An Alternative to India's Reservation Policy: A Unified Framework for Rigorous and Adaptive Measurement of Socio-Economic Status

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ABSTRACT

Affirmative action in the form of reservations is a divisive and contentious topic of policy in India. In this paper, we aim to create a principled and data-driven model to design the reservations policy in India. We look at some arguments against current policy and try to resolve them. We use statistical modeling to create our new framework, RAMSES (Rigorous and Adaptive Measurement of Socio-Economic Status). RAMSES measures the multidimensional disadvantage faced by an individual as an "adjusted income", which attempts to calibrate the quantum of compensatory aid in the form of reservations for that individual to have a level playing field. We illustrate our model using a case study.

CCS CONCEPTS

• **Applied computing** → **Economics**; **Sociology**.

KEYWORDS

Affirmative action, Data-driven policy, Socio-economic status

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1 INTRODUCTION

This paper was inspired by a discussion of two broad questions: (A) When a group X is assigned a reservation of 5%, how should that number be decided? Why not 6.8% or 3.1%?; and (B) How can we honestly deal with the intersectionality of disadvantage? E.g., a disabled "lower-caste" female below the poverty line deserves far more help than would be implied by any one of those descriptors.

The reservation system in India institutionalizes "quotas" to socially and educationally backward and historically deprived castes in government jobs and educational institutions. The Scheduled Castes (SC), also called Dalits, and Scheduled Tribes (ST), who constitute around 25% of the Indian population, have 22.5% of seats reserved for them [13]. Another grouping of castes, called Other Backward Classes (OBC), have an additional 27% of the total seats reserved for them. Very recently, in January 2019, the Indian government introduced an additional 10% quota for *economically weaker* sections of the society.

However, since its inception, the reservation policy has, in the past, been used as fuel to create animosity between the communities who benefit from it and those who believe they do not. This resentment has led to numerous protests—including rallies, riots, self-immolation, and ritual suicide [1]. The core idea behind this resentment is that caste disadvantage is not the only disadvantage individuals face and poverty is also a major barrier which should be considered.

Further, the actual amount of reservation or quota is derived politically – whether a particular group gets 6% or 8% or 15% is currently an opaque decision, based on current political winds.

We introduce RAMSES, the first principled and data-driven model to design the reservations policy in India. We use socio-economic features of each individual to decide the extent of reservation benefits they should be given. There have been previous attempts to model disadvantage, but these have focused on academic merit and social disadvantage [5]; we aim to calculate intersectional disadvantage and use discrimination in the labour market to understand how best to adjust for individual backgrounds.

We hope that a flexible and dynamically adaptive framework like RAMSES will empower policymakers, reduce bias using evidence-based decision making, and aid people who suffer from multiple disadvantages

2 POLICY RESPONSES TO CONTENTIONS

The SC, ST, and OBC communities are diverse and large. Thus, invariably, some elite among each group corner most of the benefits that the reservations offer to each community. In a Supreme Court case, *NM Thomas vs The State of Kerala* [11], the following argument was made:

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> "Research conducted by the A. N. Sinha Institute of Social Studies, Patna, has revealed a dual society among Harijans [Dalits], a tiny elite gobbling up the benefits and the darker layers sleeping distances away from the special concessions."

This is a well recognized issue and different approaches have been suggested and implemented to resolve it.

- **List revisions** can be carried out to remove castes which have benefited disproportionately from the SC, ST or OBC reservations [7]. In practice, however, few castes have been completely removed from the list. Amendment of these lists to add new castes has been a delicate and contested area of political and social debates. The addition of new castes leads to discontentment among the original members of the list as the marginal benefit enjoyed by their group goes down [13].
- **Sub-classification** of castes means creating more quotas among the already defined groups of OBC. This puts limits on how much of the group quota can a single caste benefit from. This approach, too, is often an instrument of political leverage and is again an issue which leads to bitterness and anger. Some states have attempted special schemes for the "more backward" among the SCs [13].
- A third approach is the exclusion of the ***creamy layer*** from the benefits of reservation. This currently only applies to the OBCs and consists of the top economic layer of the OBCs. This targets individuals and not groups. Thus an individual having family income above a certain amount is not given the reservation benefits as they are deemed to be economically advanced enough. The issue of *creamy layer* among OBC has been debated in the Supreme Court in the *Indira Sawhney vs Union of India 1992* [12] and *Indira Sawhney vs Union of India 1999* [10].

Article 15(3) of the Indian Constitution permits the State to make "special provisions" for women. It states:

> "Nothing in this article shall prevent the State from making any special provision for women and children."

In April 1993, the Indian Government approved a constitutional amendment that mandated that village councils hold regular elections and reserve one-third of the seats for women [8]. There is also a continuous discussion about providing a quota for women in the Lok Sabha, the lower house of the India Parliament [9]. Thus there exists a recognition that having women representatives is important and that women as a group face certain obstacles which they need to be compensated for.

The government recently passed the Constitution (124th Amendment) Bill 2019 in Lok Sabha and Rajya Sabha [6]. This bill aims to provide 10 per cent reservation in jobs and educational institutions to the economically weaker sections in the general category. The bill amended article 16 of the Constitution and inserted the following clause:

> (6) Nothing in this article shall prevent the State from making any provision for the reservation of appointments or posts in favour of any economically weaker sections of citizens other than the classes mentioned in clause (4), in addition to the existing reservation and subject to a maximum of ten per cent of the posts in each category.

3 MOTIVATION

With the introduction of the *creamy layer* for OBCs and SCs (for promotions in government jobs for the latter), there appears to exist an idea that caste and class are orthogonal; that prosperity ameliorates the effects of caste discrimination. This was underscored by the introduction of the reservations for Economically Weaker Sections, with the Government of India arguing that poverty (class) plays an important role in the attainment of education – using reservations in a way that was perhaps not originally intended. The primary motive behind reservation was to end caste based discrimination which has been a feature of Indian society for thousands of years. It was never specifically a remedy for economic backwardness.

The creamy layer exclusion, however, fails to account for other factors at play in creating an elite amongst a group. Should the policy prioritize women over men if men are better off on all parameters as compared to women? Should the policy prioritize SCs from one state of the country if they face a lot more disadvantage as compared to SCs in some other state? Should the policy give more reservation benefits to the *more* backward scheduled castes? How should this prioritization be reflected in the reservation policy? Beteille [2] says that the relationship between class and caste is very dynamic; though still quite correlated, the class system is gradually disassociating itself with caste.

The aim of this paper is to replace the current "one size fits all" reservation system with an alternative system that takes individual experiences into account. We believe that along with caste, parental income, region, and gender are some other factors that limit the opportunity individuals receive in schools. Hence, these factors should be taken into account while granting reservation. RAMSES is a framework that aims to quantify various disadvantages faced by an individual and adequately compensate them in the reservation quotas. Although we have used the labor market to quantify institutional disadvantage, the model allows for other (perhaps more efficient) metrics.

4 MODEL

We use the IHDS data [4] to measure the disadvantage individuals face in the labor market. We regress the hourly wage data on caste, education, district, urban/rural, and gender. The coefficient we get for each variable reflects the impact (positive/negative) of that variable, *ceterus paribus*, on the hourly wage. Based on these coefficients, we compensate a student seeking admission to a university based on their disadvantage. For every student, we calculate their "adjusted income" based on their socio-economic background and parental income. We use parental income as our base variable because it has a causal impact on the quality of school education children receive [3]. We also recognize that caste, gender, district are parameters that have an impact on parental income. Through Mincer's Earnings equation, we aim to quantify each of these parameters and use them in our model. Our regression shows that a Dalit earns 10.7% less than a Brahmin (the highest of the "high castes") *ceterus paribus*. Thus, for a Dalit family, we deduct 10.7%

from their income to generate the adjusted income. Now, this income portrays the disadvantage faced by the member of the family because of their caste. We continue to increase or decrease this amount for every relevant parameter like state, urban/rural, gender, etc. For example, an urban person in India will have their adjusted income increased since the quality of life and opportunities available to them are better. We use the following function, f which operates upon the family income with the regression coefficients to calculate the adjusted income:

$$\text{Adjusted Income} = Income - [f_{\text{Caste}}(\text{Income}) + f_{\text{rural/urban}}(\text{Income}) + f_{\text{State}}(\text{Income})]$$

5 CASE STUDY

In Table 1, we have regressed the log of hourly wage on caste, age, education, skills, gender and district. The base caste is Brahmin. We will use coefficients from this table to calculate the "adjusted income" of a rural SC girl who wants admission in a college. Using Table 1, we make the following adjustments to her family income:

Table 1: Regressed Coefficients. District FE: Yes. Total number of observations: 53,264. R-squared value: 0.422.

Variables	log(hourly wage)	Robust Standard Error	p
Rural	-0.180	0.00958	
Female	-0.337	0.00601	
Age	0.0305	0.000991	
Age Squared	-0.000280	1.20e-05	
Education Years	0.0239	0.000821	
Dalit (SC)	-0.107	0.0190	<0.01
High Caste	-0.0875	0.0200	
Muslim	-0.150	0.0207	
OBC	-0.122	0.0190	
Constant	2.111	0.0656	

(1) Her father's annual income is Rs. $5,00,000$ and mother's income is Rs. $2,00,000$. We use both her father's and mother's incomes separately to calculate her adjusted income.
(2) She comes from a rural area, so we reduce her father's and mother's income by 18%. So, father's income is reduced by Rs. $90,000$, and mother's income is reduced by Rs. $36,000$.
(3) She belongs to the SC community, so we reduce her parent's income by 10%. Her father's income is reduced by Rs. $50,000$ and mother's income is reduced by Rs. $20,000$.
(4) Her mother's income, being a female, is further reduced by 33%, i.e. by Rs. $66,000$.
(5) Thus, total reduction we make is $90,000 + 36,000 + 50,000 + 20,000 + 66,000 = 2,62,000$. We reduce this amount from the household income to derive adjusted income. Therefore, adjusted income $= 7,00,000 - 2,62,000 = 4,38,000$.

We see that although the parental income of this girl was Rs. $7,00,000$, this income reduces after incorporating all her disadvantages. Thus, there should be an adjusted income threshold for reservation that takes into consideration the diversity of disadvantage faced by an individual. One could imagine a college setting a "reservation" threshold of 5,00,000, for which our example individual would be eligible. Critically, note that the college would not need to care *how* this person crossed the threshold – disability, caste, gender, etc.

In our model, the higher the parental income, the higher the adjusted income. The higher the disadvantages, the lower the adjusted income. Therefore, RAMSES combines both the institutional disadvantage and family income to calculate the reservation benefits each student will be eligible for.

6 DISCUSSION

In this paper, we presented RAMSES — a framework to quantify the various disadvantages faced by an individual. We achieve this by calculating an adjusted income of a person by taking into account their parental income, caste, and other socio-economic factors.

In the future, we plan to explore ways of incorporating adjusted income in the reservation process. We also hope to access older data to understand how disadvantage evolved over time. Another idea is to come up with a cut-off for adjusted income. But what should this cut-off be, and what percentage of seats should be reserved for students with adjusted income below this cut-off? Should there be multiple, slated, cut-offs with different reservation benefits? Further, we plan to make our model more scalable by supporting more variables that we have omitted in our current model. Finally, we plan to explore machine learning based methods of computing the adjusted income instead of simple linear regression.

We recognise the sensitive nature of this topic, and want to emphasise that this paper is intended to be the beginning of a conversation, and not the end of one. We explicitly do not deal with many critical factors, such as cultural capital, political discrimination, and bias in the data-sources we use to drive our model.

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