Affirmative Actions and Inter Generational Impacts : Evidence from India

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Abstract

we study the inter generational effect of affirmative action (in higher education) on nutritional outcomes in early childhood. Using nationally representative DHS data sets from India, we find that children whose mothers were exposed to affirmative actions were less likely to be stunted. The effect is higher in urban areas and is more pronounced for daughters.A higher level of education,better medical care during pregnancy and a greater degree of exposure to media amongst treated cohorts of mothers may plausibly explain these results.

JEL Classification: I10, I20, J16

Keywords: affirmative action, intergenerational, health, education, India

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1 Introduction

Affirmative actions as a policy all over the world has been seen as an inclusive way to improve the situation of disadvantaged and minority sections of society. Although the nature of affirmative actions are somewhat difficult and debatable still a wide array of literature has studied its impact on various possible outcomes for developed as well as developing countries. (Arcidiacono et al. (2014), Bagde et al. (2016)). India as a country has implemented one of the largest affirmative actions program for minority groups such as Scheduled castes (SCs) and later on for Other Backward Classes (OBCs) in jobs and higher education. The reservation policies in India has been a contentious issue since past times which leads to our interest in this research question. A growing literature has shown the positive impact of reservation policies in higher education on Completed years of education, enrollment , and schooling(Basant and Sen (2020)),(Bhattacharjee (2019)),(Desai and Kulkarni (2008)) in India but the long term inter generational impacts of these policies are less explored.

In this study we see the intergenerational impact of Affirmative actions in higher education specifically for Other backward classes category on child health outcomes. The policy led to an increase in schooling as and college enrollment for OBC category more for women as compared to men (Bhattacharjee (2019)). We tried to observe if this increase in educational attainment for women led to the better health outcomes for their children.

Our methodology relies on the plausibly exogenous policy announcement by Government of India for increase in quotas for OBCs in higher education 2008[1]. The policy was targeted only for for Other Backward Classes without affecting other caste categories such as SCs, STs and general. This quasi experimental setting allows us to use difference in difference estimation strategy to delineate the impact on our treated group OBCs from the control group "General category".

We select General Caste category as our pure control group since the minority groups such as SCs and STs are already enjoying some of the quota beneficiaries in jobs as well

[1]The Central Educational Institutions (Reservation in Admission) Act, 2006

as education since independence (RANGANATHAN and CHATTERJEE (2020)). It is the general caste category that is immune from any of the reservations in higher education and face toughest competition from OBCs in higher education (Cassan (2019)).All the women from OBCs category born in or after 1995 forms our treated cohort as by the year 2008, they will still be in their schooling age and by the time they will enter the college the policy will already be in practice. Older birth cohorts forms the unexposed group as they have already passed the higher education age.

We find that children from Other backward classes whose mothers were exposed to the policy have higher height for age z-scores by 0.05 standard deviations and they are 0.01 % less stunted than their counterparts . We also find more antenatal care visits for these children. Moreover the chances of getting delivered in health care institutions increased by 0.02%. Further hetereogenity analysis reveals that girls were less stunted and the impact is more of an urban phenomena. The possible mechanism is mothers getting more educated after getting exposed to the treatment which then transcends to children's getting better in terms of health and pre natal care. This work makes a significant contribution to the literature studying impacts of affirmative actions on women's educational outcomes and its second order effects (Prickett and Augustine (2016), Cui et al. (2019)). By far, this is first causal evidence on inter generational impacts of affirmative actions on child health outcomes. Existing literature has scant evidence on second order effects on health outcomes of children, specifically in context of India. The remainder of this paper proceeds as follows: Section 2 describes the background of our study. Section 3 describes the data. Section 4 describes the empirical strategy. Section 5 describes the results and Section 6 concludes.

2 Background

Caste system forms the basis of social structure in India. The British rule made the caste hierarchies more rigid but also introduced the concept of Affirmative Actions in India. In

India three major caste categories Scheduled caste (SCs), Scheduled Tribes(STs) and Other Backward classes (OBCs) receive the benefits of affirmative actions in various educational, political and employment institutions. Reservations for people from SCs and STs exists for a long time since independence in public secotr emloyment, education as well as electoral quotas(Galanter (1984)). For people belonging to Other Backward Classes, there was no such exemption until the Mandal commission came into place. [2]. But this report only talked about reservations in public sector employment not in education sector. In the year 2008, the Central Educational Institutions (Reservations in Admissions) Amendment Bill (henceforth the Act) was passed in the Indian parliament[3] This Act requires 27 per cent reservations of seats for OBC students in public funded institutions of higher education in the country. The bill was amended in the year 2012 and it was mandated to complete it by 2014. Apart from this some states were already practising some form of affirmative actions but it continued even after the act was passed.

3 Data

We use data from two main sources: rounds 3 and 5 of National Family Health Surveys i.e., NFHS-3 and NFHS-5 and wave 2 of Indian Human Development Survey (IHDS-2 hereafter). We describe these two datasets in greater detail. The National Family Health Surveys (NFHS hereafter) conducted in India are a part of Demographic Health Surveys. It contains rich demographic and health information for large representative sample of Indian population. They collect detailed information of women's marital status (15-49 yrs.), their fertility history, their health and social status. NFHS also provides information on height and weight measurements, pre -natal and post- natal care, disease history such as diarrhea, tuberculosis of children 0-5

[2]The commission's report recommended that members of Other Backward Classes (OBC) be granted reservations to 27% of jobs under the Central government and public sector undertakings, thus making the total number of reservations for SC, ST and OBC to 49.5%

[3]The Central Educational Institutions (Reservations in Admission) Act, 2006 was introduced in 2006 but passed in 2008. The original Act and consequent amendments to the Act can be found at http://www.judis.nic.in/ accessed on 1 May 2014

years who have been in the household. Our analysis focusses on children's outcomes such as height for We age z- scores (as recommended by WHO to monitor the nutritional status), stunting (based on Height for age z-scores), antenatal care and place of delivery of child. Children whose height for age score falls below -2 are categorized as stunted which is an indicator of long- term malnutrition as opposed to wasting which is more of a short- term phenomena. Reservations for Other backward classes (OBCs) in higher education might impact their health and children's health outcomes as well as health care usage through channels such as increased completed years of education and age at marriage of mothers (Chari et al. (2017)). This is the reason we focus on long term nutritional outcome and child care before and after the child is born. The child's exposure to treatment in our context varies by caste category and year of birth mother. "Treated" group comprises children from other backward classes born to mother who were born in or after 1995. To causally interpret it we need "Pre and post periods". Post dummy takes the value 1 if child born to mother born in or after 1995. The children from 'General category forms the control group. We utilize retrospective birth histories using "Birth Recode" file from NFHS-3 and NFHS-5 age 0-5 years. We confine our sample to mothers got married between 1990 and 2021. The average year of marriage of mother's whose children's outcomes we are observing in our sample is 2009. We have a sample of 133680 children. The average birth year of children is 2014. We use "Individual Recode" file from NFHS-5 to find the impact on women's health and completed year of education outcomes. The average age of women in our sample is 32 years. We are left with a sample of 257887 married women.

4 Empirical Strategy

The goal of this study is to find the causal impact of affirmative actions announced for OBCs in higher education and children's health outcomes such height for age, stunted and health care usage for children 0-5 years of age in long run. Our empirical strategy exploits the fact that the reservation of 27% in higher education was given to people from Other backward

classes and other unreserved category 'General' was immune from this policy . Hence our treatment group comprises children from OBCs born to mothers who got married after the policy and was announced. OBC children born to mothers born in or after 1995 forms the treated group before the treatment. Children from "General category" forms the pure control group. For impact on child health outcomes we estimate the following empirical equation for child i residing in state s born in year b to mother born in year t.:

$$Y_{isbt} = \alpha + \beta_1 Obc_i + \gamma Post_t \times Obc_i + X'_{isbmt}\mathbf{\Gamma} + \theta_s + \phi_t + \mu_b + \kappa_s \times \mu_b + \epsilon_{isbt} \quad (1)$$

We include year of birth of child fixed effects μ_b and interaction of year of birth of child with state fixed effects $\kappa_s \times \mu_b$. ϕ_t denotes vector of mother birth year fixed effects. Including year of birth of mother fixed effects absorbs $post$ dummy.

The identification strategy relies on the fact that the policy was announced nation-wide in year 2008 in higher education only for the people from other backward classes. Other categories such as SC, STs and general were not affected from this policy. We select General category to form our pure control . Our coefficient of interest "γ" reflects the change in outcome variable Y for the treated group as compared to its counterpart the control group. The coefficient of interest is identified bases on within state variation as equation1 controls for state fixed effects and birth year fixed effects for mother and children. For DID estimates to casually capture the changes associated with the policy announced, the pre-trends for the treated and control group prior to treatment should be parallel across both the groups We conduct event studies for children's health outcomes to check the validity of our assumptions using the following regression specification:

$$Y_{isbt} = \alpha + \beta_1 Obc_i + \sum_{t \in \{t_0,..,T\} \setminus \{t_p\}} \gamma_t \mathbf{1}_{it} \times Obc_i + X'_{isbmt}\mathbf{\Gamma} + \theta_s + \phi_t + \mu_b + \kappa_s \times \mu_b + \epsilon_{isbt} \quad (2)$$

Here t_0 refers to first period of our analysis ie, the year of birth 1987-88 and T refers

to final year of birth that we have used in our analysis which is 2000-01. For each of the cases t=1993-94 forms the base category. we interact each of the time period dummy with the treated dummy so as to conduct the event study analysis. All other variables remains same as equation1.

For the heterogeneity analysis using gender, residence , birth order of child and mother's education for child's health outcomes , we use the triple difference Estimation . To illustrate, we use following specification to do the heterogeneity by gender of child.

$$\mathbf{Y}_{isbt} = \alpha + \beta_1 Obc_i + \beta_2 Girl_i + \delta Girl_i \times Post_t \times Obc_i + \gamma_1 Post_t \times Obc_i + \gamma_2 post_t \times Girl_i + \gamma_3 Obc_i \times Girl_i + X'_{isbmt}\mathbf{\Gamma} + \theta_s + \phi_t + \mu_b + \kappa_s \times \mu_b + \epsilon_{isbt} \quad (3)$$

Here $Girl_i$ indicates that the child is a girl. Our coefficient of interest is δ , the coefficient on triple interaction of Obc, post and girl child dummy. We include year of birth of mother in our regression hence the $post$ dummy gets dropped. We have included all the double interaction terms in our empirical specification. The coefficient δ shows the impact on girls as compared to boys.

5 Results

5.1 Main Results

We use NFHS-3 and NFHs-5 to find the impact on children's health outcomes. children age 0-5 years of mothers who were born after year 1995 belonging to Other backward classes

forms the treatment group.Table 1 presents results on anthropometric measures of children. Column (1) estimates basic version of equation 1 which controls for birth year fixed effects of child and mother, State fixed effects and interaction of state and child birth year fixed effects.The coefficient of interest here is 0.11 which is statistically significant at 1% level. The coefficient can be interpreted as the height for age of children from other backward classes for mothers exposed to the policy increase by 0.11 standard deviations as compared to the control group. The causal impact is identified based on within variation since we account for different fixed effects. We also include interaction of state and child birth year fixed effects so as to account for any differential time trend. In column (2) we add some additional controls which might impact our outcome of interest , the result remains statistically significant at 10% level with a magnitude of 0.058 standard deviation with the final interpretation of our estimates indicating the height for age increases by 0.058 standard deviations for the treated group as compared to its counterparts. We also check for alternative measures of child's health indicator stunting which WHO considers as marker of long term malnutrition status of children age 0-5 years. It classifies children stunted if the height for age z-score of children is less than -2 . The coefficient in column (3) is statistically significant at 1% level with a magnitude of -0.03 indicating that stunting decrease for the treated group as compared to their counterparts. Adding controls in column(4) makes the results more statistically significant at 5% level with a magnitude of 0.01. The results are robust to all specifications. To get a better understanding of the fact whether mothers are now more concerned about pre natal care and health care usage we also did some regressions using antenatal care and place of delivery of child as our outcome variable. Table 2 presents results. our coefficient in column (1) has a positive magnitude of 0.03 indicating that mothers are now having more antenatal care visits for their children. Adding significant demographic controls in column(2) does not make any difference in significance level. In column(3) the coefficient is significant at 1% level which points out to the fact that mothers are now delivering the child more in health care facilities be it government or private as compared to giving births at home. The institutional delivery increase by .03%

for the treated group as compared to their counterparts. we do some heterogeneity tests to see how the impacts vary by different dimensions. First we do heterogeneity by gender of child. Table 3 presents results. We find girl child are less stunted as compared to boys as our coefficient of interest indicates , girls are 0.03% less stunted than boys. Also, we find significant increase in institutional deliveries of girls as compared to boys. We don't find ant significant impact on girl's height for age . secondly, we do heterogeneity analysis by place of residence. Table 4 present results. The results indicate that the impacts of affirmative action in higher education for treated cohorts are more of an urban phenomena. We find the height for age for children increase by 0.12 standard deviations for people residing in urban area. Mothers do more antenatal visits in Urban areas as compared to rural areas by a magnitude of 0.05% significant at 5%. The coefficient on institutional delivery statistically significant at 1% level indicates that women after getting exposed to the policy utilise different government and non government institutions for delivering child more in urban area as compared to rural areas. We don't find any significant difference in persistence of stunting among rural and urban areas.

5.2 Mechanism

we assume there might be the education channel of mother which is affecting the health outcomes of their children. The affirmative actions were announced for reservation in higher education in government institutions which might have led to increased opportunity for girls to get admissions and continue their education. More educated mothers leads to better health outcomes for children be it their height for age (Thomas et al. (1991)) or infant mortality (Currie and Moretti (2003)) outcomes as previous literature has established. Existing literature has found that mother's education gets transmissioned to human capital of their children. More educated mothers tend to have increased age at marriage (Breierova and Duflo (2004)) and they are likely to get married to high income man and are more concerned for pre natal care (Le and Nguyen (2020)). The main channels thorough which mother's education works is more media usage , more health care literacy . To establish our mechanism we regress women's completed years of education and their media usage to see whether the policy led to an increase in our outcome of interest. We use individual recode file from NFHS-5 for this analysis. All women who were born after 1995 belonging to Other backward class were considered as treated group. We consider this cohort as the exposed group as by the year 2008, they will still be in schooling age and will be able to avail the benefits of reservation in higher education. We estimate the following specification for women i, residing in state s , born in year m:

$$Y_{ism} = \alpha + \beta_1 Obc_i + \gamma Post_m \times Obc_i + X'_{ism}\mathbf{\Gamma} + \theta_s + \phi_m + \kappa_s \times \psi_m + \epsilon_{ism} \qquad (4)$$

Here θ_s controls for vector of state fixed effects. ϕ_m controls for birth year of woman fixed effects. We also include interaction of state and birth year of woman fixed effects denoted by $\kappa_s \times \psi_m$. Our coefficient of interest is the interaction term γ. $Post_m$ dummy takes the value 1 for all women who were born after or in 1995. Table 5 presents results. our coefficient of interest for column completed years of education is 1.15 significant at 1% level. This leads

to the interpretation that the group exposed to the treatment completed 1.15 more years of education as compared to unexposed cohort. We also find a positive and significant impact on media usage of women exposed to the policy .The frequency of reading newspaper and using television increased by 0.05% and 0.03% respectively after the policy for women from Other backward classes. We include rich set of socio-demographic controls such as age of women, their place of residence, source of drinking water in household, type of toilet facility used and wealth index. The results are robust.

6 conclusion

In this paper we study the intergenerational effects of affirmative actions in higher education in India. Using an exogenous nation wide policy announcement which led to an increase in educational attainments of treated cohort of women from OBC caste category, we find that the health conditions of their children improve. They are less stunted and getting more pre natal care. The results are more plausibly driven by mothers getting more educated and aware through media usage. This study adds to literature studying the second order impacts of affirmative actions and long term consequences of it. The purpose of affirmative actions in India was to imporve the socio-economic condition of disadvantaged societies , it was later on extended to serve the purpose in long run. As the results indicate affirmative actions in a particular domain not only affects it directly but has spillovers in other dimensions also.

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7 Tables

Table 1: Affirmative actions and child health outcomes

	Height for age		Stunted	
	1	2	3	4
Treated	-0.237***	-0.118***	0.0642***	0.0338***
	(0.0253)	(0.0188)	(0.00721)	(0.00519)
Post*Treated	0.112***	0.0584*	-0.0308***	-0.0173**
	(0.0343)	(0.0324)	(0.00892)	(0.00835)
Child Birth Year Fixed Effects	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes
Mother Birth Year Fixed Effects	Yes	Yes	Yes	Yes
State*Child Birth Year Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
N	123552	114819	123552	114819
R^2	0.071	0.096	0.050	0.071
Control Mean	-1.02		0.25	

Note: sample comprises children 0-5 yrs of age.stunting is a dummy that takes the value 1 if height for age is less than -2 0 otherwise. ANC denotes antenatal care. It takes the value 1 if the number of antenatal visits is greater than or equal to 4 (as WHO suggests). Institutional delivery is the place where mother delivered the baby. It takes the value 1 if the women deliver the child in any kind of institution whether government, private or any NGO and 0 otherwise. Controls include mother's age, source of drinking water, type of toilet facility and wealth index . Standard errors are clustered at the state-caste level.
* $p < 0.1$, *8 $p < 0.05$, *** $p < 0.01$
Source: Authors' calculations from NFHS-3 & NFHS-5

Table 2: Affirmative actions and child health outcomes

	Antenatal Care		Insti.Delivery	
	1	2	3	4
Treated	-0.0550***	-0.0193***	-0.0527***	-0.0171**
	(0.00870)	(0.00710)	(0.00784)	(0.00723)
Post*Treated	0.0381***	0.0256***	0.0458***	0.0295***
	(0.00974)	(0.00870)	(0.0100)	(0.00872)
Child Birth Year Fixed effects	Yes	Yes	Yes	Yes
state Fixed Effects	Yes	Yes	Yes	Yes
Mother birth year Fixed effects	Yes	Yes	Yes	Yes
State*Child Birth Year Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
N	93857	87144	123334	114617
R^2	0.166	0.192	0.244	0.283
Control Mean	0.64		0.83	

Note: sample comprises children 0-5 yrs of age. Antenatal care is a dummy that takes the value 1 if the number of antenatal visits is greater than or equal to 4 (as WHO suggests). Institutional delivery is the place where mother delivered the child. It takes the value 1 if the women deliver the child in any kind of institution whether government, private or any NGO and 0 otherwise. Controls include mother's age, source of drinking water, type of toilet facility, wealth index . Standard errors are clustered at state-caste level. * $p < 0.1$, *8 $p < 0.05$, *** $p < 0.01$

Source: Authors' calculations from NFHS-3 & NFHS-5

Table 3: Affirmative actions and child health outcomes: Hetereogenity by gender

	HFA	Stunted	ANC	Insti.Delivery
Treatment	-0.0872***	0.0225***	-0.0120	-0.00356
	(0.0315)	(0.00702)	(0.00966)	(0.00685)
Post*Treat*Girl	0.0859	-0.0363**	0.00104	0.0193*
	(0.0671)	(0.0143)	(0.0206)	(0.00989)
Child birth year Fixed effects	Yes	Yes	Yes	Yes
state Fixed Effects	Yes	Yes	Yes	Yes
Mother birth year Fixed effects	Yes	Yes	Yes	Yes
State*Child birth year fixed effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
N	93747	93747	71813	93575
R^2	0.078	0.057	0.163	0.088

Note: sample comprises children 0-5 yrs of age. Height for age z scores and stunting are defined similar to the main table. Antenatal care is a dummy that takes the value 1 if the number of antenatal visits is greater than or equal to 4 (as WHO suggests). Institutional delivery is the place where mother delivered the baby. It takes the value 1 if the women deliver the child in any kind of institution whether government, private or any NGO and 0 otherwise. Controls include mother's age, source of drinking water, type of toilet facility, wealth index . Standard errors are clustered at state-caste level. * $p < 0.1$, *8 $p < 0.05$, *** $p < 0.01$

Source: Authors' calculations from NFHS-3 & NFHS-5

Table 4: Affirmative actions and child health outcomes: Hetereogenity by place of residence

	HFA	Stunted	ANC	Insti.Delivery
Treated	-0.0956***	0.0337***	0.00424	0.00869
	(0.0227)	(0.00638)	(0.00997)	(0.00827)
Post*Treat*Urban	0.126*	-0.0245	0.0535**	0.0599***
	(0.0708)	(0.0230)	(0.0219)	(0.0204)
Child Birth year Fixed effects	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes
Mother Birth Year Fixed Effects	Yes	Yes	Yes	Yes
State*Child Birth Year Fixed Effects	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
N	114819	114819	87144	114617
R^2	0.097	0.071	0.193	0.286

Note :sample comprises children 0-5 yrs of age. Antenatal care is a dummy that takes the value 1 if the number of antenatal visits is greater than or equal to 4 (as WHO suggests). Institutional delivery is the place where mother delivered the baby. It takes the value 1 if the women deliver the child in any kind of institution whether government, private or any NGO and 0 otherwise. Controls include mother's age, source of drinking water, type of toilet facility, wealth index . Standard errors are clustered at state-caste level. * $p < 0.1$, *8 $p < 0.05$, *** $p < 0.01$

Source: Authors' calculations from NFHS-3 & NFHS-5

Table 5: Affirmative actions and women outcomes

	Years Education	Newsapaper	Television
Treated	-1.071***	-0.0516***	-0.0160*
	(0.143)	(0.00873)	(0.00806)
Post*Treat	1.155***	0.0547***	0.0315***
	(0.162)	(0.00812)	(0.00789)
State Fixed Effects	Yes	Yes	Yes
Woman Birth year Fixed Effects	Yes	Yes	Yes
State*Woman birth Year Fixed Effects	Yes	Yes	Yes
Controls	Yes	Yes	Yes
N	257887	258778	258778
R^2	0.393	0.199	0.237
Control Mean	8.8	0.8	0.38

Note: Note: sample comprises all women present in NFHS-5. Years education indicates the completed years of education by women. Newspaper is a dummy that takes value 1 if women frequently read newspaper 0, otherwise. Similarly , Television dummy takes the value 1 if the woman frequently watches television,0 otherwise. Controls include age of the woman, place of residence, source of drinking water, type of toilet facility used in household and wealth index.Standard errors are clustered at the State-Caste level. * $p < 0.1$, *8 $p < 0.05$, *** $p < 0.01$

Source: Authors' calculations NFHS-5