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School choice with controlled choice constraints: Hard bounds versus soft bounds [☆]

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Abstract

Controlled choice over public schools attempts giving parents selection options while maintaining diversity of different student types. In practice, diversity constraints are often enforced by setting *hard upper bounds* and *hard lower bounds* for each student type. We demonstrate that, with hard bounds, there might not exist assignments that satisfy standard fairness and non-wastefulness properties; and only *constrained non-wasteful* assignments that are *fair for same type students* can be guaranteed to exist. We introduce the student exchange algorithm that finds a constrained efficient assignment among such assignments. To achieve *fair* (across all types) and *non-wasteful* assignments, we propose control constraints to be interpreted as *soft bounds*—flexible limits that regulate school priorities dynamically. In this setting, (i) the student-proposing deferred acceptance algorithm produces an assignment that Pareto dominates all other

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fair assignments while eliciting true preferences and (ii) the school-proposing deferred acceptance algorithm finds an assignment that minimizes violations of controlled choice constraints among fair assignments.

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1. Introduction

School choice policies are implemented to grant parents the opportunity to choose the school their children will attend. In order to create a diverse environment for students, school districts often implement *controlled school choice* programs providing parental choice while maintaining the racial, ethnic or socioeconomic balance at schools. Before school choice policies were in effect, children were assigned to a public school in their immediate neighborhood. However, neighborhood-based assignment eventually led to socioeconomically segregated neighborhoods, as wealthy parents moved to the neighborhoods of their school of choice. Parents without such means had to continue to send their children to their neighborhood schools, regardless of the quality or appropriateness of those schools for their children. To overcome these shortcomings, controlled school choice programs have become increasingly more popular.

There are many examples of controlled public school admission policies in the United States. To name just a few, the Jefferson County School District has an assignment plan that requires elementary schools to allocate between 15 and 50 percent of their students coming from a particular geographic area inside the district that harbors the highest concentration of designated beneficiaries of the affirmative action policy.¹ Similarly, in New York City, “Educational Option” (EdOpt) schools have to accept students across different ability ranges. In particular, 16 percent of students that attend an EdOpt school must score above the grade level on the standardized English Language Arts test, 68 percent must score at the grade level, and the remaining 16 percent must score below the grade level (Abdulkadiroğlu et al. [3]).²

As it is evident from the two examples above, in practice, controlled school choice programs are often enforced by setting feasibility constraints with hard upper bounds and hard lower bounds for different student types.³ In the first part of our paper, we analyze controlled

¹ More details on this policy are present on the “No Retreat” brochure on Jefferson County School District’s website (<http://www.jefferson.k12.ky.us/Pubs/NoRetreatBro.pdf>).

² There are similar constraints in other countries as well. For example in England, City Technology Colleges are required to admit a group of students across the ability range and their student body should be representative of the community in the catchment area (Donald Hirsch [36, page 120]).

³ There are many other examples of controlled school choice. A Racial Imbalance Law that was passed in 1965 in Massachusetts, prohibits racial imbalance and discourages schools from having student enrollments that are more than 50 percent minority. After a series of legal decisions, the Boston Public Schools (BPS) was ordered to implement a controlled choice plan in 1975. Although BPS has been relieved of legal monitoring, it still tries to achieve diversity across ethnic and socioeconomic lines at city schools (Abdulkadiroğlu et al. [4,5]). Likewise, St. Louis and Kansas City, Missouri must observe court-ordered racial desegregation guidelines for the placement of students in city schools. In contrast, the White Plains Board of Education employ their nationally recognized Controlled Parents’ Choice Program voluntarily. Miami-Dade County Public Schools control for the socioeconomic status of students in order to diminish concentrations of low-income students at certain schools. Similarly, Chicago Public Schools diversify their student bodies by enrolling students in choice options at schools that are not the students’ designated neighborhood schools.

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