

# Welfare Comparison of School Choice Mechanisms under Incomplete Information

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## Extended Abstract

We consider a school choice problem in which there are  $n \geq 2$  schools each of which has  $q \geq 1$  available seats and  $m = nq$  students. Students have (cardinal) valuations for the schools and valuations are private information. That is, each student knows his valuations but does not know the valuations of other students, instead only know the distribution that other students' valuations are drawn from. Schools favor each student equally.

We investigate two school mechanisms, namely Boston and Deferred Acceptance (DA) mechanisms. DA mechanism has been favored over Boston mechanism due to its desired property of strategy-proofness. However, we should also try to understand how these two mechanisms perform in terms of efficiency. Therefore, we compare these two mechanisms in terms of welfare of students. Abdulkadiroglu, Che and Yasuda (2011) shows in an incomplete information setting that each student type prefers Boston mechanism over DA under the assumption that students' ordinal rankings are identical (cardinal valuations may possibly be different). We step away from this assumption and assume that students' ordinal rankings may be different. To compare these mechanisms, we use two notions of welfare criteria: "Stochastic Dominance" as used in Bogomolnaia and Moulin (2001) and "Ex-ante welfare" criteria. A mechanism stochastically dominates another iff every type of student prefers the former. Ex-ante welfare comparison is the comparison of expected welfare before realization of the types.

We consider two main cases. Firstly, we show that when the number of schools is  $n$  is sufficiently large, Boston mechanism stochastically dominates DA. Secondly,

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we show that when the number of schools is small, there is no stochastic dominance relation between Boston and DA. That is, there may be some students who prefer Boston over DA and some other students who prefer DA. Although there is no stochastic dominance relation between Boston and DA in this case, we show that for many widely used distribution functions, Boston is ex-ante welfare superior to DA.

Stochastic dominance is a strong conclusion in the sense that each student type prefers Boston mechanism. Although DA is strategy-proof, and hence not manipulable, we show that this comes with a welfare cost. In other words, Boston mechanism has positive welfare features although it lacks strategy-proofness.

## References

- [1] Bogomolnaia, A. and Hervé Moulin (2001), "A New Solution to the Random Assignment Problem," *Journal of Economic Theory* 100 (2), 295-328
- [2] Abdulkadiroğlu, Atila, Yeon-Koo Che, and Yosuke Yasuda. 2011. "Resolving Conflicting Preferences in School Choice: The "Boston Mechanism" Reconsidered." *American Economic Review*, 101(1): 399-410.