How to De-reserve Reserves: Admissions to Technical Colleges in India

ORHAN AYGÜN∗, Bogazici University, Turkey
BERTAN TURHAN, Iowa State University, USA

CCS Concepts: • Theory of computation → Algorithmic mechanism design; • Applied computing → Economics; • Mathematics of computing → Graph theory.

Additional Key Words and Phrases: Market design, matching, India, affirmative action, reservations, de-reservation

ACM Reference Format:
Orhan Aygün and Bertan Turhan. 2022. How to De-reserve Reserves: Admissions to Technical Colleges in India. In Proceedings of the 23rd ACM Conference on Economics and Computation (EC ’22), July 11–15, 2022, Boulder, CO, USA. ACM, New York, NY, USA, 2 pages. https://doi.org/10.1145/3490486.3538293

India has been enforcing comprehensive affirmative action since 1950. In the allocation of government jobs and admissions to public universities, the affirmative action program has been implemented via a reserve system according to which 15, 7.5, and 27 percent of available positions are earmarked for the members of Schedule Castes (SC), Scheduled Tribes (ST), and Other Backward Classes (OBC), respectively. The remaining 50.5 percent of positions are considered open-category. The SC, ST, and OBC reservations are referred to as vertical reservations by the Supreme Court of India (SCI). The landmark judgment of the SCI in 2008 mandated that whenever the OBC category (with 27 percent reservation) has unfilled positions, they must be reverted to the general category in admissions to public schools without specifying how to implement it.

This paper studies the joint implementation of reservation and de-reservation policies in India. We disclose the drawbacks of the recently reformed allocation procedure in admissions to technical colleges and offer a solution through “de-reservation via choice rules”. We propose a novel choice procedure for institutions, the Backward Transfers (BT) choice rule. Even though a simpler choice procedure is outcome equivalent to the BT choice rule, the BT choice rule guarantees that the open-category cutoff score is higher than the OBC cutoff after unfilled OBC positions are provided to others. ¹ In the paper, we discuss authorities care about having open-category cutoff scores higher than those of reserved categories in admissions to technical universities.² We propose the deferred acceptance mechanism under the BT choice rules (DA-BT) for centralized clearinghouses. The DA-BT mechanism corrects the flaws of the multi-run DA mechanism proposed by Baswana et al. (2018) [5] and provides Pareto improvement over it.

We formulate legal requirements and policy goals in India with the following axioms: (1) individual

¹ Both authors contributed equally to this research.
² See [4] for the description of the simpler choice rule via soft reserves.
² See also [5] for the same discussion.
rationality, (2) meritocracy, (3) non-wastefulness, (4) open-first, and (5) incentive compatibility. The first three axioms are the adaptations of standard axioms in matching literature and are crucial in practice. The open-first axiom ensures that reservation policy is implemented as over-and-above for initially set and de-reserved positions. Moreover, it ensures that the cutoff scores of open-category positions are higher than the cutoff scores of reserved categories. Incentive compatibility levels the playing field because it makes submitting true rankings over institutions and true category membership weakly dominant strategies for participants. Our main result provides a sharp characterization: A mechanism satisfies these five axioms if and only if it is the DA-BT mechanism.

Echenique and Yenmez (2015) [6] is the first to discuss affirmative action in India from a market design perspective and provide college admission in India as an example of controlled school choice in Appendix C.1. Aygün and Turhan (2017) [1] discuss issues in admissions to IITs. Both [6] and [1] consider only vertical reservations. Aygün and Turhan (2020) [2] formulate vertical reservations and de-reservations in admissions to technical colleges in India.

There are also horizontal reservations implemented within each reserved category, including the open category. This manuscript does not model horizontal reservations for simplicity and focuses only on the joint implementation of vertical reservations and OBC de-reservations. Sönmez and Yenmez (2021) [7] formulate vertical and horizontal reservations jointly and relate Indian laws on reservation policy to matching theory. However, the authors [7] do not model OBC de-reservations and, hence, restrict attention to allocating government jobs, where OBC de-reservation is not mandated. While this restriction simplifies their analysis considerably, the de-reservation policy is critical for admissions to technical colleges due to the landmark SCI ruling in 2008. Our paper also deviates from [7] significantly in that ours considers both priority design for a single institution and mechanism design for centralized marketplaces with multiple institutions, while [7] only considers priority design for a single institution.

Building on [2], Aygün and Turhan (2022) [3] formulate vertical reservations, horizontal reservations, and de-reservations altogether. [3] presents significant evidence that many reserve category members consider open-category and reserve-category positions differently and model individuals’ preferences over institution-position category pairs for reserve category members. Similar to [2], [3] invokes the matching with contracts framework to model allocation problems in India. The framework of the current paper can be straightforwardly extended to this larger preference domain and modeled via matching with contracts.

Our paper can be downloaded from https://arxiv.org/abs/2103.05899.

REFERENCES

[1] Orhan Aygün and Bertan Turhan. 2017. Large scale affirmative action in school choice: Admissions to IITs in India. *American Economic Review* 117, 5 (May 2017), 210–213. https://doi.org/10.1257/aer.p20171049

[2] Orhan Aygün and Bertan Turhan. 2020. Dynamic reserves in matching markets. *Journal of Economic Theory* 188:105069, 1 (2020), 1–29. https://doi.org/10.1145/1219092.1219093

[3] Orhan Aygün and Bertan Turhan. 2022. Affirmative action in India: Restricted strategy space, complex constraints, and direct mechanism design. (2022).

[4] Orhan Aygün and Bertan Turhan. 2022. Choice rules with forward and backward transfers. (2022).

[5] Surender Baswana, Partha Pratim Chakrabarti, Sharat Chandran, Yashodhan Kanoria, and Utkarsh Patange. 2018. Centralized admissions for engineering colleges in India. *INFORMS Journal on Applied Analytics* 49, 5 (2018), 338–354.

[6] Federico Echenique and Bumin Yenmez. 2015. How to control controlled school choice. *American Economic Review* 105, 8 (2015), 2679–2694.

[7] Tayfun Sönmez and Bumin Yenmez. 2022. Affirmative action in India via vertical, horizontal, and overlapping reservations. *Econometrica* 90, 3 (2022), 1143–1176.