Market Design for Social Justice: A Case Study on a Constitutional Crisis in India

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Commissioned vs. Aspired Market Design

- Commissioned market design is fundamentally different than aspired market design by an outsider.
  - Commissioned market design:
    1. The need for a change is already established (i.e., no need for a persuasion strategy in reform process).
    2. Commissioned design economist is chosen mostly based on past success and experience. She is given a lot of flexibility on various details.
    3. Custom-made theory is not expected. A strong case can be made through experimental, empirical or computational techniques.
  - Aspired market design:
    1. The need for a change is not established. There will be a lot of resistance for a reform. Motives will be questioned.
    2. A compelling persuasion strategy is absolutely necessary for a reform. Past success or merely providing intuition with previous research are not compelling factors to convince policymakers who have vested interests in maintaining the status quo.
    3. Custom-made theory which represents the true goals of the stakeholders may be an important part of the persuasion stage.

Minimalist Market Design and its Three Main Tasks ▸ PDF

- Minimalist market design (Sönmez, 2023) is a design paradigm which embeds a persuasion strategy for an aspiring design economist who is an outsider. There are three main tasks under this paradigm.

1. Identify the mission of the institution: What are the primary objectives of policymakers, system operators and other stakeholders?
   - The history of the institution may be instructive.
2. Determine whether the institution in place satisfies these primary objectives or not.
   - If it doesn't, then there is potential for policy impact.
   - To materialize this potential into a successful redesign, the root causes of the failures should be identified.
3. Address the failures by interfering only with the flawed components and interfaces of the deficient institution.
   - Akin to a surgeon performing a "minimally invasive" procedure.

Minimalist Market Design and its Three Main Tasks

- In some market design applications, primary objectives of the stakeholders may be collectively unattainable.
  - In these cases, a design economist may need to formulate compelling compromises between these objectives.

  E.g. The incompatibility between Pareto efficiency and no justified envy in school choice.
- In some applications, a potential discord between the mission of the institution and its practical implementation can be eliminated by a unique minimalist intervention.
  - Straightforward resolution via the three main steps of minimalist market design.

  E.g. US Army's Branching Process (Greenberg, Pathak & Sönmez, 2021)

  E.g. Joint Implementation of Vertical and Horizontal Reservations in India (Sönmez & Yenmez 2022)

A Supplemental Task under Minimalist Market Design

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4. If there are multiple "minimally invasive" designs through tasks 1-3, present a comprehensive analysis of these competing institutions.
   - May be especially valuable in applications "in which issues of social, racial and distributive justice are particularly salient" (Hitzig, 2020).
   - Depending on policy objectives, axiomatic characterizations may be one way to pursue such analyses.

- The role of the fourth task is to maintain informed neutrality between reasonable normative principles in design proposals.
  - Li (2017) coins the term "informed neutrality" for ethical principles.

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- The role of the fourth task is to maintain informed neutrality between reasonable normative principles in design proposals.
  - Li (2017) coins the term "informed neutrality" for ethical principles.
- This fourth task takes center place in my presentation.

Vertical Reservations

- Vertical reservations (VR protections), is the strongest affirmative action (AA) policy in India.
  - Formulated in the Supreme Court judgment *Indra Sawhney (1992)*.
  - Originally, designed as a reparatory and compensatory instrument that corresponds to the protective provisions described in the Article 16(4) of the 1950 Constitution of India.
  - Sets aside a percentage of government positions and seats at public universities for each of a number of protected groups.
- Until 2019, VR protections were exclusively granted to Socially and Educationally Backward Classes (SEBCs) who historically faced caste-based oppression and discrimination.
  - 15% to Scheduled Castes (SC)
  - 7.5% to Scheduled Tribes (ST)
  - 27% to Other Backward Classes (OBC)
  - In total 49.5% to SEBCs

103rd Constitutional Amendment

- January 2019: In a highly controversial Constitutional Amendment, VR protections are granted for members of a new category called Economically Weaker Sections (EWS).
  - Reserves 10% of positions, reducing the percentage of open positions from 50.5% to 40.5%.
  - For the first-time awarded to a group based on an individual-based transient characteristics.
  - Beneficiaries of earlier VR protections, i.e., members of SEBCs, are excluded from the scope of EWS.
  - More than 95% of the individuals from general-category (i.e., those who do not belong to an SEBC) qualify for EWS, de facto making it a forward caste reservation.

Supreme Court Challenge: Timeline

- January 2019: Amendment was immediately challenged in court.
  - The burden of proof to revoke an Amendment is very high due to separation of powers: Challengers need to establish that the Amendment violates the basic structure of the Constitution.
- August 2020: Case elevated to a five-judge Constitution Bench of the Supreme Court.
- September 2022: The Bench announced the following main issues to examine whether the Amendment violates the basic structure:
  1. Can reservations be granted solely on the basis of economic criteria?
  2. Can states provide reservations in private educational institutions which do not receive government aid?
  3. Are EWS reservations constitutionally invalid for excluding SEBCs from its scope?

Supreme Court Hearings

- Advocates for the petitioners repeatedly argued that the amendment violates the *Equality Code* by excluding SEBCs from its scope.
- A Minimalist Compromise: In the last day of hearings, Professor Dr. Mohan Gopal, a renown Constitutional Scholar, suggested a compromise that does not involve striking down the amendment:

  Remove the exclusion clause on SEBCs from the scope of EWS.

- Our formal analysis is about the implications and implementation of this compromise policy (i.e., the removal of the exclusionary clause).

A Controversial Verdict

- November 2022: In a landmark judgment *Janhit Abhiyan (2022)*, the Constitution Bench upheld the 103rd Constitutional Amendment.
  - Decision reached in a 3-2 split verdict.
- All justices agreed that reservations can be granted on the basis of economic criteria.
- However, the two dissents strongly disagreed with the majority justices on the constitutionality of the exclusion of SEBCs.

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Why 10% quota for 'economically weak' in India has caused uproar

Controversial 10 percent quota in jobs and education for so-called 'Economically Weaker Sections' category of people angers politicians and caste activists.

Supreme Court's EWS verdict may have opened a can of worms

The Supreme Court's split 3:2 verdict on the validity of the 10 percent reservation for EWS raises several questions, leaves the door open for states to make their own interpretations, and potentially attempt to raise quotas to well beyond the 50 percent ceiling

HINDI THE CARAVAN

NEWS / LAW

EWS judgement undermines Constitutional code of equality: Legal experts, Bahujan leaders

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EWS quota verdict: What's the double benefit debate and how does it affect the SC/ST/OBCs?

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'Setback in century-long struggle': Opposition tears up SC's verdict on EWS

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DMK Files Review Petition Against EWS Quota Verdict, Says it 'Legitimises Discrimination'

The Tamil Nadu ruling party sought an open court hearing on its review plea, stating that there is an "error" in the judgment as it overrules earlier larger nine-judge bench verdict delivered in the 1992 'Indira Swahney' case.

A Controversial Verdict

- The extent of the disagreement can be vividly seen in the opening paragraph of the Dissenting Opinion by Justice S. Ravindra Bhat:

  "I regret my inability to concur with the views expressed by the majority opinion on the validity of the 103rd Amendment on Question No. 3, since I feel - for reasons set out elaborately in the following opinion - that this court has for the first time, in the seven decades of the republic, sanctioned an avowedly exclusionary and discriminatory principle. Our Constitution does not speak the language of exclusion. In my considered opinion, the Amendment, by the language of exclusion, undermines the fabric of social justice, and thereby, the basic structure."

Reactions to Verdict

- While the verdict was declared as a major victory for the central government led by Prime Minister Narendra Modi, according to many, it also created an uproar in the country.

"It is constitutionally perverse that the compelling need for measures to address social backwardness has become a justification for the exclusion of backward classes from measures to address economic deprivation.

[...] India's most marginalised sections that comprise a significant proportion of India's poor stand excluded from reservation meant for the poor, and second, it is now far easier to provide reservation for this narrowly constructed EWS than it is to do the same for India's most marginalised sections."

Anup Surendranath, Professor of Law

Justification of Exclusion in the Majority Opinion

- The majority justices are not unsympathetic to this perspective on social justice, but they are of the opinion that exclusion is inevitable.

  "[...] Rather, according to the petitioners, the classes covered by Articles 15(4), 15(5) and 16(4) are comprising of the poorest of the poor and hence, keeping them out of the benefit of EWS reservation is an exercise conceptionally at conflict with the constitutional norms and principles.

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  At the first blush, the arguments made in this regard appear to be having some substance because it cannot be denied that the classes covered by Articles 15(4), 15(5) and 16(4) would also be comprising of poor persons within. However, a little pause and a closer look makes it clear that the grievance of the petitioners because of this exclusion remains entirely untenable and the challenge to the Amendment in question remains wholly unsustainable. As noticed infra, there is a definite logic in this exclusion; rather, this exclusion is inevitable for the true operation and effect of the scheme of EWS reservation."

Justification of Exclusion in the Majority Opinion

- The majority justices offer the following technical justification for their alleged necessity of the exclusion:

  "The moment there is a vertical reservation, exclusion is the vital requisite to provide benefit to the target group. In fact, the affirmative action of reservation for a particular target group, to achieve its desired results, has to be carved out by exclusion of others.

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  [...] But for this exclusion, the purported affirmative action for a particular class or group would be congenitally deformative and shall fail at its inception. Therefore, the claim of any particular class or section against its exclusion from the affirmative action of reservation in favour of EWS has to be rejected.

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  [...] But for this exclusion, the purported affirmative action for a particular class or group would be congenitally deformative and shall fail at its inception. Therefore, the claim of any particular class or section against its exclusion from the affirmative action of reservation in favour of EWS has to be rejected.

  [...] It could easily be seen that but for this exclusion, the entire balance of the general principles of equality and compensatory discrimination would be disturbed, with extra or excessive advantage being given to the classes already availing the benefit under Articles 15(4), 15(5) and 16(4)."

Justification of Exclusion in the Majority Opinion

- To summarize, the entire justification of the majority justices for their support of the exclusion is based on two related technical arguments made in paragraphs 79-82 of the Majority Opinion.
- They argue that, exclusion of the beneficiaries of earlier provisions from a new provision is absolutely necessary to be able to deliver any benefit to groups who are outside the scope of earlier provisions.
- Majority justices also argue that, inclusion of SEBCs to the scope of EWS would necessarily result in excessive advantage to members of these classes.



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SC/ST/OBC Exclusion From EWS Quota Logical, Necessary To Avoid Double Benefits: Supreme Court

Padmakshi Sharma

8 Nov 2022 1:45 AM

Fallacy of the Technical Claims in the Majority Opinion

- As I present next, this entire line of arguments which defends the exclusion is flawed.
- More precisely, while the technical justification offered by the majority justices is accurate under non-overlapping vertical reservations, it is false under overlapping vertical reservations, i.e. the relevant version of the problem with scope-extended EWS.
- As such, the justification offered by the majority justices for their controversial decision is due to their oversight of the implications of the overlapping vertical reservations, a technical and subtle phenomenon they are unfamiliar with.

Basics

- q^{Σ} # of identical positions
- $\mathcal{I}$ set of individuals
  - each individual is in need of one position
  - each individual $i \in \mathcal{I}$ is endowed with a distinct merit score $\sigma_i \in \mathbb{R}_+$
- In the absence of affirmative action (AA), individuals with higher merit scores have higher claims for a position.
- The primary AA policy is known as Vertical Reservations (VR).
  - Managed through category memberships.

Vertical Reservations

- $\mathcal{R}$ set of VR-protected categories (e.g.,{SC,ST,OBC,EWS})
- $e \in \mathcal{R}$ EWS
- g a general category for those ineligible for VR protections
- $\rho_i \subset \mathcal{R}$ set of VR-protected categories individual $i \in \mathcal{I}$ belongs
  - $\rho_i = \emptyset$ i belongs to the general category g
  - $\rho = (\rho_i)_{i \in \mathcal{I}}$ profile of category memberships
- Non-Overlapping VR protections: $|\rho_i| \leq 1$ for each $i \in \mathcal{I}$
- Overlapping VR protections: $|\rho_i| > 1$ for some $i \in \mathcal{I}$

Vertical Reservations

- q^c # of category-c positions set aside for members of $c \in \mathcal{R}$
- $q^o = q^\Sigma - \sum_{c \in \mathcal{R}} q^c$ # of open category (category-o) positions
- $\mathcal{V} = \mathcal{R} \cup \{o\}$ set of vertical categories for positions
- $\mathcal{E}^v(\rho) \subseteq \mathcal{I}$ Individuals who are eligible for category-v positions
  - $\mathcal{E}^o = \mathcal{E}^o(\rho) = \mathcal{I}$
  - $\mathcal{E}^c(\rho) = \{i \in \mathcal{I} : c \in \rho_i\}$ for any $c \in \mathcal{R}$

Solution Concept: Choice Rule

- For any given set of applicants, a choice rule specifies who receives a position and from which categories they do.

  - A choice rule is a function $C(\rho;.) = (C^v(\rho;.))_{v\in\mathcal{V}} : 2^{\mathcal{I}} \to \left(2^{\mathcal{I}}\right)^{|\mathcal{V}|}$ such that, for any $I \subseteq \mathcal{I}$,

    1. for any category $v \in \mathcal{V}$,

    $$C^v(\rho; I) \subseteq I \cap \mathcal{E}^v(\rho) \quad \text{and} \quad |C^v(\rho; I)| \leq q^v,$$

    2. for any two distinct categories $v, v' \in \mathcal{V}$,

    $$C^v(\rho; I) \cap C^{v'}(\rho; I) = \emptyset.$$

  - Given a choice rule $C(\rho;.)$, the resulting aggregate choice rule $\widehat{C}(\rho;.) : 2^{\mathcal{I}} \to 2^{\mathcal{I}}$ specifies who receives a position:

  $$\widehat{C}(\rho; I) = \bigcup_{v\in\mathcal{V}} C^v(\rho; I) \qquad \text{for any } I \subseteq \mathcal{I}.$$

Mandates under *Indra Sawhney (1992)*

- Non-wastefulness: For as long as there is at least one eligible individual, no position can remain idle.
  - A choice rule $C(\rho;.)$ is non-wasteful if, for every $I \subseteq \mathcal{I}$, $v \in \mathcal{V}$, and $j \in I$,

$$j \notin \widehat{C}(\rho;I) \text{ and } |C^v(\rho;I)| < q^v \implies j \notin \mathcal{E}^v(\rho).$$

- No justified Envy: Subject to category eligibility, the higher the merit score of an individual is, the higher claim she has for a position.
  - A choice rule $C(\rho;.)$ satisfies no justified envy if, for every $I \subseteq \mathcal{I}$, $v \in \mathcal{V}$, $i \in C^v(\rho;I)$, and $j \in \left(I \cap \mathcal{E}^v(\rho)\right) \setminus \widehat{C}(\rho;I)$,

$$\sigma_i > \sigma_j.$$

Mandates under *Indra Sawhney (1992)*

- Compliance with VR protections: VR-protected positions cannot be used up for individuals who deserve an open position based on merit.
  - A choice rule $C(\rho; .)$ complies with VR protections if, for each $I \subseteq \mathcal{I}$, $i \in I$ and $c \in \mathcal{R}$,

$$i \in C^c(\rho; I) \implies \begin{cases} |C^o(\rho; I)| = q^o\,, & \text{and} \\ \sigma_j > \sigma_i & \text{for any } j \in C^o(\rho; I). \end{cases}$$

  - Highest-level AA provision: Assures that reserved positions are awarded to individuals who are "truly in need of" AA.

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  - Highest-level AA provision: Assures that reserved positions are awarded to individuals who are "truly in need of" AA.
- A choice rule complies with Indra Sawhney if and only if it satisfies all three axioms.

Implementation of Non-Overlapping VR Protections

- VR protections have always been non-overlapping in India.
  - Until 2019: Due to caste system.
  - Since 2019: Due to caste system and the controversial exclusion.
- The following choice rule plays a key role in our analysis.

Over-and-Above (O&A) Choice Rule $C_{OA}(\rho; .)$

Step 1. Allocate open positions to highest merit individuals.

Step 2. For each VR-protected category, allocate the reserved positions to its highest merit members who remain unassigned.

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Proposition (Sönmez & Yenmez, 2022)

Assuming non-overlapping VR protections, O&A choice rule uniquely complies with Indra Sawhney.

Overlapping VR Protections: Open Positions

- If the exclusion is removed from EWS, an individual can be a member of both EWS and a SEBC.
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Overlapping VR Protections: Open Positions

- If the exclusion is removed from EWS, an individual can be a member of both EWS and a SEBC.
  - Special case of overlapping VR protections.
- Under the Indra Sawhney (1992) mandates, whether VR protections are overlapping or not is immaterial for allocation of open positions.

Lemma

For any choice rule that complies with Indra Sawhney, recipients of open positions are same as those who receive them under the O&A choice rule.

  - Allocation of open positions can still be carried out through Step 1 of the O&A choice rule.

Overlapping VR Protections: Reserved Positions

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  O&A Choice Rule

  Step 1. Allocate open positions to highest merit individuals.

  Step 2. For each VR-protected category, allocate the reserved positions to its highest merit members who remain unassigned.

- A Practical Resolution: What about processing VR-protected categories sequentially?

Sequential Choice Rules

- Fix a processing sequence $\triangleright$ (an order of precedence) for vertical categories in $\mathcal{V}$.
  - Δ^o Open-First orders of precedence
  - Δ^o_e Open-First and EWS-Last orders of precedence
  - $\Delta^{o,e}$ Open-First and EWS-Second orders of precedence

  Sequential Choice Rule $C_S(\triangleright, \rho; .)$

  Following the order of precedence, sequentially choose the highest merit-score eligible individuals for each category.

- Remark: For any $\triangleright \in \Delta^o$, the resulting sequential choice rule $C_S(\triangleright, \rho; .)$ generalizes the O&A choice rule.
  - EWS-Last O&A $C_S(\underline{\triangleright}, \rho; .)$ with $\underline{\triangleright} \in \Delta^o_e$.
  - EWS-First O&A $C_S(\overline{\triangleright}, \rho; .)$ with $\overline{\triangleright} \in \Delta^{o,e}$.

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- Bottomline: The main challenge under overlapping VR protections is not the difficulty of abiding by the Indra Sawhney mandates, but rather the multiplicity of the choice rules which do.
- Question: Why would that be a challenge?

Initial Observations on EWS-Last and EWS-First O&A

- Assumption 1: All individuals are eligible for EWS.
  - With current EWS eligibility restrictions on income in India, the estimated fraction is 98% (Deshpande & Ramachandran, 2019).
- Assumption 2: There is excess demand from forward castes (i.e., old general category before the introduction of EWS).
- Assumption 3: For any category $c \in \mathcal{R} \setminus \{e\}$,

$$\frac{\#\text{ of category-}c\text{ positions}}{\#\text{ of category-}c\text{ applicants}} \geq \frac{\#\text{ of EWS positions}}{\#\text{ of old general category applicants}}$$

- Assumption 4: Merit score distribution for old general category is either same as or first order stochastically dominates merit score distribution for any SEBC.

Initial Observations on EWS-Last and EWS-First O&A

Proposition

1. *Under Assumption 1, the outcome of the EWS-Last O&A choice rule is same as the outcome of the O&A choice rule with EWS exclusion, i.e., the outcome of the current policy.*
2. *Under Assumptions 1-4, the outcome of the EWS-First O&A choice rule is same as the outcome of the O&A choice rule without EWS reservation, i.e., the outcome of the policy prior to the controversial Amendment.*

Preliminary Observations on Sequential Choice Rules

- The first part of this proposition on EWS-Last O&A refutes the technical claims of the Majority justices in *Janhit Abhiyan (2022)*.
  - Individuals ineligible for earlier VR protections for SEBCs, i.e., members of the old general category, are still the primary beneficiaries of EWS.
  - Under EWS-Last O&A the removal of the exclusion does not generate excessive benefits to SEBCs. It merely assures that SEBCs are not hurt by AA!
- Removal of the exclusion w/o additional details is not a good option either, because it creates a major loophole.

Violation of Right to Equality under the Amendment

- The Amendment allows for a "poor" member of a forward class to receive a position, while it denies the same position for a potentially poorer member of an SEBC with higher merit score!
  - Cannot be justified by either meritocracy or AA.


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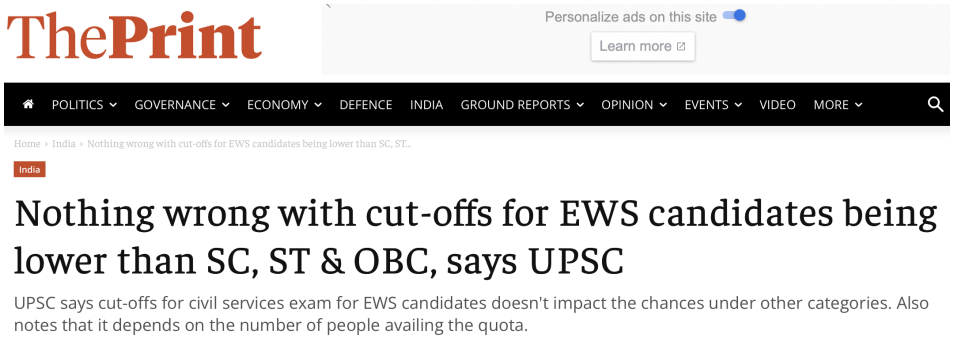
EWS verdict shows merit matters only when it's 'their' children, not 'our' kids

The historical hurt that the Hindu upper-caste elite has entertained about the quota system is now a legal doctrine. It can have far-reaching consequences.

"[...] the 'othering' of socially and educationally disadvantaged classes – including SCs/ STs/OBCs by excluding them from this new reservation on the ground that they enjoy pre-existing benefits, is to heap fresh injustice based on past disability. [...] The net effect of the entire exclusionary principle is Orwellian, (so to say) which is that all the poorest are entitled to be considered, regardless of their caste or class, yet only those who belong to forward classes or castes, would be considered, and those from socially disadvantaged classes for SC/STs would be ineligible."

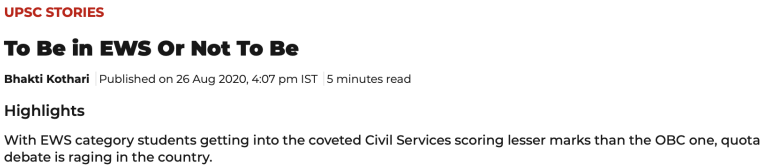
Justice S. Ravindra Bhat, Dissenting Opinion in Janhit Abhiyan (2022)

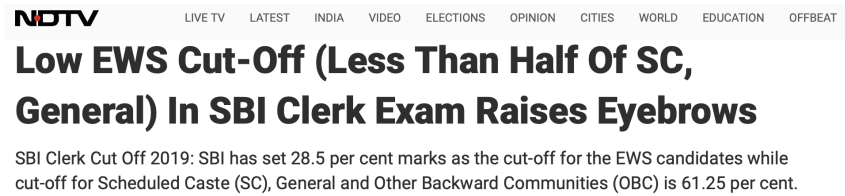

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25% less cut-off marks for EWS candidates sparks controversy in Tamil Nadu
Hindustan Times, Chennai | By MC Rajan

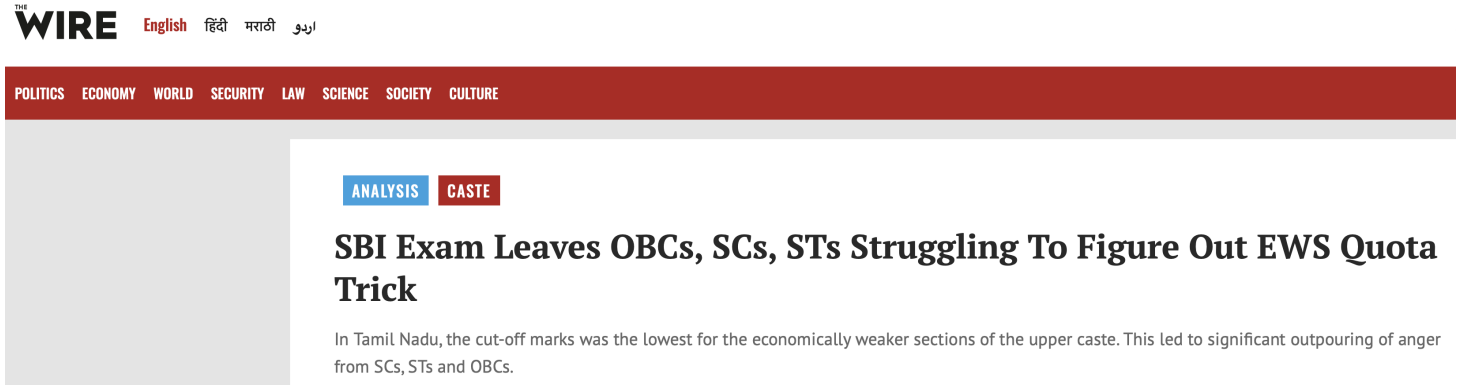

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India
Nothing wrong with cut-offs for EWS candidates being lower than SC, ST & OBC, says UPSC
UPSC says cut-offs for civil services exam for EWS candidates doesn't impact the chances under other categories. Also notes that it depends on the number of people availing the quota.


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UPSC cut-off for EWS lower than for OBCs again


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Why don't the guardians of merit protest lower EWS cutoffs?


UPSC STORIES
To Be in EWS Or Not To Be
Bhakti Kothari | Published on 26 Aug 2020, 4:07 pm IST | 5 minutes read
Highlights
With EWS category students getting into the coveted Civil Services scoring lesser marks than the OBC one, quota debate is raging in the country.


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Low EWS Cut-Off (Less Than Half Of SC, General) In SBI Clerk Exam Raises Eyebrows
SBI Clerk Cut Off 2019: SBI has set 28.5 per cent marks as the cut-off for the EWS candidates while cut-off for Scheduled Caste (SC), General and Other Backward Communities (OBC) is 61.25 per cent.


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ANALYSIS CASTE
SBI Exam Leaves OBCs, SCs, STs Struggling To Figure Out EWS Quota Trick
In Tamil Nadu, the cut-off marks was the lowest for the economically weaker sections of the upper caste. This led to significant outpouring of anger from SCs, STs and OBCs.

Three Potential Resolutions

- Question: How should the violation of Right to Equality be avoided without creating a loophole?
  - Answering this question requires making a normative judgment.
- We will consider the following three normative positions:
  1. Majority Perspective (once the technical flaws are removed)
     - Assures that the outcome differs minimally from the current outcome subject to eliminating violation of the Right to Equality.
  2. Dissenting Perspective
     - Assures that the higher-level provision aspect of reparatory and compensatory VR protections to SEBCs is maintained.
  3. Technocratic Perspective
     - Treats all VR protected categories neutrally.

What it Takes to Revoke a Constitutional Amendment?

- In India, the Supreme Court can revoke a Constitutional Amendment only if it breaches the basic structure of the Constitution.

  "It is hardly a matter of debate that the challenge herein is not to any executive order or even to an ordinary legislation. The challenge is to a constitutional amendment. [...] The challenge is founded on, and in fact could only be founded on, the premise that the amendment in question violates the basic structure of the Constitution in the manner that it destroys its identity."

  Majority Opinion, Janhit Abhiyan (2022)

- Dissenting justices argue that the exclusion breaches the basic structure by violating the Right to Equality.
  - The technical arguments offered by the Majority justices to dismiss this perspective are flawed.

Minimal Interference due to Separation of Powers

- We next formulate a policy that removes the violation of Right to Equality from the Amendment through minimal interference.
  - Valuable due to separation of powers.

"The reason for minimal interference by this Court in the constitutional amendments is not far to seek. [...] The interplay of amending powers of the Parliament and judicial review by the Constitutional Court over such exercise of amending powers may appear a little bit complex but ultimately leads towards strengthening the constitutional value of separation of powers."

Majority Opinion, Janhit Abhiyan (2022)

Who are Affected from Violation of Right to Equality?

- $\mathring{\rho}$ Current profile of non-overlapping category memberships
- $\mathcal{J}$ Set of individuals whose Right to Equality is violated due to exclusion from EWS

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- Question: Which individuals in $\mathcal{J}$ (if any) are affected by this violation?
- Tentative Answer: An individual $j \in \mathcal{J}$ who remains unmatched under $\mathring{\rho}$, even though she would have been matched if she were granted with a membership of EWS instead of her existing VR-protected category.
  - Eligibility for reparatory and compensatory SEBC reservation hurts such individuals, not only negating, but also reversing the intended effect!

Who are Affected from Violation of Right to Equality?

- Given an individual $j \in \mathcal{J}$, let $\tilde{\rho}_j = \{e\}$.
- For the next series of definitions, fix a profile of category memberships ρ, a choice rule $C(\rho; .)$, and a set of applicants $I \subseteq \mathcal{I}$.

Definition

A set of individuals $J \subseteq \left(I \cap \mathcal{J}\right)$ is vulnerable to a violation of the Equality Code if, for each $j \in J$,

$$j \notin \widehat{C}\Big(\rho; I\Big) \quad \text{and} \quad j \in \widehat{C}\Big(\left(\rho_{-J}, \tilde{\rho}_J\right); I\Big).$$

- We will say no applicant is materially affected by the violation of the Equality Code, if no subset of applicants $J \subseteq \left(I \cap \mathcal{J}\right)$ is vulnerable to a violation of the Equality Code.

Who are Affected from Violation of Right to Equality?

Definition

The set of individuals $J \subseteq \left(I \cap \mathcal{J}\right) \setminus \widehat{C}(\rho; I)$ is a maximal set of individuals who suffer from a violation of the Equality Code if,

1. J is vulnerable to a violation of the Equality Code, and
2. for any $J' \subseteq \left(I \cap \mathcal{J}\right) \setminus \widehat{C}(\rho; I)$,

$$J \cap J' \subseteq \widehat{C}\Big(\big(\rho_{-J'}, \tilde{\rho}_{J'}\big); I\Big) \quad \text{and} \quad J' \setminus J \not\subset \widehat{C}\Big(\big(\rho_{-J'}, \tilde{\rho}_{J'}\big); I\Big).$$

Lemma

The maximal set of individuals who suffer from a violation of the Equality Code is unique.

The Case for the EWS-Last O&A Choice Rule

- Let the category membership profile ρ^* be such that,
  1. $\rho_i^* = \mathring{\rho}_i \cup \{e\}$ for any $i \in \mathcal{J}$, and
  2. $\rho_i^* = \mathring{\rho}_i$ for any $i \in \mathcal{I} \setminus \mathcal{J}$.
  - Introduces a special form of overlapping VR protections.
  - Corresponds to the removal of the exclusion.

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Proposition

Let $\trianglerighteq \in \Delta_e^o$. Then, no set of individuals is vulnerable to a violation of Equality Code under the EWS-Last O&A choice rule $C_S(\trianglerighteq, \rho^*; .)$.

The Case for the EWS-Last O&A Choice Rule

Theorem

The set of individuals who receive a position under EWS-Last O&A but not under O&A, i.e.,

$$C_S(\trianglerighteq, \rho^*; I) \setminus C_{OA}\left(\mathring{\rho}; I\right),$$

is equal to the maximal set of individuals who suffer from a violation of the Equality Code under O&A.

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Corollary

EWS-Last O&A generates the same outcome as O&A if and only if no applicant is materially affected by the violation of the Equality Code under O&A.

The Legal Concept of Migration (Mobility) in India

- Legal terminology does not differentiate between categories of individuals and categories of positions in India.
  - Somewhat benign for the case of VR-protected categories such as SC, because SC positions are exclusive to members of SC.
- As a result the general category and the open category are used synonymously.
  - Legal documents speak of open category individuals or general category positions.
  - Not so benign, since open category positions are not exclusive to individuals from general category.
- The legal concept of migration (aka mobility) is a consequence of this misleading convention.
  - When a member of a VR-protected category (eg. SC) receives an open position, she is said to have migrated to general/open category.

The Role of Migration/Mobility in VR Policy

- What makes the VR policy a higher level AA policy is, it provides members of VR-protected categories (eg. SC, ST, OBC) with the benefit of mobility from their category to general category.
  - In our formal framework, this benefit is regulated through the axiom of compliance with VR policy.

The Loss of Mobility under the Exclusion

- In his Dissenting Opinion, Justice S. Ravindra Bhat describe his strong objection to the exclusion as follows:

  "The exclusionary clause operates in an utterly arbitrary manner. Firstly, it 'others' those subjected to socially questionable, and outlawed practices – though they are amongst the poorest sections of society. Secondly, for the purpose of the new reservations, the exclusion operates against the socially disadvantaged classes and castes, absolutely, by confining them within their allocated reservation quotas (15% for SCs, 7.5% for STs, etc.). Thirdly, it denies the chance of mobility from the reserved quota (based on past discrimination) to a reservation benefit based only on economic deprivation."

- The quote suggests that, in addition to the removal of the exclusion, the Dissenting Justices are also in favor of establishing mobility from SC/ST/OBC to EWS.
  - Assures that VR protections granted to SEBCs maintain their status as the highest level AA protection.

Granting Mobility from Reparatory Categories to EWS

- The role EWS plays in our next axiom is parallel to the role open category plays for compliance with VR protections.

- Mobility from reparatory categories to EWS: No VR-protected position for SEBCs can be used up for an EWS-eligible individual who deserves an EWS position based on merit.

  - A choice rule $C(\rho; .)$ grants mobility from reparatory categories to EWS if, for any $I \subseteq \mathcal{I}$, $c \in \mathcal{R} \setminus \{e\}$, and $i \in \mathcal{E}^e(\rho)$,

$$i \in C^c(\rho; I) \implies \begin{cases} |C^e(\rho; I)| = q^e\,, & \text{and} \\ \sigma_j > \sigma_i & \text{for any } j \in C^e(\rho; I). \end{cases}$$

The Case for the EWS-First O&A Choice Rule

- Together with the mandates of *Indra Sawhney (1992)*, our last axiom has a sharp implication in India.

Theorem

Let the category membership profile ρ be such that, for any $i \in \mathcal{I}$,

$$|\rho_i \setminus \{e\}| \leq 1.$$

Let $\overline{\rhd} \in \Delta^{o,e}$. Then, a choice rule $C(\rho; .)$ complies with Indra Sawhney and grants mobility from reparatory categories to EWS if, and only if, it is the EWS-First O&A choice rule $C_S(\overline{\rhd}, \rho; .)$.

VR-Maximality

- Sequential choice rules are not the only extensions of the O&A choice rule with normative appeal. Indeed, if the objective is maintaining neutrality between all VR-protected categories, then there is a more compelling alternative.

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- Given a set of individuals $I \subseteq \mathcal{I}$, let $\beta(I)$ denote the maximum number of VR-protected positions that can be awarded to eligible individuals.
  - For the case of non-overlapping VR protections,

$$\beta(I) = \sum_{c \in \mathcal{R}} \min \left\{ \left| I \cap \mathcal{E}^c(\rho) \right|, q^c \right\}.$$

VR-Maximality

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- For any $I \subseteq \mathcal{I}$ and $j \in \mathcal{I} \setminus I$, individual j increases the VR utilization of I if,

$$\beta(I \cup \{j\}) = \beta(I) + 1.$$

Meritorious O&A Choice Rule $C_{\textcircled{OA}}(\rho; .)$

Given $I \subseteq \mathcal{I}$

Step 1 (Open Positions). Allocate open positions to highest merit-ranking individuals. Let $J = I \setminus C^{o}_{\textcircled{OA}}(\rho; I)$.

Step 2 (VR-Protected Positions).

Step 2.0 (Initiation): Let $J_0 = \emptyset$.

Step 2.k ($k \in \{1, \ldots, \sum_{c \in \mathcal{R}} q^c\}$)*: Assuming such an individual exists, choose the highest merit score individual in* $J \setminus J_{k-1}$ *who increases the VR-utilization of* J_{k-1}. *Denote this individual by* j_k *and let* $J_k = J_{k-1} \cup \{j_k\}$. *If no such individual exists, then end the process.*

For any individual who receives a VR-protected position in Step 2, the category of the assigned position is determined at the termination of the procedure subject to eligibility.

Meritorious Over-and-Above Choice Rule

Proposition

Meritorious O&A choice rule complies with Indra Sawhney.

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Meritorious O&A choice rule complies with Indra Sawhney.

- Moreover, of all such choice rules, it is the one that is most "meritorious."

Definition (Gale, 1968)

Let members of two sets of individuals $I = \{i_1, \ldots, i_{|I|}\}$, $J = \{j_1, \ldots, j_{|J|}\}$ be each enumerated such that the higher the merit score of an individual is the lower index number she has. Then, set I Gale dominates set J if,

1. $|I| \geq |J|$, and
2. for each $\ell \in \{1, \ldots, |J|\}$,
$$\sigma_{i_\ell} \geq \sigma_{j_\ell}.$$

Meritorious Over-and-Above Choice Rule

Theorem

Let $C(\rho; .)$ be any choice rule that complies with Indra Sawhney. Then for any $I \subseteq \mathcal{I}$, the set of individuals $\widehat{C}_{\textcircled{OA}}(\rho; I)$ admitted by the meritorious O&A choice rule Gale dominates the set of individuals $\widehat{C}(\rho; I)$ admitted under choice rule $C(\rho; .)$.

Implementation of EWS Quota

- Key arguments by the majority justices in their defense of the exclusion of SEBCs from EWS in the controversial Supreme Court ruling *Janhit Abhiyan (2022)* are false.
  - Akin to a false proof of a theorem!
  - Since these arguments are technical in nature, experiences like these suggest an important support role for design economists.
- Subject to earlier mandates of the Supreme Court and avoiding the violation of the Equity Code,
  1. Minimal intervention $\implies$ EWS-Last O&A
  2. Maintaining elevated status of reparatory VR Protections $\implies$ EWS-First O&A
  3. Neutral VR implementation $\implies$ Meritorious O&A

Importance of Informed Neutrality

- As emphasized in Li (2017),

  "In addition to studying cause and effect in markets, economists also have a comparative advantage in stating precisely the normatively-relevant properties of complex systems [...]"

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  "In addition to studying cause and effect in markets, economists also have a comparative advantage in stating precisely the normatively-relevant properties of complex systems [...]"

- Taking advantage of this comparative advantage through minimalist market design, we have seen how an intuitive compromise policy brought in September 2022 to the hearings of *Janhit Abhiyan (2022)* could have
  - on the one hand, resulted in a major loophole in the system if it was adopted by the court without any additional structure,
  - but at the same time, could have been further refined to one of three policies that each serve a distinct (but reasonable) normative objective.