murarka (2009), Lavy (2010), Abdulkadiroğlu et al. (2011a), Dobbie and Fryer (2011), Hastings et al. (2012), Neilson (2013), and Demin et al. (2014). Others have studied the effect of school choice on housing prices (see Machin and Salvanes, 2010, Bogart and Cromwell, 2000, and Ries and Somerville, 2010).

² Epple and Romano (2003), Brunner and Imazeki (2008) and Allen et al. (2010) explore how choice programs affect sorting in schools. Burgess et al. (2009) study if the type of school chosen differs across parents' characteristics.

³ This was the mechanism used in the city of Boston until 2005. See Agarwal and Somaini (2015) for a description of the mechanisms used in different cities around the world. See Abdulkadiroğlu (2013) for a literature review.

⁴ The lack of incentives to reveal true preferences is referred to *manipulability* of the mechanism (see Pathak and Sönmez, 2013). On the other hand, Abdulkadiroğlu et al. (2011b) show that this *manipulability* can be useful for eliciting cardinal preferences in a way that other mechanisms cannot. Calsamiglia and Miralles (2012) theoretically show that all parents ranking high priority schools is one of the possible Nash equilibria, and it is the unique equilibrium when one of the schools is thought to be *sufficiently* bad for all families. Abdulkadiroğlu et al. (2014) estimate preferences and provide evidence of the benefits from moving from a decentralized to a centralized choice system for secondary schools in New York City. He (2017), Calsamiglia et al. (2014), Agarwal and Somaini (2015) and de Haan et al. (2015) evaluate the performance of different mechanisms with estimated preferences using data from Beijing (China), Barcelona (Spain), Cambridge (USA), Amsterdam (Netherlands), respectively.

⁵ Parents can move to another school every year, but pre-existing children in the school have priority. Given that school capacity is fixed, assignment at any time later than at age 3 is extremely difficult and requires that some other child leaves the school. Many schools include both primary and secondary school, which means that changing schools is complicated before the end of secondary school. Even for schools that only include secondary school, priority is given to children from a given primary school.

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