Cast into Castes? Targeting persistent Caste-based inequalities with Affirmative Action

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Abstract

This paper analyzes Affirmative Action in higher education to investigate if making access to college easier can incentivize underprivileged students in the target group to complete high school. In 2006, the central government in India passed the legislation for a 27 percent quota for a disadvantaged caste-group – the Other Backward Classes (OBC) – in all central government funded colleges. Exploiting this policy change using a difference-in-difference framework reveals that the college enrollment rate for the OBC increased by 5.1 percentage points more than the other disadvantaged caste group unaffected by the policy (Scheduled Castes). Moreover, there is a significant differential increase of 4.1 percentage points in high-school completion rate for the OBC as compared to the Scheduled Castes. These impacts are heterogeneous based on sex and place of residence. Dividing the OBC households by education of the household head as proxy for socioeconomic status (SES), I find that the policy impact on college enrollments is larger for OBC students from lower SES strata.

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1 Introduction

Affirmative Action is a class of policy measures aimed at alleviating rigid socioeconomic inequalities created by historical discrimination and marginalization. These imbalances are addressed by providing easier access to certain sectors like higher education, labor markets, civil services, and political ranks. Many countries, including the United States, India, Malaysia, Brazil, and South Africa, have implemented some form of Affirmative Action to correct for a legacy of oppression. Affirmative Action in India is based on castes wherein a fixed quota of seats is reserved for disadvantaged castes[1] in public institutes of higher education, public sector jobs, and elected assemblies. These policies of compensatory discrimination are controversial and highly debated, drawing fervent support as well as criticism, and yet continue to be implemented for the past 70 years. This calls for a closer examination of impacts to investigate whether these policies have been successful in improving social, economic, and educational outcomes for the underprivileged castes. A recently implemented affirmative action policy in India, for a disadvantaged group of castes – Other Backward Classes (OBC), allows me to examine whether the potential increase in access to higher education through affirmative action could improve college enrollment rates, simultaneously creating incentives for students from these underprivileged castes to complete high-school.

In 2006, the central government passed a legislation that provides for a 27 percent quota in admissions for the Other Backward Classes(OBC) in all Central Educational Institutions (CEI), that is all higher education institutes or universities established, maintained, or aided by the central government[2]. This was done to bring high-ranking central universities, and premier colleges of technical and medical education funded by the central government – such as the Indian Institutes of Technology (IITs), All India Institute for Medical Sciences

[1] In India, these policies are locally referred to as "Reservations". Reservations do not imply that beneficiaries are excluded from open competition for non-reserved jobs

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

(AIIMS), and Indian Institutes of Management (IIMs) – under the ambit of affirmative action [3]. I exploit this exogenous policy shock in access to higher education for the Other Backward Classes (OBC) to estimate the change in college enrollment and high school completion rates for students from the OBC as compared to students from the Scheduled Castes (an underprivileged group of castes that are already beneficiaries of affirmative action) and other non-beneficiary caste groups.

A policy that provides easier access to premier institutes of higher education can effect substantial gains in educational outcomes for the targeted group[4]. In India, admission into a government funded (public) college – central or state – guarantees subsidized tuition and a chance at procuring need-based financial aid. An affirmative action policy that allows for preferential admission into a public college (especially a high-ranked premier institute) increases the expected wages in future[5] while reducing the current cost of attending college, thereby motivating more number of students from beneficiary (disadvantaged) groups to enroll in college. Moreover, the increased likelihood of an opportunity to attend a premier public college can incentivize students from these underprivileged groups to complete high school to be eligible for college. This policy could thus have an effect along two margins - a *direct* effect on the targeted group of students entering college, as well as a *spillover* effect on students who plan to go to college in the future. Given the evidence for inter-generational transmission of education, these effects could persist well into the future thereby transforming the society into a more egalitarian one in the long run.

Using a difference-in-difference framework and four rounds of a nationally representative household survey dataset[6], I find that college enrollments for OBC increased by 5.1

[3]This information is drawn from annual rankings of higher education institutes in India published by Indian news-weeklies such as *India Today*, *The Outlook*, and *The Week*. There was no official or formal ranking of higher education institutes in India prior to 2016. The Ministry of Human Resource Development (MHRD) now publishes an Annual ranking (https://www.nirfindia.org/Home)

[4]The low-ranked castes were historically deprived of educational benefits, economic opportunities, and political positions of power, and remained socioeconomically backward.

[5]Azam (2010) finds that in India, the wage premium between tertiary and secondary graduates has been increasing and that the increase is biased toward younger age-groups.

[6]I use four rounds of the Employment-Unemployment Survey of the National Sample Surveys (NSS)

percentage points more than the Scheduled Castes (SC), and high school completion rates increased by 4.1 percentage points more than SC. When both SC and the non-beneficiary group are included in the control group, the differential increase in college enrollment and high-school completion for OBC is smaller but still significant. There is heterogeneity in the policy effects by sex and location of the household (urban or rural) – the largest effect on college enrollment is observed among male students from urban households, whereas the largest effect on high-school completion is observed among female students from urban households. There are different impacts by socioeconomic status (SES) as well[7] – the largest effect of the policy on college enrollments for the OBC is observed in the lowest SES group. *This result challenges the common argument against affirmative action that the benefits are most likely captured by students from high SES households* [8]

This paper is the first to investigate the pan-India impact of the OBC quota implemented in Central Educational Institutions (CEI) on the educational outcomes of the intended beneficiaries. Another significant contribution of this paper is establishing that there are possible *spillovers* from affirmative action in college admissions that simultaneously improve high-school completion for the beneficiary group. It is essential to recognize the possibility of such spillovers (or unintended effects) from affirmative action in a discussion of policies targeting educational attainment of minorities/underprivileged groups.

2 Background and Literature

2.1 *Caste-based hierarchies and Affirmative Action in India*

The Caste system is 'sui generis' of the social structure in India and of Hindus in particular. Castes are endogamous groups associated with a traditional occupation and were ranked by ritual purity which followed from their traditional occupation (De Zwart, 2000). Caste

[7] Education of household head serves as proxy for SES

[8] As of 2012, about 39 percent of students enrolled in college are from households of the lowest SES

identity supersedes individual identity – members of a caste share its rank in the hierarchy irrespective of whether they choose to follow the traditional occupation of their caste. Per ancient Hindu scriptures (Vedas), these different castes are broadly classified into four categories or Varnas, which in order of their rank are as follows: Brahmin (priest and teacher), Kshatriya (ruler and warrior), Vaishya (trader), and Shudra (workers). There was an even lower group of castes considered to be outside of the Varnas and treated as 'untouchables' (referred to as 'dalits'). Members of indigenous tribes (referred to as 'adivasis') were also considered out of the Varna classification and of the lowest status in society. Considered to be impure or less pure, the dalits', 'adivasis', and the low-ranked 'Shudra' castes, were deprived of educational benefits, economic opportunities, and political positions of power. Perpetuated by religious sanctions this oppressive hierarchy persisted for centuries and as a result, members of the low-ranked castes remained socioeconomically disadvantaged.

After independence from the British Rule, political leaders in India acted to implement affirmative action policies in favor of the most disadvantaged social groups, the 'dalits' and 'adivasis'. A list of these groups was drawn and enumerated in two separate schedules of the Constitution of India – Schedule of Castes (Dalits), and Schedule of Tribes (Adivasis) – and the two groups are now referred to as Scheduled Castes (SC) and Scheduled Tribes (ST) respectively. India was the first country to enact legislation for affirmative action in the form of group-based reservation of seats in public colleges, public sector jobs, and later even in elected assemblies, for the Scheduled Castes and the Scheduled Tribes. This was done with the objective of weakening the monopoly of upper castes in higher education, bureaucracy (civil services), political positions of power, and over economic resource.

These constitutionally guaranteed quotas were instituted according to the share of these groups in the population. In all colleges and jobs funded by the Central Government, 7.5 percent of seats are reserved for the ST and 15 percent of seats are reserved for the SC; in colleges and jobs funded by the different State Governments, the percentage of seats

reserved for ST and SC depend on the approximate proportions of these groups in each state [9].

2.2 *Affirmative Action for the Other Backward Categories (OBC)*

The Constitution of India prohibits discrimination against *socially, educationally, and economically backward classes* but there were no affirmative action policies enacted for this group, mainly because at the time of ratifying the Constitution this group had not been clearly identified. Over time, the government set up two exploratory commissions to determine the identity of this group – the Kalelkar Commission in 1953, and the Mandal commission in 1978. Since caste and class are inextricably linked in India, it was no surprise that both commissions recommended caste as the most effectual criteria by which to classify these socioeconomically backward groups. Thus, emerged an administrative classification of low-ranked castes as the Other Backward Classes (OBC), which are separate from the Scheduled Castes (SC) and Scheduled Tribes (ST) and typically lie above the SC and ST in the caste hierarchy. It was not until 1992 that a 27 percent quota was implemented for the OBC in all jobs (but not colleges) funded by the central government. Individual state governments implemented different OBC quotas in state-funded colleges and jobs based on the approximate proportion of this group in each state.

In 2006, the central government announced a plan to extend the 27 percent quota for the OBC to all Central Educational Institutions (CEI), that is all higher education institutes or universities established, maintained, or aided by the central government. This was operationalized through the Central Educational Institutions (Reservation in Admission) Act, 2006. In India, typically higher education institutes under the administration of or funded by the central government are ranked higher than state colleges [10]. These include

[9] This section draws from a reading of various texts on Castes and Affirmative Action in India such as Shah (2004), Dumont (1980), Milner Jr (1994), Thorat and Neuman (2012).

[10] Based on annual rankings published in news-weeklies such as *India Today*, *The Outlook*, and *The Week*.

premier institutes of professional education such as the Indian Institutes of Technology (IITs), Indian Institute of Management (IIMs), and All India Institute for Medical Sciences (AIIMS). The primary objective of this extension was to bring these top-ranked colleges and universities in the country under the umbrella of affirmative action for the OBC. The country witnessed a wave of protests and demonstrations against this policy extension and a Public Interest Litigation was filed with the Supreme Court of India, which then stayed the implementation of the OBC quota in response. Finally, in April 2008, the Supreme Court upheld the 27 per cent quota for the OBC in colleges funded by the Central Government, but maintained that the "creamy" layer be excluded from such preferential admission policies [11]. Further, as per the provisions of the Central Educational Institutions (Reservation in Admission) Act, 2006, all CEIs had to increase the number of seats such that the total number of seats available to candidates from the non-beneficiary groups remained the same even after implementing the OBC quota.

2.3 *Literature Review*

There is a substantial literature around the efficacy of affirmative action policy in India, primarily focused on the reservations for the Scheduled Castes (SC) and Scheduled Tribes (ST). OBC quota is a relatively new policy and there exist fewer studies on its impact on educational and labor market outcomes. Bagde et al. (2016) examine the impact of the recent OBC quota in higher education using administrative data from 200 engineering colleges and find that the quota increases college attendance for OBC students, especially in higher quality institutions. Deshpande and Ramachandran (2015), using a difference-in-difference strategy, find that the OBC quota implemented in 1992 in public sector jobs increased the percentage of OBCs obtaining public sector jobs and finishing secondary

[11] At present, the 27 per cent OBC quota can be availed only by those whose annual family income is up to Rs 6 lakh. Those earning more are classified as the 'creamy layer and are not eligible for affirmative action.

education by 2.6 and 4 percentage points, respectively. Weisskopf (2004) finds that reservation policies at all levels of higher education both redistribute SC/ST students upward in the university quality hierarchy and attract into universities significant numbers of SC/ST students who would not otherwise pursue higher education. Frisancho and Krishna (2016) find evidence from an elite engineering college that reservation policies effectively target SC/ST students who are poorer than average displaced non-beneficiary students. Bertrand et al. (2010) examine the affirmative action in engineering colleges in one Indian state for "lower-caste" groups (SC, ST, OBC) and find that it successfully targets the financially disadvantaged: the marginal upper-caste applicant comes from a more advantaged background than the marginal lower-caste applicant who displaces him.

There is ample evidence even in the case of U.S. that affirmative action helps improve minority enrollments in colleges, especially in the higher quality schools. Epple et al. (2008) examine the consequences of affirmative action on college admissions and tuition policies in a general equilibrium framework and find that minority students pay lower tuition and attend higher-quality schools. They also show that repealing affirmative action will lead to a substantial decline of minority students in the top-tier colleges, a result supported empirically by Arcidiacono (2005). In the case of US, there is a unique opportunity to examine the effects of removing affirmative action – Long (2004) finds that after the elimination of affirmative action in California and Texas, the gap between number of SAT score reports sent by non-minority and minority students to in-state public colleges significantly widened; on the other hand Card and Krueger (2005) find no change in the SAT-sending behavior of highly qualified black or Hispanic students in either state. Hinrichs (2012) shows that the ban on affirmative action decreased underrepresented minority enrollment at selective colleges, and shifted underrepresented minority students from more selective campuses to less selective ones at the University of California (Howell (2010) finds a similar result). Domina (2007) presents evidence on how diversity programs enacted in Texas, after affirmative action was banned, were successful

in improving educational outcomes at the high school level.

There are also numerous studies that focus on the "mismatch hypothesis", the argument that affirmative action places academically unprepared students into competitive schools without the required skills and abilities. In the case of India, Bertrand et al. (2010) and Frisancho and Krishna (2016) find evidence in favor of the mismatch hypothesis, whereas Bagde et al. (2016) do not find evidence of such adverse impacts. In the U.S. context, Fischer and Massey (2007) and Rothstein and Yoon (2008) find limited or no evidence of mismatch, whereas Arcidiacono et al. (2011) show that laws banning the use of racial preferences in California public colleges lead to better match quality and higher graduation rates. There is thus a lack of consensus on the validity of the argument against affirmative action on grounds of creating a "mismatch".

My contribution to literature is in that I use national level household data to evaluate the effects of affirmative action for OBC in higher education, a policy announced in 2006 and implemented in 2008, on the educational outcomes of OBC students. Another distinct contribution is to examine spillover effects of affirmative action in college admissions on high-school completion (an anticipatory behavioral response on the part of prospective college students).

3 Estimation

3.1 Data

The National Sample Survey Organization under the Ministry of statistics Planning and Implementation carries out a set of nationally representative household surveys – annual surveys using a thin sample of households, and quinquennial surveys or thick rounds using a larger sample and more detailed questionnaires. The quinquennial Employment-Unemployment survey of the NSS contains information on household demographics,

extensive information on employment and wages, and some information on consumption and expenditure.

I use four thick rounds of the Employment-Unemployment Survey for the empirical analysis – the 55th round (1999-2000), the 61st round (2004-05), the 66th round (2009-10) and the 68th round (2011-12). These surveys are carried out over a period of 10 to 11 months (for example, the 55th round was conducted during June 1999 to July 2000). Table 1 gives the sample sizes for the different rounds (the number of households and individuals). The number of Hindu households is also listed which gives an idea of how large the Hindu community is in terms of share in population (since the sample is representative of the population).

The policy being evaluated was announced in May 2006 and implemented in April 2008. I have used two rounds from before the policy was announced, and two rounds from after the implementation.

3.2 Descriptive Statistics

Table 2 presents the share of different social groups in a representative sample [12] These proportions are largely stable over time suggesting limited mobility between these groups. OBC are the largest social group in sample and ST are the smallest, which is true of their population shares as well.

There is a clear hierarchy in socioeconomic status (SES) between the different social groups - on every indicator of SES used in this paper, Others (non-beneficiaries of affirmative action[13]) rank the highest and the SC/ST rank the lowest. Figure 1 shows the education

[12] I have restricted the sample to only Hindu households since the Caste system is native to Hinduism. Those among other religions listed as belonging to lower castes are so identified mainly because at some point in the past they (or their ancestors) converted to a different religion yet held on to their caste identity. It is much more difficult to disentangle religion and caste as separate indicators of socioeconomic backwardness.

[13] In the administrative classification of caste groups, the non-reserved category is called the "General" category. In the dataset I use, this group is referred to as "Others"

of the household head for the different categories and the persistent difference in levels by social groups is clearly observable. The same can be said for Monthly Per Capita Expenditure of households (Figure 2). The percentage of households in the sample who reside in urban areas is the lowest among the ST and highest for Others (Figure 3). It is worth noting that the trends in SES over time for the different social groups are parallel, suggesting little or no convergence between the groups.

3.3 Empirical Strategy

I use a difference-in-difference framework to estimate the effect of the policy on the targeted group. This strategy exploits two sources of variation: (i) whether the individual belongs to the OBC group; and (ii) whether the individual is observed before or after the policy was implemented. As discussed above, the quota of seats for OBC is at 27 per cent since 2008 which has reduced the share of seats available for Others (non-beneficiaries) without changing the share of seats for the SC/ST. However, as per the directives of the central government, institutes have been scaling up their infrastructure to increase total number of seats to not adversely affect students from non-beneficiary groups. Hence this policy should only differentially impact the OBC while the SC and Others category remain unaffected.[14].

The Estimating equation is as follows:

$$Y_{it} = \beta_1 + \beta_2 post_{it} + \beta_3 OBC_{it} + \beta_4 post_{it} OBC_{it} + \beta_5 X_{it} + s + \mu_i t$$

Y_{it} is a binary indicator variable for individual 'i' at time 't', based on the outcome being considered. Individuals are restricted to the relevant age group [15] in each of the

[14]I have dropped the Scheduled Tribes (ST) from the comparison since they do not show parallel trends in educational outcomes and have much more variation in the outcomes. However they do follow the caste hierarchy and, on an average, have the lowest level of educational attainment, consumption expenditure, and urban residence.

[15]These are based on the typical age when individuals attend college and high-school in India

above two cases – 17 to 22 year olds for college outcomes, and 17 to 19 year olds for high school outcomes.[16] 'post' is a dummy variable that takes the value one if the observation is after the policy change, that is after 2008; 'OBC' is the dummy for caste, and takes the value one if the household belongs to OBC, 0 otherwise; X_{it} is the vector of individual and household characteristics which includes the monthly per capita expenditure, years of schooling of household head, an urban dummy, and a female dummy; s are state-fixed effects; and μ_{it} is the error term clustered at the State level.

In an Ordinary Least Squares (OLS) estimation, β_4 is the coefficient of interest which shows the differential change in college enrollments/high-school completion rates for the OBC as compared to the change for the control group (SC, or SC and Others). In a subsequent analysis, I divide the sample into different sub-groups by place of residence (rural or urban) and sex and estimate a separate β_4 for each group.

The OBC are the largest social group in terms of share in population with a wide variation in the socioeconomic status of households belonging to this category (Somanathan, 2006). As was observed earlier in Figures 1 and 2, on the SES spectrum OBC lie below the Others and above the SC. It is then reasonable to expect that if the OBC group was split into subgroups based on SES, the policy impacts could be different for the different subgroups. To operationalize this idea, I use *education level of the household head* as proxy for socioeconomic status (SES) and split the sample into three parts based on whether household head has primary, secondary, or tertiary education. The difference-in-difference analysis is repeated for each of these three groups with SC and Others as both separate and combined control.

[16] I have done the analysis with slight variations in the relevant age group. The results are robust to these small changes

4 Results

4.1 College Enrollment

Figure 4 shows the average college enrollment rates over time for the three social groups - SC, OBC, and Others. The trends are quite parallel (especially for the SC and OBC) and after implementation of the policy the trend for OBC shifts upward. Table 3 presents the difference-in-difference estimates for college enrollments using SC and Others as control groups, both separately and together. With SC as control, the increase in college enrollment rate for the OBC is 5.1 percentage points more than the increase for SC, over a baseline mean college enrollment rate of 9.6 per cent [17]. This translates into a differential increase of about 53 per cent for the OBC . With only Others as control, there is no significant impact on college enrollment. When SC and Others are both used as control, there is an increase in college enrollments for the OBC of 1.8 percentage points more than the increase for SC and Others. Over a baseline mean of 9.6 per cent, this translates into a differential increase of about 19 per cent for the OBC.

There are heterogeneous policy impacts by location of household–rural or urban–and sex. As shown in Figure 5 for college enrollments, it appears that the largest gains are made by the group of male OBC students from urban households. Table 4 presents the OLS estimates for these heterogeneous impacts on college enrollments. There is a ***significant impact only for urban males and urban females***. The increase in college enrollment rate for male OBC students from urban households is 5.1 percentage points more than the increase for male students from SC and Others (a differential increase of about 25 per cent given a baseline mean of 20.2 per cent); the increase in college enrollment rate for female OBC students from urban households is 4.8 percentage points more than female students from SC and Others (a differential increase of about 27 per cent).

[17] The college enrollment rate for the OBC in 2005 was 9.6 per cent

Figure 6 shows the trends in college enrollments for the different groups divided by the education level of household head. It is striking to note that the differential increase in college enrollments is quite significant in the primary and secondary education groups. This implies that students from households that do not have a history of higher education made the most gains from affirmative action. Table 5 gives the difference-in-difference estimates when the sample if restricted to urban households where the head has at most completed the primary level of education [18]. The impact is largest when the control group is SC – the increase in college enrollments for OBC is 6.9 percentage points more that for SC. The estimate when Others is the control group is smaller and less precise, but still significant at the 10 per cent level. This isn't unexpected since there are fewer households from the non-beneficiary groups (Others) that have a head who has only completed up to primary education. [19]. Table 6 gives estimates for the sample of urban households where the head has more than primary and up to secondary education. Here the impact is larger when Others is the control group rather than SC. Combining SC and Others into one control group increases the precision of the estimates.

Table 7 presents the difference-in-difference estimate when the sample consists of urban households where the head has tertiary education. What is interesting to note here is that there are no significant effects at all with either of the control groups. This implies that ***the observed differential increase in college enrollments for OBC students was largely concentrated among lower SES households.***

4.2 High School Completion

Figure 7 shows the average high-school completion rates over time for the three social groups. Similar to the case for college enrollments, it can be seen that post 2008 (after

[18] I restrict the results presented here to urban households since in the previous results it was shown that the effects are significant only for individuals from urban households. I have carried out the same analysis without restricting the sample to urban households and the pattern of results remain the same

[19] Comparing the number of observations in columns 1 and 2 in Table 5 makes this apparent

policy was implemented) the trend in high-school completion for the OBC shifts upward, away from the parallel trend for the Sc and closer to the trend for Others. Table 8 presents the difference-in-difference estimates for high-school completion. With SC as control, the increase in high-school completion rate for the OBC is 4.1 percentage points more than the increase for SC, over a baseline mean high-school completion rate of 12.5 per cent (an differential increase of about 33 per cent) . As was the case for college enrollments, using only Others as control I find no significant effect. When SC and Others are both used as control, the increase in high-school completion rate for the OBC is 2.6 percentage points more than the increase for SC and Others (a differential increase of about 21 per cent).

Figure 8 shows the heterogeneous impacts for high-school completion by location of household and sex. Similar to college enrollments, the gains appear to be realized only in urban areas. However, in this case ***the largest gains are made by the group of urban female OBC students***. Table 9 presents the heterogeneous impacts on high-school completion. There are no significant effects in rural areas for either male or female students. The increase in high-school completion rate for male OBC students in urban areas is 6 percentage points more than the increase for male students from SC and Others (a differential increase of about 30 per cent given a baseline mean of 20.1 per cent); the increase in high-school completion for female OBC students in urban areas is 8.1 percentage points [20] more than female students from SC and Others (a differential increase of about 33 per cent).

Figure 9 shows the trends in high-school completion for the different groups divided by the education level of household head. Unlike the case for college enrollments, it appears that differential increase (especially when comparing OBC to Others) accrues more to the secondary and tertiary education groups. Table 10 lists the difference-in-difference estimates when the sample if restricted to urban households where the head has at most completed the primary level of education. The impact is significant when the control group

[20] This is the largest impact among any of the sub-groups considered

is SC but insignificant when control group is Others. Table 11 gives the results for the sample of urban households where the head has more than primary and up to secondary education. In this case there are no significant effects irrespective of which control group is used.

When the sample consists of urban households where the head has tertiary education (Table 12), the impact is large and significant when Others is included in the control group (by itself or together with SC). This implies that in higher SES groups, there is no significant differential impact on high-school completion rates for the OBC as compared to SC, but there is significant differential increase for the OBC when compared to Others. Unlike the case for college enrollments, in high-school completion the higher SES groups have larger gains from the policy.

4.3 Robustness Checks

As a check for robustness, I carry out three placebo tests: shift the policy timing to before 2005 when there should be no differential impacts: shift policy timing to after 2010 when the differential impacts should again be much smaller or insignificant; and thirdly restrict the sample to an older age-group (25-30 year olds) which should not be affected by the policy.

Tables 13 and 14 present the results of these Robustness checks for College Enrollments and High-School Completion respectively. As is expected, there are no significant effects in any of the three cases [21]. These results make the case stronger for there being positive and significant impacts of extending the OBC quota in higher education institutes funded by the central government.

[21] There is some differential increase in College enrollments for the OBC after 2010 but this is most likely continued gains attributable to the policy

5 Discussion

As the results above show, OBC students made significant differential gains in college enrollment and high-school completion after the 27 per cent OBC quota was implemented in colleges funded by the central government. There were no other caste-based policies being implemented at the same time, which implies that these differential changes can only be attributed to the policy of interest.

The policy impacts being significant only for urban households is not unexpected since these households are favorably placed to take advantage of increased access to higher education – most colleges (especially the premier institutes) are located in urban areas; and schools in urban are of much higher quality, in terms of infrastructure and teachers. There is established evidence of gender differences in returns to schooling (Duraisamy, 2002; Gandhi Kingdon, 2002), yet female students from urban OBC households made similar differential improvements as male students, in college enrollment as well as high-school completion. A possible explanation could be that since a college education is expected to increase white-collar employment opportunities that draw more women to the labor force, easier access to college can incentivize more women to aspire to these opportunities leading to higher levels of human capital accumulation (similar to the pathway outlined in Jensen (2012)).

The most interesting revelation is the different effects for the different SES groups. A common criticism of affirmative action is that it only benefits students from higher SES strata. For the affirmative action policy being considered in this paper, OBC students from households with the lowest SES make the highest gains in college enrollment rates. This speaks to the effective targeting achieved under this policy and makes the case for affirmative action in higher education stronger. However, a similar result is not observed in case of high-school completion rates – OBC students from both low and high SES groups make significant gains.

This policy was only implemented in colleges controlled and/or funded by the central government. Each state already had its own OBC quota, determined by the proportion of OBC in that State and implemented in state-funded colleges, and these were not changed in response to the OBC quota announced by the central government[22]. I posit that this policy affected both central as well as state colleges. A reasonable explanation is that the OBC students who are able (in terms of educational background, skill, or ability) and willing to compete for seats in premier institutes are freeing up more seats in state and local colleges for other OBC students who are either not able or not willing to compete for admission in premier colleges.

6 Conclusion

The purpose of affirmative action in India was to enable inclusive development and eventually move toward a caste-less society. The constitutional provisions for positive discrimination was initially meant to continue for a period of ten years. This has been extended up to the present day through constitutional amendments. Yet, as observed in the previous sections, there has not been a significant convergence (on average) in socioeconomic outcomes for the different caste groups. However, the OBC quota implemented in 2008 seems to have had the intended effect of increasing college enrollments among OBC students relative to students from both other beneficiary group (SC) and non-beneficiary group (Others). This affirmative action policy also had a significant *spillover* effect on high-school completion rates for the OBC.

The legislation to extend reservations in central government colleges to OBC was meet with widespread protests and demonstrations. The objection to an OBC quota was based on the argument that it undermines merit as the basis for admissions and displaces deserving candidates from non-beneficiary groups. I have shown in this paper that not

[22]except for Delhi, Rajasthan, who increased state OBC quota.

only did this policy have a significant effect on the targeted group (OBC), it was also most effective among households of lower socioeconomic status. It enabled students from households without a history of higher education to realize the opportunity of a college education. Moreover, it motivated more students to complete high-school that not only gives them a chance to compete for college admissions but also makes the wage premium for having completed high-school accessible.

This policy can potentially affect labor market returns for the OBC, more so in the high skilled labor market. With the given data (last round is of 2012), it is too early to observe changes in labor market outcomes. A future extension of this paper will definitely be focused on examining whether affirmative action in higher education can impact labor market outcomes for the targeted beneficiaries, and if there are any unintended effects on non-beneficiary groups.

References

Arcidiacono, P. (2005). Affirmative action in higher education: How do admission and financial aid rules affect future earnings? *Econometrica 73*(5), 1477–1524.

Arcidiacono, P., E. M. Aucejo, H. Fang, and K. I. Spenner (2011). Does affirmative action lead to mismatch? a new test and evidence. *Quantitative Economics 2*(3), 303–333.

Azam, M. (2010). India's increasing skill premium: role of demand and supply. *The BE Journal of Economic Analysis & Policy 10*(1).

Bagde, S., D. Epple, and L. Taylor (2016). Does affirmative action work? caste, gender, college quality, and academic success in india. *American Economic Review 106*(6), 1495–1521.

Bertrand, M., R. Hanna, and S. Mullainathan (2010). Affirmative action in education: Evidence from engineering college admissions in india. *Journal of Public Economics 94*(1), 16–29.

Card, D. and A. B. Krueger (2005). Would the elimination of affirmative action affect highly qualified minority applicants? evidence from california and texas. *Industrial & Labor Relations Review 58*(3), 416–434.

De Zwart, F. (2000). The logic of affirmative action: Caste, class and quotas in india. *Acta Sociologica 43*(3), 235–249.

Deshpande, A. and R. Ramachandran (2015). Affirmative action, political representation and caste disadvantage: Mapping changes in post-mandal india.

Domina, T. (2007). Higher education policy as secondary school reform: Texas public high schools after hopwood. *Educational Evaluation and Policy Analysis 29*(3), 200–217.

Dumont, L. (1980). *Homo hierarchicus: The caste system and its implications*. University of Chicago Press.

Duraisamy, P. (2002). Changes in returns to education in india, 1983–94: by gender, age-cohort and location. *Economics of Education Review 21*(6), 609–622.

Epple, D., R. Romano, and H. Sieg (2008). Diversity and affirmative action in higher education. *Journal of Public Economic Theory 10*(4), 475–501.

Fischer, M. J. and D. S. Massey (2007). The effects of affirmative action in higher education. *Social Science Research 36*(2), 531–549.

Frisancho, V. and K. Krishna (2016). Affirmative action in higher education in india: targeting, catch up, and mismatch. *Higher Education 71*(5), 611–649.

Gandhi Kingdon, G. (2002). The gender gap in educational attainment in india: How much can be explained? *Journal of Development Studies 39*(2), 25–53.

Hinrichs, P. (2012). The effects of affirmative action bans on college enrollment, educational attainment, and the demographic composition of universities. *Review of Economics and Statistics 94*(3), 712–722.

Howell, J. S. (2010). Assessing the impact of eliminating affirmative action in higher education. *Journal of Labor Economics 28*(1), 113–166.

Jensen, R. (2012). Do labor market opportunities affect young women's work and family decisions? experimental evidence from india. *The Quarterly Journal of Economics*, qjs002.

Long, M. C. (2004). College applications and the effect of affirmative action. *Journal of Econometrics 121*(1), 319–342.

Milner Jr, M. (1994). *Status and sacredness: A general theory of status relations and an analysis of Indian culture*. Oxford University Press.

Rothstein, J. and A. H. Yoon (2008). Affirmative action in law school admissions: What do racial preferences do? Technical report, National Bureau of Economic Research.

Shah, G. (2004). *Caste and democratic politics in India*. Orient Blackswan.

Somanathan, R. (2006). Assumptions and arithmetic of caste-based reservations. *Economic and Political Weekly*, 2436–2438.

Thorat, S. and K. S. Neuman (2012). *Blocked by caste: economic discrimination in modern India*. Oxford University Press.

Weisskopf, T. E. (2004). *Affirmative action in the United States and India: A comparative perspective*. Routledge.

Tables and Figures

Table 1: Sample Sizes

	1999-2000	2004-05	2009-10	2011-12
No. of Households	120216	124586	100957	101721
No. of Individuals	594774	602814	459784	456999
Hindu Households	93542	95021	76949	77034

Table 2: Share of each Social Group in Sample

	2000	2005	2010	2012
ST	0.0944	0.0891	0.0916	0.0925
SC	0.218	0.223	0.223	0.218
OBC	0.383	0.430	0.430	0.443
Others	0.304	0.258	0.255	0.247

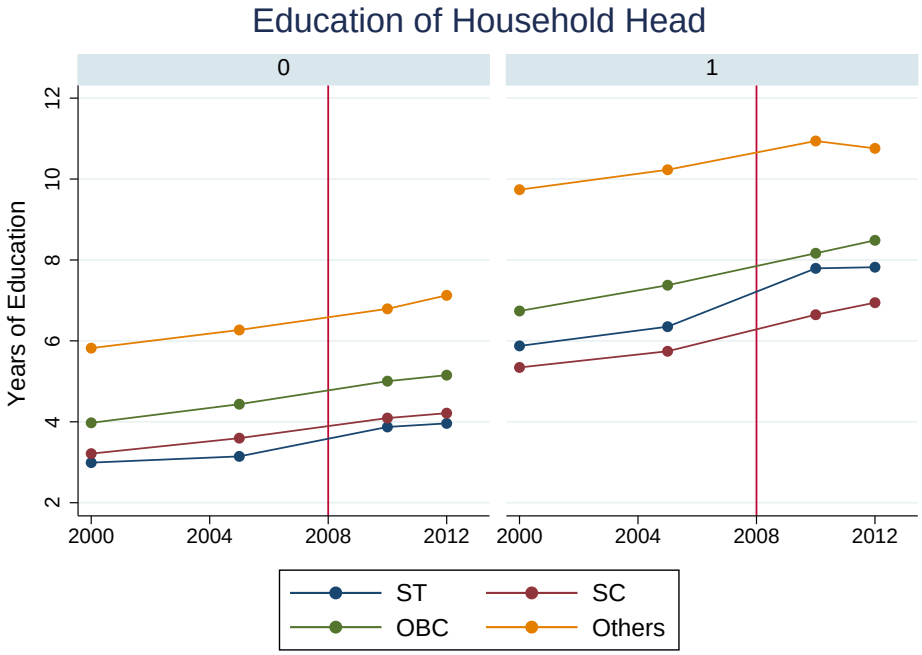

Figure 1: Education of Household Head

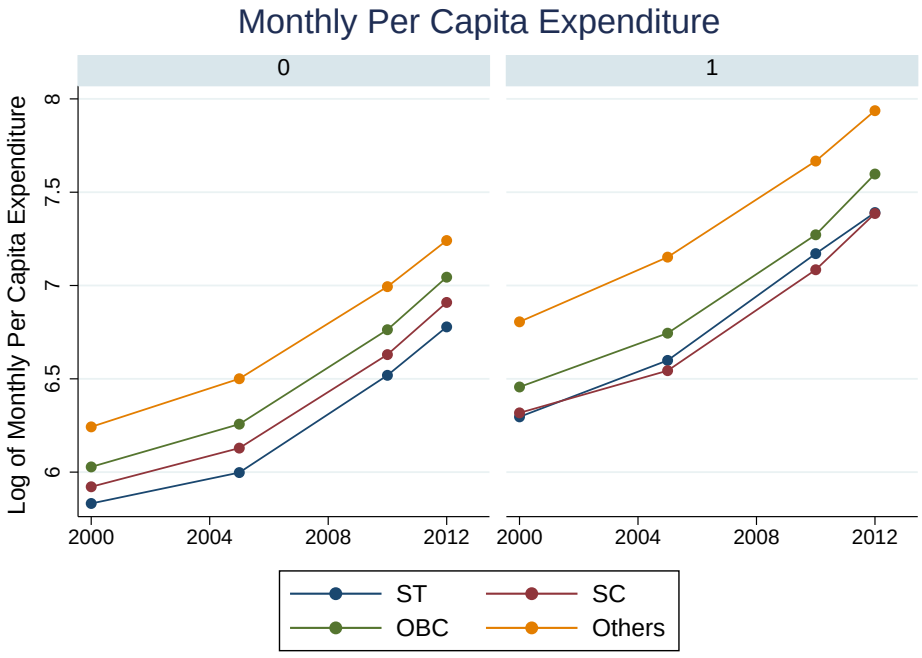

Figure 2: Monthly Per Capita Expenditure

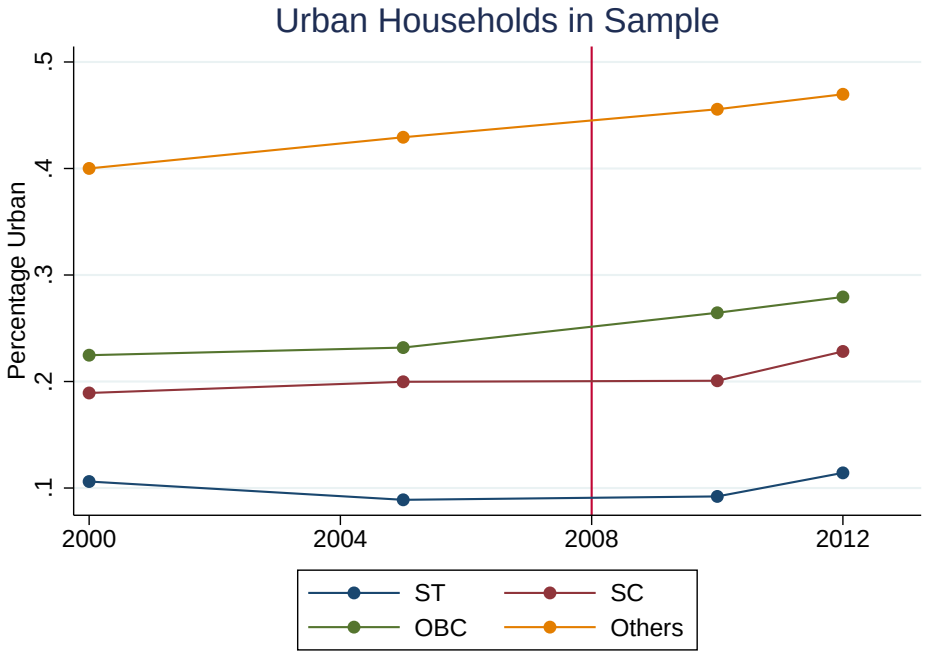

Figure 3: Percentage of Urban Households in Sample

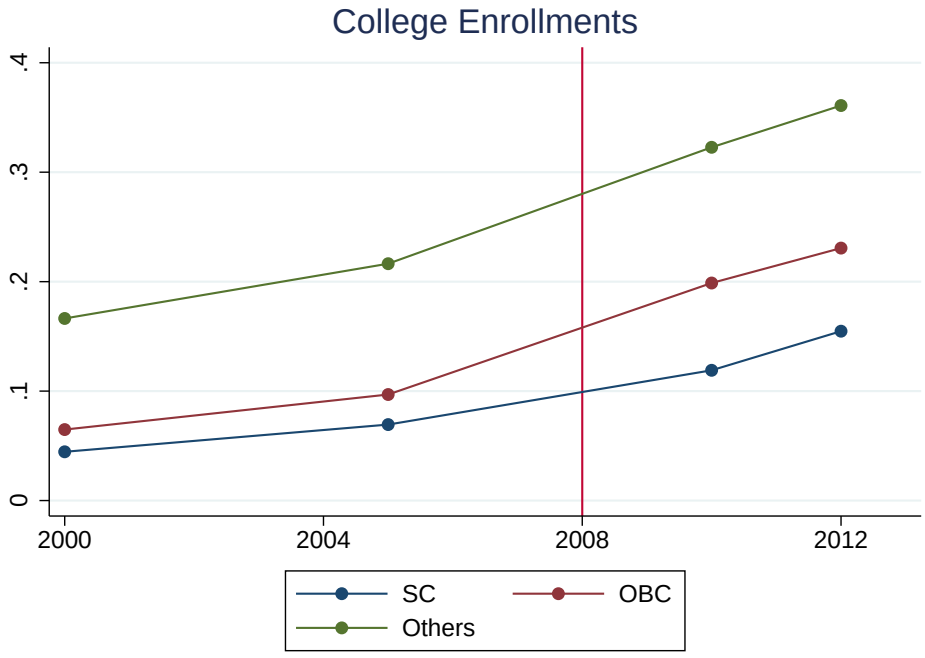

Figure 4: College Enrollment Rates: Before and After Policy

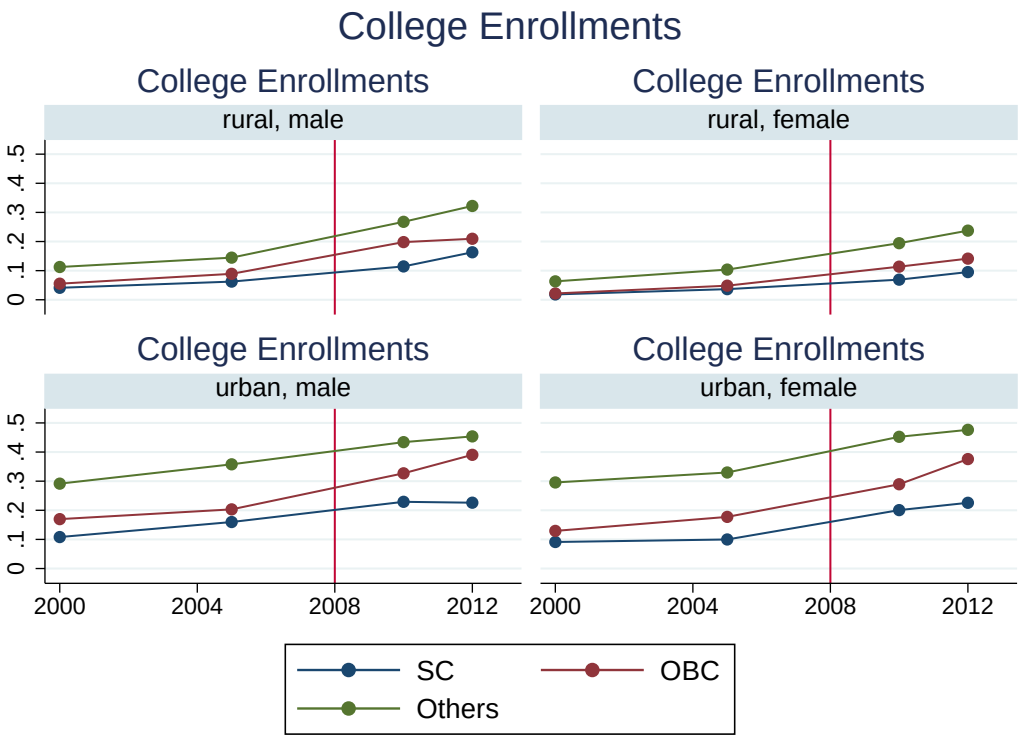

Figure 5: College Enrollment by place of residence and sex

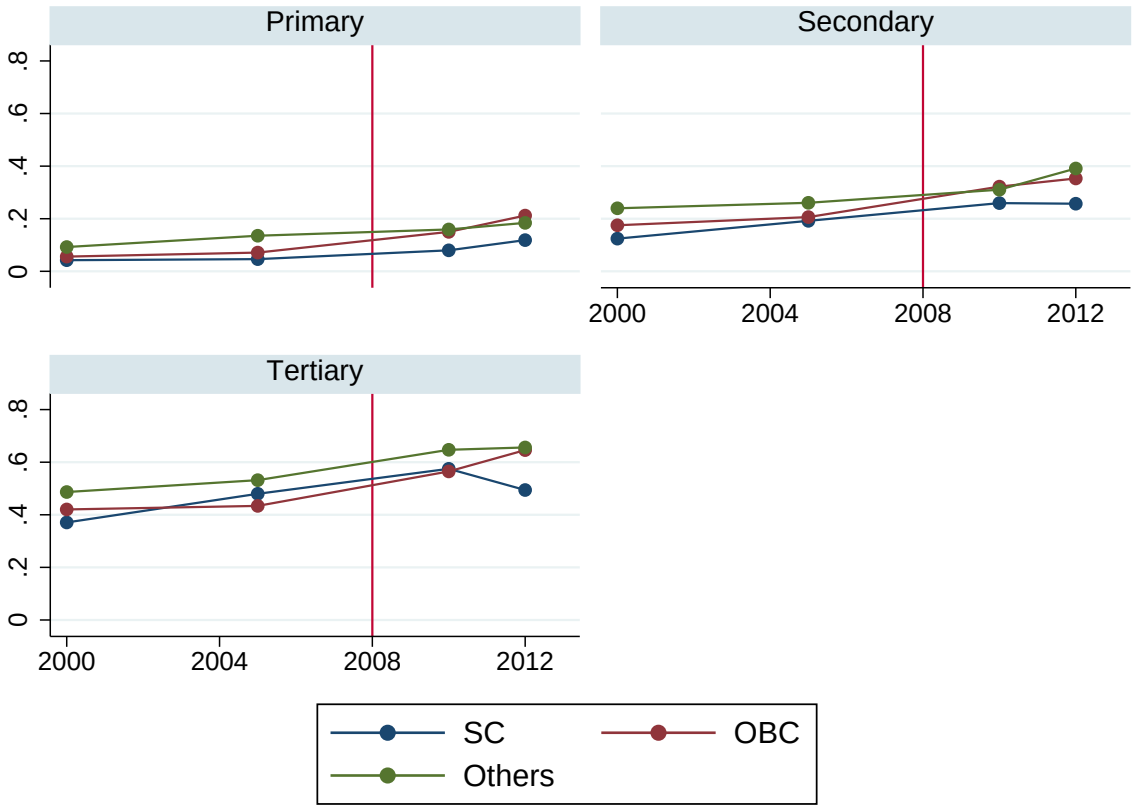

Figure 6: College Enrollment by Education level of Household Head (Urban)

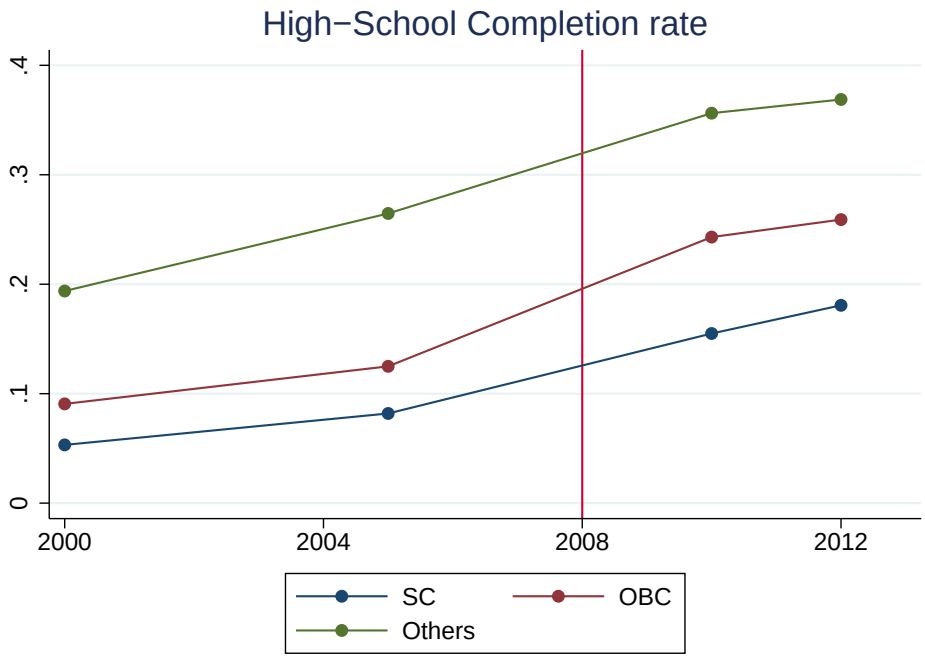

Figure 7: High-School Completion: Before and After Policy

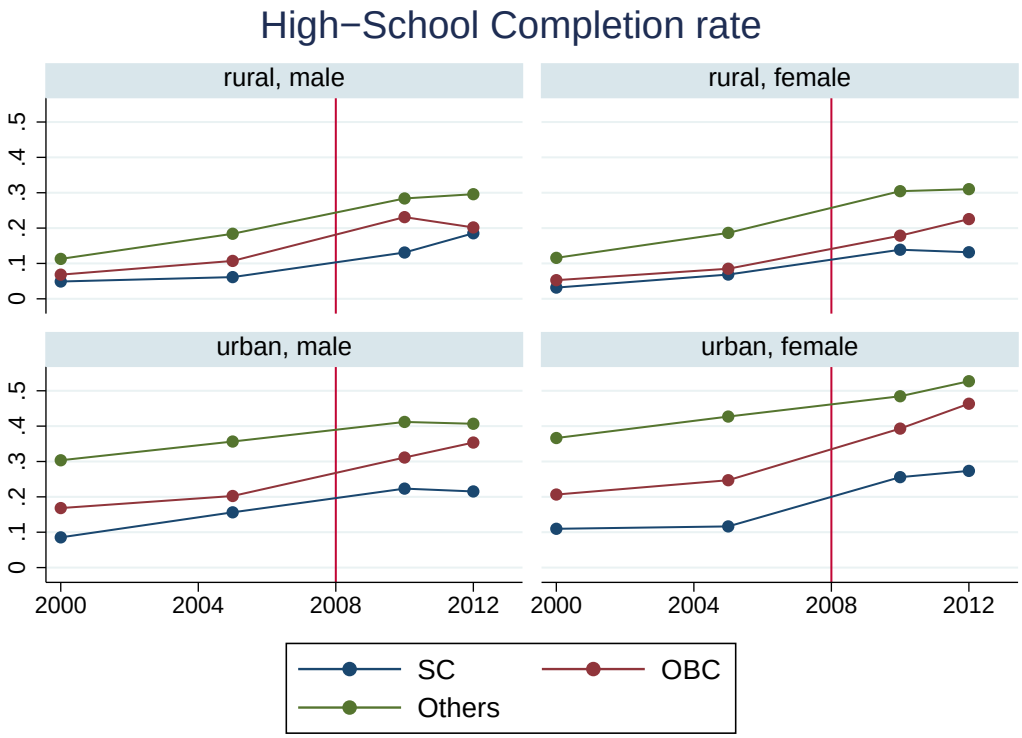

Figure 8: High-School Completion by place of residence and sex

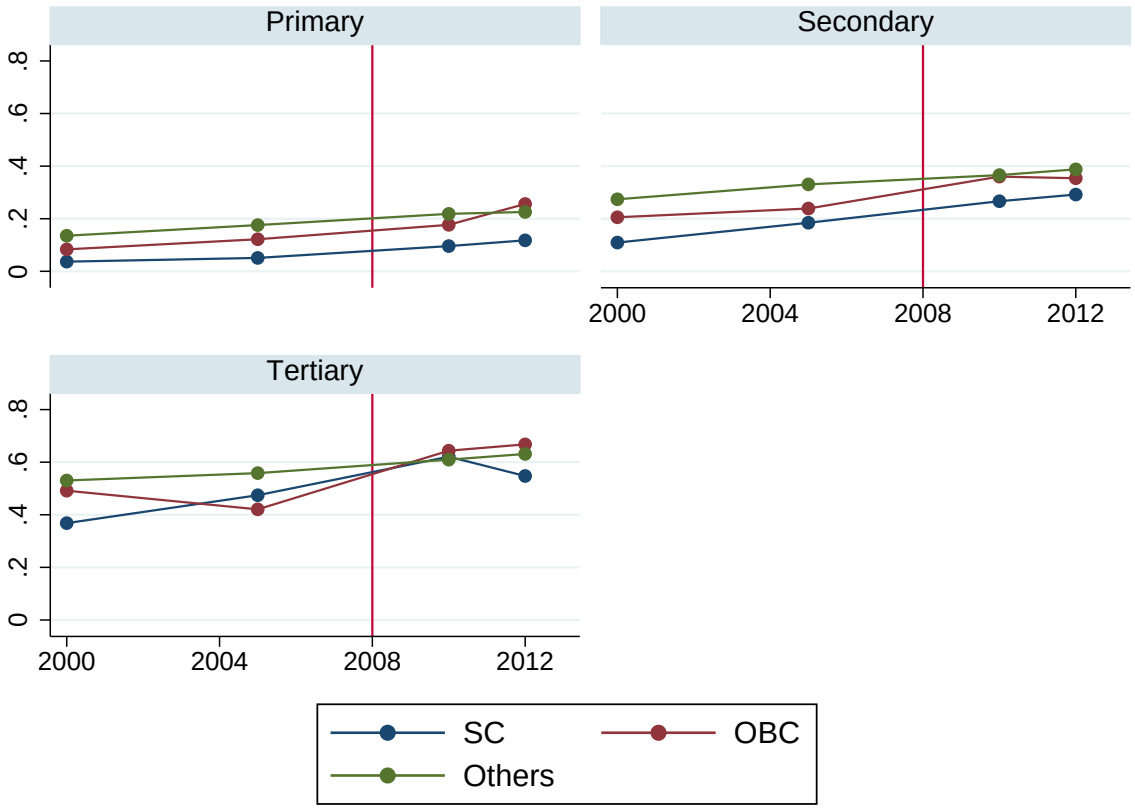

Figure 9: High-School Completion by Education level of Household Head (Urban)

Table 3: Impact on college enrollment rates by different excluded groups

	(1)	(2)	(3)
VARIABLES	SC	Others	SC/Others
post	0.016	0.081***	0.051*
	(0.018)	(0.029)	(0.028)
OBC	-0.006*	-0.038***	-0.026***
	(0.004)	(0.009)	(0.004)
postxOBC	0.051***	-0.013	0.018*
	(0.008)	(0.013)	(0.010)
hhedu	0.015***	0.020***	0.020***
	(0.001)	(0.002)	(0.002)
urban	0.042***	0.070***	0.064***
	(0.008)	(0.014)	(0.013)
female	-0.040***	-0.043***	-0.041***
	(0.006)	(0.006)	(0.006)
logmpce	0.072***	0.067*	0.064*
	(0.025)	(0.037)	(0.036)
Observations	106,496	127,070	162,131
R-squared	0.231	0.317	0.292
State FE	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Mean	0.0967	0.0967	0.0967

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Sample restricted to individuals aged 17 to 22 years

Standard errors are clustered at State level

Table 4: Impact on College Enrollment by place of residence and sex

	(1)	(2)	(3)	(4)
VARIABLES	Rural Male	Rural Female	Urban Male	Urban Female
post	0.071**	0.064***	0.027	0.015
	(0.033)	(0.016)	(0.034)	(0.033)
OBC	-0.015**	-0.013***	-0.041***	-0.061***
	(0.007)	(0.004)	(0.009)	(0.013)
postxOBC	0.018	0.002	0.051**	0.048***
	(0.019)	(0.013)	(0.021)	(0.013)
hhedu	0.017***	0.010***	0.030***	0.026***
	(0.001)	(0.001)	(0.002)	(0.002)
logmpce	0.049	0.035*	0.085*	0.115***
	(0.035)	(0.020)	(0.043)	(0.041)
Observations	51,740	48,190	33,433	28,768
R-squared	0.208	0.158	0.416	0.415
State FE	Yes	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes	Yes
Mean	0.0891	0.0484	0.202	0.177

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

SC and Others used as Control

Sample restricted to individuals aged 17 to 22 years

Standard errors are clustered at State level

Table 5: College Enrollment when Household Head has Primary Education

	(1)	(2)	(3)
VARIABLES	SC	Others	SC/Others
post	0.012	0.011	0.008
	(0.016)	(0.032)	(0.025)
OBC	-0.006	-0.048***	-0.024***
	(0.007)	(0.013)	(0.007)
postxOBC	0.069***	0.051*	0.061***
	(0.017)	(0.026)	(0.019)
female	-0.015	-0.010	-0.013
	(0.009)	(0.012)	(0.009)
logmpce	0.055**	0.078***	0.068**
	(0.022)	(0.025)	(0.026)
Observations	18,099	17,638	24,823
R-squared	0.135	0.158	0.137
State FE	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Mean	0.0708	0.0708	0.0708

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Sample restricted to ages 17-22 yrs and Urban HHs

Standard errors are clustered at State level

Table 6: College Enrollment when Household Head has Secondary Education

	(1)	(2)	(3)
VARIABLES	SC	Others	SC/Others
post	0.015	0.025	0.015
	(0.029)	(0.028)	(0.028)
OBC	0.018	-0.077***	-0.052***
	(0.016)	(0.020)	(0.015)
postxOBC	0.049*	0.051*	0.058**
	(0.027)	(0.025)	(0.022)
female	-0.019	-0.005	-0.009
	(0.025)	(0.017)	(0.017)
logmpce	0.118***	0.099***	0.102***
	(0.034)	(0.033)	(0.036)
Observations	10,936	17,156	20,191
R-squared	0.274	0.300	0.288
State FE	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Mean	0.206	0.206	0.206

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Sample restricted to ages 17-22 yrs and Urban HHs

Standard errors are clustered at State level

Table 7: College Enrollment when Household Head has Tertiary Education

	(1)	(2)	(3)
VARIABLES	SC	Others	SC/Others
post	-0.033	0.018	0.006
	(0.043)	(0.037)	(0.035)
OBC	0.007	-0.074***	-0.063***
	(0.036)	(0.015)	(0.015)
postxOBC	0.029	0.034	0.039
	(0.043)	(0.025)	(0.023)
female	-0.080***	-0.040**	-0.034*
	(0.026)	(0.016)	(0.018)
logmpce	0.193***	0.139***	0.148***
	(0.022)	(0.033)	(0.034)
Observations	6,591	15,680	17,205
R-squared	0.555	0.586	0.579
State FE	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Mean	0.433	0.433	0.433

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Sample restricted to ages 17-22 yrs and Urban HHs

Standard errors are clustered at State level

Table 8: Impact on High-School completion rates by different excluded groups

	(1)	(2)	(3)
VARIABLES	SC	Others	SC/Others
post	0.050**	0.098***	0.075***
	(0.019)	(0.028)	(0.027)
OBC	0.010**	-0.055***	-0.026***
	(0.005)	(0.010)	(0.005)
postxOBC	0.041***	0.007	0.026*
	(0.009)	(0.022)	(0.014)
hhedu	0.017***	0.021***	0.021***
	(0.001)	(0.001)	(0.001)
urban	0.035***	0.076***	0.062***
	(0.008)	(0.015)	(0.013)
female	-0.009	0.004	-0.001
	(0.008)	(0.010)	(0.009)
logmpce	0.065**	0.046	0.049
	(0.024)	(0.035)	(0.036)
Observations	51,112	60,604	77,514
R-squared	0.248	0.329	0.303
State FE	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Mean	0.125	0.125	0.125

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Sample restricted to individuals aged 17 to 19 years

Standard errors are clustered at State level

Table 9: Impact on High-School Completion by place of residence and sex

	(1)	(2)	(3)	(4)
VARIABLES	Rural Male	Rural Female	Urban Male	Urban Female
post	0.095***	0.092***	0.038	0.033
	(0.029)	(0.023)	(0.029)	(0.034)
OBC	-0.009	-0.023***	-0.046***	-0.061***
	(0.008)	(0.006)	(0.012)	(0.017)
postxOBC	0.010	0.013	0.060***	0.081***
	(0.024)	(0.019)	(0.019)	(0.020)
hhedu	0.017***	0.014***	0.030***	0.032***
	(0.001)	(0.001)	(0.002)	(0.003)
logmpce	0.032	0.044	0.054	0.091**
	(0.029)	(0.030)	(0.036)	(0.040)
Observations	25,784	22,083	16,353	13,294
R-squared	0.208	0.211	0.400	0.471
State FE	Yes	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes	Yes
Mean	0.107	0.0852	0.201	0.246

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

SC and Others used as Control

Sample restricted to individuals aged 17 to 19 years

Standard errors are clustered at State level

Table 10: High-School Completion when Household Head has Primary Education

	(1)	(2)	(3)
VARIABLES	SC	Others	SC/Others
post	0.035	0.018	0.021
	(0.023)	(0.044)	(0.032)
OBC	0.032***	-0.084***	-0.019**
	(0.007)	(0.021)	(0.009)
postxOBC	0.064***	0.059	0.062**
	(0.022)	(0.037)	(0.026)
female	0.027**	0.031*	0.027**
	(0.010)	(0.017)	(0.013)
logmpce	0.047*	0.078***	0.066**
	(0.024)	(0.027)	(0.029)
Observations	8,852	8,462	12,014
R-squared	0.155	0.193	0.159
State FE	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Mean	0.121	0.121	0.121

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Sample restricted to ages 17-19 yrs and Urban HHs

Standard errors are clustered at State level

Table 11: High-School Completion when Household Head has Secondary Education

	(1)	(2)	(3)
VARIABLES	SC	Others	SC/Others
post	0.084*	0.033	0.034
	(0.041)	(0.041)	(0.035)
OBC	0.057**	-0.103***	-0.062***
	(0.023)	(0.017)	(0.014)
postxOBC	-0.002	0.065	0.057
	(0.051)	(0.047)	(0.041)
female	0.067***	0.085***	0.078***
	(0.018)	(0.025)	(0.021)
logmpce	0.089***	0.075**	0.082**
	(0.026)	(0.028)	(0.032)
Observations	5,221	8,188	9,634
R-squared	0.312	0.354	0.333
State FE	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Mean	0.237	0.237	0.237

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Sample restricted to ages 17-19 yrs and Urban HHs

Standard errors are clustered at State level

Table 12: High-School Completion when Household Head has Tertiary Education

	(1)	(2)	(3)
VARIABLES	SC	Others	SC/Others
post	0.092*	0.018	0.021
	(0.046)	(0.026)	(0.027)
OBC	0.059	-0.069**	-0.052*
	(0.055)	(0.030)	(0.029)
postxOBC	-0.022	0.090**	0.077**
	(0.057)	(0.034)	(0.035)
female	0.022	0.056*	0.055**
	(0.024)	(0.028)	(0.026)
logmpce	0.106***	0.075***	0.087***
	(0.031)	(0.023)	(0.027)
Observations	3,084	7,286	8,006
R-squared	0.604	0.627	0.617
State FE	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Mean	0.420	0.420	0.420

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Sample restricted to ages 17-19 yrs and Urban HHs

Standard errors are clustered at State level

Table 13: Robustness for College Enrollments: Placebo tests

	(1)	(2)	(3)
VARIABLES	before 2005	after 2010	Ages 25-30
post	0.007	-0.016*	-0.006**
	(0.006)	(0.008)	(0.002)
OBC	-0.002	0.018*	-0.002***
	(0.004)	(0.010)	(0.001)
postxOBC	0.006	0.021*	0.003
	(0.008)	(0.011)	(0.002)
hhedu	0.013***	0.021***	0.001***
	(0.001)	(0.002)	(0.000)
urban	0.043***	0.041***	0.007***
	(0.008)	(0.012)	(0.002)
female	-0.034***	-0.061***	-0.008***
	(0.006)	(0.012)	(0.001)
logmpce	0.056**	0.100**	0.010***
	(0.020)	(0.038)	(0.002)
Observations	59,640	46,856	88,638
R-squared	0.169	0.329	0.027
State FE	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Mean	0.0647	0.198	0.0125

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

SC used as Control

Sample restricted to individuals aged 17 to 22 years

Standard errors are clustered at State level

Table 14: Robustness for High-School Completion: Placebo tests

	(1)	(2)	(3)
VARIABLES	before 2005	after 2010	Ages 25-30
post	0.017*	-0.014	-0.012
	(0.009)	(0.009)	(0.008)
OBC	0.014**	0.030*	0.010*
	(0.006)	(0.017)	(0.005)
postxOBC	0.004	0.012	0.010
	(0.009)	(0.019)	(0.008)
hhedu	0.016***	0.022***	0.015***
	(0.001)	(0.002)	(0.001)
urban	0.039***	0.028*	0.016**
	(0.008)	(0.015)	(0.007)
female	-0.010	-0.005	-0.050***
	(0.007)	(0.018)	(0.006)
logmpce	0.053**	0.075**	0.029***
	(0.020)	(0.034)	(0.010)
Observations	28,401	22,711	91,804
R-squared	0.186	0.353	0.146
State FE	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Mean	0.0903	0.243	0.0650

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

SC used as Control

Sample restricted to individuals aged 17 to 19 years

Standard errors are clustered at State level