Executive Summary: Centralized Admission and the Student-College Match

Each year, millions of students apply to colleges through a wide variety of mechanisms. In some countries, such as Chile, Turkey, Germany, Taiwan, and the U.K., admissions are entirely centralized, and the allocation of students to colleges is mediated by a clearinghouse. In other countries, such as Japan and the U.S., admissions are decentralized, in the sense that colleges make decisions separately from each other.

In comparison to decentralized markets, it is widely believed that centralization improves coordination, reduces congestion, increases the scope of the market, and improves welfare and matches (Gale and Shapley, 1962; Roth and Xing, 1997; Niederle and Roth, 2003; Abdulkadiroğlu et al., 2005, 2015). These features explain why centralized clearinghouses have long been adopted in many markets.[1] Recent theoretical research has developed specific frameworks for understanding decentralized markets in college admission and the welfare and efficiency gains of centralization (Chade et al., 2014; Hafalir et al., 2014; Che and Koh, 2016).[2] Yet, empirical evidence on the benefits of centralized matching in higher education remains surprisingly scarce.

This paper addresses this limitation by exploiting a unique and large-scale policy change in Brazil to study the effects of centralization on college admission. Prior to 2010, each higher education institution selected students based on its own admission exams. Students, in turn, were allowed to apply to as many institutions as they wanted, submitting specific degree choices in each application. A test-score based admission policy meant that institutions offered their seats to the top-scoring candidates. In 2010, the Ministry of Education created the SISU, a centralized clearinghouse that allocates students to federal and state public higher education institutions.[3] Using scores from a nationwide exam called ENEM, students could submit up to two program choices — where a program corresponds to a degree and

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[1]In the U.S., for example, a centralized clearinghouse called the National Residency Match Program determines the placement of medical students to residency options (Agarwal, 2015). Also, in many cities in the U.S. distinct clearinghouses have been created to assign students to schools in response to research on school choice (Abdulkadiroğlu and Sönmez, 2003).

[2]Chade et al. (2014) develop a decentralized model to understand the role of two application frictions — costly portfolio choices and admission uncertainty — in college admissions. Hafalir et al. (2014) and Che and Koh (2016) characterize the equilibrium outcomes under decentralized admission.

[3]Throughout the paper, we use the terms "public institutions" and "federal and state public institutions" interchangeably.

institution pair — among the ones made available through the system. Final assignments were made using a deferred acceptance algorithm based on the ENEM score.

We exploit the gradual adoption of the clearinghouse across public institutions to compare outcomes within programs before and after centralization, controlling for a battery of fixed effects, state trends, and covariates. Because adoption was not mandatory, we validate our empirical strategy by showing that the timing of adoption was not driven by institution-specific characteristics. Our analysis sample exploits rich information provided by the Brazilian Higher Education Censuses and individual-level data of ENEM test takers, linked together using restricted access identifiers. Our final dataset contains information on all first-year students ever registered in higher education institutions, their demographic characteristics (including places of birth and residence), their ENEM test-scores, and the degrees and institutions they attended.

While most demographic characteristics of admitted students remain similar after centralization, we find sizable effects of centralization on admission test scores. Institutions under the centralized assignment system are able to recruit students that score one-third of a standard deviation higher in the ENEM exam. In addition, we find that enrolled students are more likely to come from a state or municipality that is different from where their program is located. Overall, market integration brought on by centralization increases interstate mobility by 2.5 percentage points, which correspond to a 25 percent increase in the baseline migration rate. These effects are robust to several alternative specifications. Taken together, both findings indicate that centralization expands the scope of the market and improves the student-college match by admitting students with higher scores and from different regions of the country.

Last, we investigate effects on enrollment. The clearinghouse leads to a higher likelihood of an ever-registered student not being enrolled by the end of the first year. Nonetheless, this result is mainly driven by students who cancel their registration before the end of the academic term, possibly indicating that they have opted for a preferred program elsewhere and that the same seat was subsequently occupied by another applicant. We find small effects of a registered student requesting a leave of absence and no effect on the occupancy rate of seats. We interpret these findings as a rise in the turnover rate of seats available in the clearinghouse, with very little impact on enrollments. We note this finding is specific to the Brazilian context, as will be later described.

Our work speaks to three strands in the literature. First, application costs and admission uncertainty are important determinants of students' application decisions (Chade et al., 2014; Fu, 2014). In different contexts, college application has been shown to be sensitive to financial aid and application assistance (Bettinger et al., 2012; Dinkelman and Martínez, 2014), to information about colleges and programs (Carrell and Sacerdote, 2013; Hoxby and Turner, 2013; Oreopoulos and Dunn, 2013), and even to small changes in application costs (Pallais, 2015). In the setting of our study, the centralized system alleviates several costs by providing online information on majors, campus, and institutions, as well as information on admission chances.[4] Monetary costs are also considerably reduced as one application fee for taking the ENEM exam serves the same purpose as several applications. In addition, the SISU platform is free. The combined reduction of search, time, monetary, and information costs further enhances the reach of the centralized admission system under study.

Second, there is now growing evidence of both under- and overmatch between students and colleges (Dillon and Smith, 2016). The literature has documented that low-income high-achievers undermatch more often than their high-income counterparts because their application decisions are sensitive to information acquired by peers in the same geographical location (Hoxby and Avery, 2014; Hoxby and Turner, 2015). Market scope also plays a relevant role in academic mismatch, which generally results from restricted admission and affirmative action policies (Arcidiacono et al., 2011; Sander and Taylor, 2012; Black et al., 2015; Arcidiacono and Lovenheim, 2016). Our results suggest that market integration improves the matches between students and institutions. Since college quality is strongly associated with college completion rates (Cohodes and Goodman, 2014), improvements in the student-college match can have lasting effects on educational attainment and labor market returns of the affected cohorts.

Third, this paper also relates to the literature that studies the effects of centralization and coordination in other markets. Niederle and Roth (2003) find that the implementation of a centralized clearinghouse for gastroenterologists increased mobility by widening the scope of the market. Abdulkadiroğlu et al. (2015) show that the introduction of a coordinated centralized assignment enhances students' willingness to travel, in comparison to the old uncoordinated mechanism, even though daily commutes are costly to school students. Our

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[4]In a school choice context, Narita (2016) shows that demand-side frictions affect the gains from centralization. The author suggests that information on school characteristics and updated choices can reduce these frictions.

results are the first to focus on the college market and, specificities apart, are consistent with the existing empirical evidence.

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