THE RISE OF THE COMMONS: THE POST-INDEPENDENCE SOCIO-ECONOMIC TRANSITION OF INDIAN SOCIETY

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Note: This is still a work in progress paper and hence, the readers are requested not to cite this paper. Comments and criticism are welcome.

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Abstract:

Main aim of this research work is to study the impact of affirmative action (social engineering) policies of Indian government against the wide-spread caste-based discrimination in Indian society. This study exploits the fact that social engineering policies laid by Indian government in the post-independence India created the possibility of a level playing field for the under-privileged lower caste population. In addition, economic growth of post 1980 financial reforms played a crucial role in speeding up the socio-economic convergence between lower and upper castes. This study provides theoretical confirmation for this revival and helps understand the role of incentives in the process of convergence. The theory exploits the fact that education attainment is an important variable explaining the initial income difference between these two castes and also explains the convergence. Furthermore, theoretical predictions of the model are tested with the help of a comparative study of discriminatory reservation quota setting for different castes by the state government of Orissa. Main result states that, given they are relatively positively discriminated, educated STs performed better than educated SCs in the state of Orissa.

Keywords: Indian independence, social engineering, economic growth, caste system, socio-economic equality, redistribution.

JEL Classification: D63, O40, O53, P20, P21.
"Discriminatory and cruel, inhuman, and degrading treatment of a vast global population has been justified on the basis of caste. In much of Asia and parts of Africa, caste is the basis for the definition and exclusion of distinct population groups by reason of their descent."


1 Introduction

Post-independence Indian politics can be remarkably seen as the rise of commons through political and economic empowerment of the lower caste population. In post-independence India, i.e. after the year 1947, understanding the vast spread of caste based discrimination, national government had implemented various social engineering policies. Policies, for example, political reservations for lower castes in politics and reservations in government jobs and education played pivotal role in strengthening of lower caste population and bringing them into the main stream. These policies improved the opportunity set for the socially excluded and economically backward lower castes. In this study, we simply model an economy with redistributive social engineering policies and then explain the ongoing convergence between upper and lower castes. We also emphasize on the role of changed incentives due to economic growth (from 1980s onwards) in speeding up this convergence.

Social discrimination on the basis of castes is widely present in the Indian socio-economic environment. Social discrimination involves the group’s initial reaction or interaction, influencing the individual’s actual behavior towards the group or the group leader, restricting members of one group from opportunities or privileges that are available to another group.

\footnote{In addition Article 15 of Indian Constitution, as enacted in 1950, prohibits any discrimination based on caste. Article 17 of Indian Constitution declared any practice of untouchability as illegal. In 1955, India enacted the Untouchability (Offenses) Act (renamed in 1976, as the Protection of Civil Rights Act). The Scheduled Castes and Scheduled Tribes (Prevention of Atrocities) Act, similar to the Hate Crime Laws in the United States, was passed in India in 1989.}

\footnote{The term caste is usually referred to a social group that is endogamous and occupationally specialized.}
leading to the exclusion of the individual or entities based on logical or irrational decision making (Appelbaum, 2009). In addition, it is also well-understood that caste is correlated with many other attributes and those could be driving the observed choices, such as, marriages, migration decisions, collective action.

Various papers estimating the welfare loss due to discrimination are already present in economics literature. While studying the extent of caste based discrimination in the Indian private sector, Siddique (2011) finds that, on average, low-caste applicants need to send 20% more resumes than high-caste applicants to get the same callback. Takahiro (2007) also confirmed the caste based discrimination in labor market. Anderson (2011) explains how the caste is an impediment to trade although is not an optimal.

Although socio-economic gap between different castes still exist, in recent times, there have been several contributions which indicate the socio-economic convergence between upper and lower castes. Some articles denote the important role played by political reservations

4Banerjee et al. (2009) found that there is a very strong preference for within-caste marriages and because the groups are fairly homogeneous in terms of the distribution of other attributes, in equilibrium, the cost of wanting to marry within-caste is low.

5According to Hoff et al. (2010), lower caste individuals exhibit a much lower willingness to punish norm violations that hurt members of their own caste and perhaps inhibit the low caste's ability to sustain collective action and so may contribute to its economic vulnerability.

6Munshi and Rosenzweig (2006) shows how caste-based labor market networks have locked entire groups of individuals into narrow occupational categories for generations. Another study by Munshi and Rosenzweig (2009) cites that local risk-sharing networks restrict mobility, that is, among households with the same (permanent) income, and also those in higher-income caste networks are more likely to participate in caste-based insurance arrangements and are less likely to both out-marry and out-migrate.
in alleviating poverty \textsuperscript{7,8,9}. Other articles suggest that both economic growth and political empowerment of lower castes may have played a significant role in accounting for the declining gaps between these groups during this period (Hnatkovska and Lahiri, 2011) \textsuperscript{10}. Another contribution indicate that the economic growth experienced by the country in last 20 years might explain speeding up of this convergence channeling through increased education attainment (Hnatkovska et al, 2010) \textsuperscript{11}. These studies confirm that the convergence in occupation and wages is mostly due to a convergence in attributes, especially education.

As a consequence to the convergence in education and wages, the change of social status have followed. A social science study by Kapur et al. (2010) argues that many practices that reflected social subordination and routine humiliation of dalits (untouchables) have considerably declined. Another article, Desai and Dubey (2012) shows that status hierarchies seem to be on the decline with considerable civic and political participation by marginalized groups, economic and educational disparities between large caste groupings continue to flourish.

While modeling the unequal distribution in the society, this study assumes the most important feature of neo-classical theory, the capital market imperfections in the form of

\textsuperscript{7}Using data on sixteen major Indian states for the period 1960-2000, Chin and Prakash (2011) finds that increasing the share of seats politically reserved for Scheduled Tribes (ST - a social group falling in to lower caste) significantly reduces the level as well as intensity of poverty while increasing the share of seats reserved for Scheduled Castes (SC - another social group falling in to lower caste) has no impact on poverty.

\textsuperscript{8}Pande (2003) found that political reservation has increased transfers to groups which benefit from the mandate and also that that ST and SC reservation in state legislative assemblies have different policy effects, with the former increasing spending on ST welfare programs and the latter increasing the number of state government jobs set aside for minorities.

\textsuperscript{9}In India, seats are reserved for historically disadvantaged groups (Scheduled Castes, or SC, and Scheduled Tribes, or ST) in federal or state legislative assemblies and for both historically disadvantaged groups and women at all levels of the Panchayat system, the system of decentralized decision making (Duflo, 2005).

\textsuperscript{10}Hnatkovska and Lahiri (2011) suggests that the wage gap between other castes and Dalits (lower caste) has decreased to 21 percent, down from 36 percent in 1983 and education gap has been halved. Also, SC/STs (traditionally lower castes) have systematically and significantly reduced the gap with non-SC/STs in their average education attainment levels and in their relative representations in different occupations.

\textsuperscript{11}The key findings of this paper suggests that education attainment rates and wages have been converging across the two groups, that is, upper castes and lower castes.
unequal distribution of wealth or human capital. That is to say that as per Banerjee and Newman (1993), initial unequal distribution explains the persistence of either subsistence or self-employment. Similarly, Galor and Zeira (1993) suggested that in the presence of capital market imperfections and indivisibilities in investments in human capital, the initial distribution of wealth affects aggregate output and investment both in short and long run. As a result redistributive policies, such as, the affirmative action by the Indian government earn immense importance among policy makers. Redistribution in this setting should increase the affordability of basic education for the underprivileged and encourage human capital accumulation. In addition, this study emphasizes the role of incentives due to economic growth (from 1980s onwards) in occupation selection and speeding up the convergence.

The theoretical setting used in this study models an economy with redistributive social engineering policies. The study derives its intuitions from Croix and Doepke (2002) stating that in a society with unequal distribution of income, public schooling dominates in terms of growth. In addition to this, our model also tackles the real question of differential distribution of initial endowments among population on the basis of social status, that is, upper and lower castes. Following the results of Hnatkovska, Lahiri, and Paul (2012), the study assumes that education attainment explains the initial income difference between these two castes and also explains the convergence. Then the intuition of this study goes somewhat in parallel with Galor and Moav (2006) which formulates the process of convergence between upper and lower classes.

The empirical section of this paper tests the theoretical predictions of the study using National Sample Survey data from India. The main result of the empirical analysis states

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12 The new classical theory states that families in low-skill occupations with low levels of human capital can stay poor from one generation to the next, while families in high-skill occupations with correspondingly high levels of human capital stay wealthy, despite being endowed with the same level of ability on average.

13 An explanation given in this paper states that because of capital market imperfections, people can borrow only limited amounts and as a result, occupations that require high investment amounts remain beyond the reach of poor people. Moreover, it also suggests that the process of development affects the structure of occupations as it alters the demand for and supply of different types of labor, and hence, the returns to and allocations of occupations.
that, given that they were relatively positively discriminated, educated STs performed better than educated SCs in increasing their earning share for the period under consideration, that is, 1983 to 1993.

2 Basic Framework

This section studies an economy populated with overlapping generations of people. The population is structurally divided into two differently endowed groups and affirmative action on the part of the government aims to build an equal society. Individuals live for two periods: childhood, and adulthood. An individual makes all the decisions in her adulthood. Parents choose education level for their children and pay government a tax rate \( \tau_t \) which government spends on the education of all children. On the production side, model economy produces a single homogeneous good that can be used for consumption. In this setting, the growth comes from human capital accumulation and all that is saved or transferred (bequest) is being invested in human capital. Main motivation behind this section is to derive a socially optimal growth rate to provide policy implications.

2.1 Production of Final Output

We assume the simplest form of production function with only labor as input. This assumption also helps to remain consistent with prime motive of this analysis, that is, to study the accumulation of human capital. There is a unique consumption good and it is produced by a single representative firm. The production technology used by this firm is given by,

\[
Y_t = AH_t
\]  

where, \( H_t \) is the aggregate labor supply (measured in efficiency units) employed in production at time \( t \) and \( A \) is the level of technology\(^{14}\). The profit function of the firm is given by,

\[
Y_t - w_t H_t.
\]

\(^{14}\)We assume \( A = 1 \) in order to keep calculations simple and invoke it in corollary 4 directly.
2.2 The Individual Household

The representative individual derives her utility by deciding on her own consumption \(c_t\), intergenerational transfer of wealth (that is, bequest \(b_{t+1}\)), and the human capital of her children \(h_{t+1}\). The utility is given by,

\[
U = \max \{ \ln(c_{i,t}) + \gamma \ln(b_{i,t+1}) + (1 - \gamma) \ln(h_{i,t+1}) \}
\]

where, \(c_{i,t}\) represents consumption decision for individual \(i\) for period \(t\); \(b_{i,t+1}\) represents intergenerational transfer of wealth to the children; \(\gamma\) represents the altruism factor; and \(h_{t+1}\) represents human capital of the children. The budget constraint of the individual is as follows:

\[
c_{i,t} + s_{i,t} = (1 - \tau_t)(w_t h_{i,t}(1 - \varphi) + b_{i,t})
\]

where, \(s_{i,t}\) represents the saving of individual \(i\) for period \(t\), \(\tau_t\) is the tax levied by government in order to finance public education on the total earning of individual for period \(t\), \(w_t\) denotes wage per unit of human capital and \(h_{i,t}\) is the human capital of the parent \(i\). \(w_t h_{i,t}\) is labor income in efficiency units for individual \(i\) and \(b_{i,t}\) is the amount of bequest, i.e., intergenerational transfer she received from her own parents. Adult uses his/her time endowment in two respects: total time available in hours (assumed it as 1), and time spent in child rearing, \((\varphi)\). The time devoted in child rearing is not available for work and individual looses its wage income.

An assumption here entails that there is an intra-family transmission of human capital suggesting that educated parents create a positive externality on the children’s human capital level. Another assumption suggests that teachers create a positive externality on children’s human capital and this come through schooling. The human capital of the teacher is duplicated to the average human capital of the society, that is, \(\bar{h}_t\). While explaining the development of human capital of the child, the following equation of \(h_{t+1}\) is being considered,

\[
h_{i,t+1} = v_t(\theta + \epsilon_{i,t})^\eta(h_{i,t})^\delta(\bar{h}_t)^\kappa
\]
The parameter $\theta$ captures the positive human capital of the children, in the circumstances when he/she is not being educated. The parameter $\delta$ represents the inter-generational transmission of human capital within the household. Parameter $\kappa$ represents the quality of education system or schooling. The efficiency parameter $\nu$ and $\theta$ satisfy the positivity condition, i.e. $\nu, \theta > 0^{15}$.

Another constraint on individual optimization is the level of bequest transferred to the next generation. We assume that individual saves in order to pass it on to the next generation. Hence, the amount of bequest consists of an accumulated saving for the period $t$ with interest rate $R_{t+1}$, hence, is given by,

$$b_{t+1} = R_{t+1}s_{i,t}$$  \hspace{1cm} (4)

Based on our caste structure assumption, we divide the total population in the economy into two groups : group 1 and group 2 with different distribution of level of human capital, that is, $h_{1,t}$ and $h_{2,t}$. Let us assume that the level of human capital of group 1 is higher as compared to that of group 2, that is, $h_{1,t} > h_{2,t}^{16}$. The absolute relative sizes of these two groups are given by $N_{1,t}$ and $N_{2,t}$ and we assume that $N_{1,t} < N_{2,t}$. Hence, literal calculation of average human capital should yield,

$$\bar{h}_t = \frac{N_{1,t}h_{1,t} + N_{2,t}h_{2,t}}{N_{1,t} + N_{2,t}}$$  \hspace{1cm} (5)

In our setting, since the government balances the education budget with the help of a proportional tax levied on wage income earned by the individual as well as on the bequest transferred by her parents. The total expenditure on education has to equal total tax receipts at time $t$. The government’s budget constraint is given by:

$$\bar{c}_t w_t \bar{b}_t N_t = \tau_t (N_{1,t}(w_t h_{1,t}(1 - \varphi) + b_{1,t}) + N_{2,t}(w_t h_{2,t}(1 - \varphi) + b_{2,t}))$$  \hspace{1cm} (6)

$^{15}$ $\nu_t$ is the efficiency parameter as defined in Rangazas (2000).

$^{16}$ This assumption is in line with the empirical result in Hnatkovska, Lahiri, and Paul (2012) that education attainment is an important variable explaining the income difference between these two castes initially and also explain the convergence.
Education \( \bar{t} \) is measured in units of time of the average teacher per child, and hence education expenditure per child is given by \( \bar{t} w_t \).

**Definition 1**: Given initial human capital endowments \((h_{1,0}, h_{2,0})\), bequest transfers \((b_{1,0}, b_{2,0})\), and group sizes \((N_{1,0}, N_{2,0})\), an equilibrium consists of sequences of aggregate quantities \(\{N_t, \bar{t}_t, H_t\}\), group sizes \(\{N_{t+1,i}\}i = 1, 2\), private decision rules \(\{c_{it}, b_{t+1,i}, h_{t+1,i}\}i = 1, 2\), and policy variables \(\{\tau_t, e_t\}\), such that

1. Households’ decision rules \(c_{it}, h_{t+1,i}, b_{t+1,i}\) maximize utility subject to the constraints
2. Government’s budget constraint is satisfied
3. Given the decision rules, the policy variables maximize the utility of adult households.

As given in the equation (1), the aggregate production function for the consumption good is linear in the aggregate supply of effective labor and total consumption in this economy is given as,

\[
Y_t = (1 - \tau_t)(N_{1,t}(w_t h_{1,t}(1 - \varphi) + b_{1,t}) + N_{2,t}(w_t h_{2,t}(1 - \varphi) + b_{2,t})) - s_{1,t} - s_{2,t} \quad (7)
\]

Hence, everything that is produced is consumed by the population using their after tax income.

Now let’s denote the term relative human capital \((x_{i,t})\) as \(x_{i,t} = \frac{h_{i,t}}{n_t}\). This is an important term which provides us with some idea about the distribution of capital in the society. By carrying forward from our previous assumption on human capital of members of high caste and lower caste, we get another assumption that \(x_{1,t} \geq 1 \geq x_{2,t}\). At equilibrium, we force a harsh assumption here that, in the long run, the ratio of bequest transfer to individual \(i\) at period \(t\) to the labor income she earned is constant. Let’s call it, \(B = \frac{b_{i,t}}{w_t h_{i,t}}\), and from assumption, B is constant and is same for poor as well as rich\(^{17}\). Hence, government budget constraint gives us,

\[
\tau_t = \frac{\bar{t}_t}{(1 - \varphi + B)(\frac{N_{1,t}}{N} x_{1,t} + \frac{N_{2,t}}{N} x_{2,t})} \quad (8)
\]

\(^{17}\)This assumption on bequest transferred is in line with savings rate per capita labor income calculation performed in equation 10 from De La Croix and Doepke (2003) and equation 12 from Deole (2012).
As from the equation above, common education level provided via public education is also dependent on the distribution of human capital within different societal groups, that is, group 1 and 2.

### 2.3 Optimal Education

This subsection derives the optimal expenditure on education in order to avail everybody with education facility and therefore the optimal tax rate. In our model, the government is engaged in direct transfers from the rich to the poor in addition to the provision of public schooling, a possible conflict emerged regarding the desirable tax rate could be solved through voting. This supports the fact that in a country like India, although forces against political reservation were strong, in reality, the reservation for lower castes in government jobs or in education institutions has increased over the period under consideration.

It is important to calculate the level of optimal public education and as a result, taxes being collected for it. Let us substitute the equation 8 in the optimization program of the individual,

\[
U = \max \{\ln\left(\left(1 - \varphi\right) s_i,t\right) + \ln\left(R_i,t\right) + \ln\left(\left(1 + e\right) h_i,t\right)\}
\]

First order condition with respect to education gives us,

\[
\bar{e}_t = \left(\frac{(1 - \varphi + B)[\eta\left(\frac{N_1}{N}x_1 + \frac{N_2}{N}x_2\right)(1 - \gamma) - \theta(1 + \gamma)]}{(1 + \gamma)(1 - \varphi + B) + \eta(1 - \gamma)}\right)
\] (9)

The optimal way the government can calculate taxes is after taking into consideration the social costs of caste system on different castes as shown in subsubsection 3.5.2. The addition of variable giving us time bound fixed effect imposed by the caste system on individual income $C_t$ only complicates our calculations rather than impacting important intuition of the result and hence, to keep our analysis simple and intuitive, we study this variable in a separate section. Substituting the equation 9 into equation 8, we get the formula for optimal tax rate.
\[
\tau_t = \frac{\eta \left( \frac{N_1}{N} x_1 + \frac{N_2}{N} x_2 \right) (1 - \gamma) - \theta (1 + \gamma)}{\left[ (1 + \gamma) (1 - \varphi + B) + \eta (1 - \gamma) \right] \left( \frac{N_1}{N} x_1 + \frac{N_2}{N} x_2 \right)}
\]  

(10)

This equation shows that the optimal level of tax is chosen by the government taking into consideration the distribution of human capital between two groups as well as the intergenerational transfer in the society.

### 2.4 Balanced Growth Path Analysis

This subsection studies the dynamic behavior of the economy and helps to understand the convergence in more detail. While studying the balance growth path of the economy, it is pertinent to understand that the growth rate of economy is given by the growth rate of the human capital over time and hence, \( g_t = \frac{h_{t+1}}{h_t} \).

**Definition 2 (Balanced Growth Path) :** Given that the ratio of average bequest left behind and average human capital is constant, there exists a balanced growth path in our economy and the economy experiences perfect equality, i.e. equality in education as well as wealth.

To obtain the balanced growth path trajectory and the growth equation, equation 3 is used.

From equation 3 and 11, it follows that,

\[
h_{t+1} = v_t(\theta + \frac{(1 - \varphi + B)[\eta \left( \frac{N_1}{N} x_1 + \frac{N_2}{N} x_2 \right) (1 - \gamma) - \theta (1 + \gamma)]}{(1 + \gamma)(1 - \varphi + B) + \eta (1 - \gamma)})^{\eta (h_t)^{\delta} (\bar{h}_t)^{1-\delta}}
\]

\[
g = \frac{h_{t+1}}{h_t} = v_t(\theta + \frac{(1 - \varphi + B)[\eta \left( \frac{N_1}{N} x_1 + \frac{N_2}{N} x_2 \right) (1 - \gamma) - \theta (1 + \gamma)]}{(1 + \gamma)(1 - \varphi + B) + \eta (1 - \gamma)})^{\eta (x)^{\delta-1}}
\]  

(11)

At BGP, and for \( x = x_1 = x_2 = 1^{18} \) and let’s denote growth rate obtained as \( \bar{g} \),

\[
\bar{g} = v_t(\eta (1 - \gamma) (1 - \varphi + B + \theta) \left( \frac{1 + \gamma}{1 - \varphi + B + \eta (1 - \gamma)} \right)^{\eta})
\]  

(12)

\(^{18}\)This assumption is possible because we are considering that every children in this economy receives the same education via public schooling and there is no role for private education.

For other values of \( x_1 \) and \( x_2 \), please refer to proposition 3.
at optimal level of taxation ($\varpi$) is,

$$\varpi = \frac{\eta(1 - \gamma) - \theta(1 + \gamma)}{[(1 + \gamma)(1 - \varphi + B) + \eta(1 - \gamma)]}$$

(13)

Above equations shows that the BGP growth rate of the economy is constant and positive. This is possible because we have assumed that every children receives the same education and private schooling is inexistent. Note that, in our framework, the only public education regime is a national education regime. It approximates countries where the central government organizes education (majority of developing countries, and much of Europe). This assumption is an important limitation of our model because otherwise individuals with higher initial endowments could prefer to send their children to private schooling with relatively better quality than public schooling and pay higher in fees.

In this setting, taxes are levied on initial endowments (bequests) as well as labor income of parents and hence inequality decreases over time. Convergence prevails following the assumption in Tamura (2001) that the difference in education of teachers across districts is smaller than the differences in education of parents.

**Proposition 1 (Conditional convergence)**: The optimum level of growth rate ($\bar{g}$) is possible only when initial distribution of population composition and human capital distribution satisfies $(N_1x_1 + N_2x_2) = N.(1)$. For any other level of distribution of human capital among two groups, $\varpi$ should be varied accordingly.

Simplifying assumption made in previous paragraph suggested that, maximum level of growth in BGP is achieved when $x_1 = x_2 = x = 1$ so as to bring in perfect social equality. Now, let’s recall our preliminary assumptions on the distribution of human capital as well as the population composition for both groups in the economy: $h_{1,t} > h_{2,t}$ and $N_{1,t} < N_{2,t}$. For $\bar{g}$ to be optimal growth rate for perfect social equality in the economy, the initial distribution of population composition and human capital distribution should satisfy $(N_1x_1 + N_2x_2) = 1.N$. For any values of $x_1$, $x_2$, $N_1$, and $N_2$, for example, $(N_1x_1 + N_2x_2) > 1.N$, the growth rate will be higher ($g > \bar{g}$) but may not be a social optimum. In this case, the tax rate $\varpi$ should be varied in such a way that $\varpi > \bar{g}$ and socially optimal growth level $\bar{g}$ is achieved. Similarly for $(N_1x_1 + N_2x_2) < 1.N$, $\varpi$ should be reduced to $\varpi < \bar{g}$ and the social optimal $\bar{g}$ is achieved. The impact of changes in tax rates on growth levels channels through education attainment.
by social groups. In the empirical section of this paper, we will mainly focus on testing this proposal.

**Proposition 2:** *For higher B, that is, the ratio of bequest transfer at period t to labor income earned, our economy enjoys higher level of economic growth.*

This proposition could also be translated as, for higher level of initial saving rate for intergenerational transfer, model economy enjoys higher level of economic growth. To prove this proposition, we need to calculate, $\frac{\partial g}{\partial B}$ and prove $\frac{\partial g}{\partial B} > 0$.

### 3 The Socio-economic Transition of Indian society

This section analyzes the endogenous demise of the upper caste-lower caste discrepancies in terms of socio-economic indicators as the economy evolves from early stage (no social engineering) to final stage (social engineering and economic growth). If additional plausible restrictions are imposed on the basic model, the economy endogenously evolves through two fundamental regimes.

#### 3.1 Regime 1: Pre-independence era (before 1947)

This early stage is characterized by the time period since the formation of the caste system till the independence of the country. This regime is characterized by widely present caste-based discrimination and stable but unequal wealth distribution between upper and lower castes. Upper caste population generates a higher rate of return for all its investments and lower caste population is excluded for doing so by social norms. Due to social norms in place, there is no possibility for any side to shift its strategy and change the occupation. In our model, this era can be translated by changing original budget constraint of parents as:

$$c_{i,t} = w_t h_{i,t} - s_{i,t} - C_{i,t} + b_{i,t}$$

(14)

where $C_{i,t}$ is time fixed effect imposed by caste system on individual income through structural discrimination. This caste system cost in period $t$ is as follows,
\[ C_{i,t} = -C_t \quad \text{for} \quad i = 1 \quad (\text{member of a higher caste}) \]
\[ = C_t \quad \text{for} \quad i = 2 \quad (\text{member of a lower caste}) \]

As a result, on the basis of caste of the individual, this caste system cost will show up in individual budget constraint. This could also be called as societal externality on individual budget constraint channeled through social norms and their firm impositions.

### 3.2 Regime 2: Post independence era (post 1947 - till date)

Regime 2 could be divided into two parts considering two turning points of the movement against caste discrimination. Part I summarizes the role of social engineering, that is, policy making in order to reduce this form of social discrimination and then Part II summarized the speed-up of the convergence in socio-economic variables between upper and lower castes.

#### 3.2.1 Part I: Post-independence era (post 1947 - financial reforms of 1980s)

In the post-independent era, due to various social engineering policies implemented by the Indian government, possibility of socio-economic equality emerged but due to lack of sufficient economic incentives, total equality was far away. We could also see slower increase in education attainment and hence convergence.

In order to accommodate the role of social engineering in our model, we present this new parental budget constraint.

\[ c_{i,t} = (1 - \tau_t)(w_{i,t} h_{i,t} + b_{i,t}) - s_{i,t} - C_{i,t} \quad \text{(15)} \]

Social policies introduced in this part of the regime 2 focus on reducing social costs of discrimination with the help of redistributive taxes collected in order to spend on education system for all.

The tax levied tends to minimize these social costs of caste discrimination \( C_{i,t} \) to zero, that is, \( \tau_t(w_{i,t} h_{i,t} + b_{i,t}) - s_{i,t} = C_{i,t} \). The taxation evolves as following,
\( \tau_i = \begin{cases} > 0 & \text{for } i = 1 \text{ (member of a higher caste)} \\ < 0 & \text{for } i = 2 \text{ (member of a lower caste)} \end{cases} \)

This part of regime 2 is characterized by slow catch up by lower castes, followed by relatively lower investment in accumulation of human capital. In this model, the only channel through which redistribution will improve the socio-economic state of lower castes is through education attainment. Lower wages during this period may provide low incentives for lower castes to accept opportunities provided and send children to school (lesser investment in human capital). Also, the wages earned in jobs requiring education should also be greater than the social costs in order for them to accept this social change.

### 3.2.2 Part II: Post-financial reforms era (post 1980s - )

Financial reforms energized the convergence process by improving economic incentives for socially under-privileged groups to change their occupations. With economic growth, wages on all levels improved fastly and opportunity cost of leaving their children out of school increased dramatically. This resulted into their increased preference for education and hence, speeded-up the convergence. According to the model explained above, there is a clear role of human capital improvement of under-privileged groups in this transformation following the demise of the social structure due to financial reforms a la Galor and Moav (2006).

During this period, output per worker sees an increase due to exogenous shock on productivity (due to financial reforms or increased trade with technologically advanced foreign countries) and wages improve with greater speed.

Let’s assume the output per worker prior to the exogenous shock is \( \hat{Y}_t \). In this setting, the level of output per worker and hence the labor income in efficiency units is sufficient enough to neutralize the societal opportunity cost of changing the occupation or educating your children. But increase in \( Y_t \) due to productivity shock changes this scenario completely, please refer corollary 1.

**Corollary 1:** For the level of output per worker \( Y_t \) higher than \( \hat{Y}_t \), that is, \( Y_t >> \hat{Y}_t \), it
is considerable for lower caste population to shift its strategy, change their occupation, and send their children to school.

From equation 14, it is clear that higher level of production activity in the economy means higher level of household level consumption. Higher level of output per worker should translate through higher labor income in efficiency units. Let us suppose that $\hat{Y}_t$ is the output level large enough to level the caste system costs. At this level of output per worker, individual from lower caste is indifferent between continuing the work he was doing as per assigned by the caste system and hence no incentive in shifting his strategy. But for any output per capital value higher than $\hat{Y}_t$, that is, $Y_t >> \hat{Y}_t$ (financial reforms resulting into economic growth), it is feasible for the individual to consider changing occupation or send children to school. The channel through which output per worker in this regime is higher than that of previous is if there is a shock on the level of technology, that is, $A >> \hat{A}$.

4 Empirical Explorations

In this section, we study the differential rates of welfare improvements for different backward castes due to discriminatory setting of quotas. We tend to prove the theoretical results dictated in the above section (mainly proposition 1). The data for this study comes from National Sample Survey (NSS), which is an all-India survey (except few inaccessible areas). There have been several rounds of NSS surveys carried out but we consider only two surveys: survey number 38 (year 1983), and 50 (year 1993) because this period was characterized by the accelerated economic growth of 1980s and passive reservation quota setting in the state of Orissa. This survey covers individual data on attributes like education, castes (social groups), employment, consumption, and wages as well as other individual characteristics. It is important to admit the limitation of the empirical analysis that the methodology used is a simple cross section analysis.
4.1 The Curios Case of Orissa

The state of Orissa is a coastal state located in middle-east of India. Following on figure (1) and (2), it is clear that, the performance of the state government in managing the reservation quotas was abysmal. The quotas for SCs and STs (lower castes) were not changed for the change in their population composition in the state. The quota was set above the population composition for the social group STs and slightly below the population composition for the social group SCs. Hence, we broadly expect the differential rate of convergence for SCs and STs in the state of Orissa. Moreover, the era of late 1980s was important where financial reforms happened and convergence between income and education levels of different castes was speeded up. We expect STs to perform relatively better than SCs for the period under consideration.

![Figure 1: Situation of SC in Orissa](image)

4.2 Data Description

From table 1, it is clear that the upper caste population is over represented for both years in the survey. Males are relatively highly represented for all the castes. SCs are relatively better education than STs, but worse than Non-SC/STs. In ten years, from 1983 till 1993, we see a tremendous improvement in terms of number of years of education for all castes, especially, for lower castes. Household size reduced for all the castes under study, but we can not say, if
it is due to reduction in fertility levels or increased migration levels. Similarly, upper caste population is highly represented in the urban areas if compared with other castes. Also, all the castes saw tremendous increase in wage income during the period under study.

4.3 Empirical Methodology

In line with the main hypothesis of the paper, we study changes in the levels of earnings of under-privileged castes due to differential and passive reservation quota setting. We conduct a simple cross-sectional analysis for different social groups for different years. The empirical equation for our analysis is given as,

\[ \log(\text{income}_i) = \alpha_0 + \alpha_1 \text{education}_i + \alpha_2 \text{age}_i + \alpha_3 (\text{education} \ast \text{caste}) + \alpha_4 \text{agesquare}_i + \alpha_5 \text{education}^2_i + \alpha_6 X_i + \epsilon_i \]  

As shown in above equation, the dependent variable here is the logarithm of wage income earned by an individual \(i\); \text{education} is the education completed by the individual in terms of number of years of schooling completed. The study also controls for individual characteristics, such as, age, caste, household size, urban/rural, and gender. The important independent variable in the regression equation is the interaction term between education
Table 1: Descriptive Statics: State of Orissa

<table>
<thead>
<tr>
<th>Variables</th>
<th>1983</th>
<th>1993</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ST</td>
<td>SC</td>
</tr>
<tr>
<td>Male (in %)</td>
<td>56</td>
<td>58</td>
</tr>
<tr>
<td>Age (in years)</td>
<td>26.4</td>
<td>27.1</td>
</tr>
<tr>
<td>Education (in years)</td>
<td>.55</td>
<td>.83</td>
</tr>
<tr>
<td>Household Size</td>
<td>5.8</td>
<td>5.7</td>
</tr>
<tr>
<td>Urban (in %)</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>Income (in rupees)</td>
<td>1413.2</td>
<td>1546.7</td>
</tr>
<tr>
<td>Observations</td>
<td>6534</td>
<td>5018</td>
</tr>
</tbody>
</table>

Note: The data used in this table has been gathered from National Sample Survey for the year 1983 and 1993. Variable male is a binary variable taking value of 1 if the individual is male and 0 for female and is shown in percentage. Variables age and education are in years. Variable urban is another binary variable taking a value of 1 if the individual resides in a urban area and 0 otherwise. It is shown here in percentage. Income of the individual is shown in Indian rupees.

and the caste of the individual. This variable explains the caste specific effect of education on individual earning. Any changes in the coefficient of this variable might explain improvement in the impact of education in explaining wage earnings of an individual of specific caste group.

4.4 Results and Discussion

Table 2 shows the results of the simple regressions performed. An important result of this study is given by the interaction term of the education of the individual belonging to certain caste. Over the span of 10 years, the coefficient of the interaction term has changed drastically for different castes. In line with our hypothesis, educated STs are better off in 1993 than they were in 1983. Similarly, the impact for already better off castes like SCs and Non-SC/STs is negative and significant. The possible explanation of the negative signs could be the base effect for other social groups than STs. From table 1, it is easy to observe that SCs and Non-SC/STs were relatively better off if compared with STs. But with the
help of positively discriminatory reservation quotas, it was easier for educated individuals belonging to social group ST to get a job and improve upon their wages. As a result, we see an overall increase in the education levels of STs and also, increase in income levels. This study admits that after the primitive cross section analysis, it is hard to draw any important conclusions regarding convergence, but it is interesting to see that, given that they are relatively positively discriminated, STs performed relatively well on income as well as education fronts.

With respect to the trivial issue of endogeneity in wage regressions, it is important to mention that the survey doesn’t permit to have data indicating the ability of the individual. This makes us put more emphasis on the education term in the equation, which measures number of year of schooling completed by the individual. Primitive analysis for endogeneity indicates that if the residual term of the respective regression is not correlated with the explanatory variables, then, there is no endogeneity. This study conducted robustness checks for endogeneity and did not find any endogeneity in results.

Table 2: Estimation results : Dependent variable is log(income earned in wages)

<table>
<thead>
<tr>
<th>Variables</th>
<th>1983 (1)</th>
<th>1983 (2)</th>
<th>1983 (3)</th>
<th>1993 (4)</th>
<th>1993 (5)</th>
<th>1993 (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educated ST</td>
<td>.01</td>
<td></td>
<td></td>
<td>.18***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educated SC</td>
<td>-.04</td>
<td></td>
<td></td>
<td>-.05***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educated Uppercaste</td>
<td>.03</td>
<td></td>
<td></td>
<td>-</td>
<td>-.06*</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>2.2***</td>
<td>2.1***</td>
<td>2.3***</td>
<td>1.7***</td>
<td>1.5***</td>
<td>1.7***</td>
</tr>
</tbody>
</table>

Note: The level of significance of the results is as follows: *** p<0.01, ** p<0.05, * p<0.1.
5 Concluding Remarks

This research article hypothesizes that the ongoing convergence of socio-economic variables between upper and lower castes in India is orchestrated by the common education provision by the Indian government.

First contribution of this article is to provide theoretical interpretation of the Indian government’s affirmative action policies against social discrimination. Second, this study explains the important role of social engineering to provide a level playing field for all social groups and then that of economic growth in bridging the caste based gaps between different social groups. Third, the study proposes the possible conditionality on the process of convergence, considering initial population composition and distribution of human capital within different societal groups. Fourth, the model successfully explained the slow catch up by lower castes during post independence and pre-financial reforms period, followed by low investment in accumulation of human capital. Because in this model, the only channel through which taxation led redistribution will improve the socio-economic state of lower castes is if they attend schools. Moreover, lower wages during pre-financial reforms’ period might have provided low incentives for the lower caste population to accept opportunities provided against social costs incurred. In the post-financial reforms era, with economic growth, wages on all levels improved fastly and the social costs of sending their children to school reduced drastically for lower caste population. Hence, the speeded up convergence process.

Furthermore, we tested theoretical predictions of the model with the help of cross section analysis in the final section. Understanding the limitations of the data as well as methodology used in this study, main result states that, given that they were relatively positively discriminated, educated STs performed better than educated SCs in increasing their earning share.
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