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Muslims? Evidence from Wage Earners in India,
1987-2004**

By: Sumon Kumar Bhaumik and Manisha Chakrabarty

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Is education the panacea for economic deprivation of Muslims? Evidence from wage earners in India, 1987-2004*

Sumon Kumar Bhaumik**

Brunel University,
IZA, Bonn, and
William Davidson Institute, Ann Arbor

Manisha Chakrabarty

Indian Institute of Management, Kolkata, and
Keele University

Abstract:

Few researchers have examined the nature and determinants of earnings differentials among religious groups, and none has been undertaken in the context of conflict-prone multi-religious societies like the one in India. We address this lacuna in the literature by examining the differences in the average (log) earnings of Hindu and Muslim wage earners in India, during the 1987-2004 period. Our results indicate that education differences between Hindu and Muslim wage earners, especially differences in the proportion of wage earners with tertiary education, are largely responsible for the differences in the average (log) earnings of the two religious groups across the years. By contrast, differences in the returns to education do not explain the aforementioned difference in average (log) earnings. Citing other evidence about persistence of educational achievements across generations, however, we argue that attempts to narrow this gap using quotas for Muslim households at educational institutions might be counterproductive from the point of view of conflict avoidance.

Keywords: earnings gap, education, decomposition, religion

JEL classification: J31, J15, I28

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** *Corresponding author.* Address: Brunel University, School of Social Sciences, Marie Jahoda, Uxbridge UB8 3PH, United Kingdom. Phone: +44 1895 267 247. Fax: +44 1895 266 649 Email: Sumon.Bhaumik@brunel.ac.uk.

1. Introduction

Economists had traditionally viewed economic class division as a source of social conflict. There is, however, an increasing perception that differences in economic opportunities and living standards of groups that are divided along ethnic or religious lines may be a bigger source of conflict than traditional divisions along class lines (e.g., Stewart, 2001; Varshney, 2001). This could be on account of past grievances that are alive in the collective consciousness of the ethnic or religious groups (Horowitz, 1985; Collier and Hoeffler, 2004). Horowitz (1998) has extended this line of argument to explain inter-ethnic group conflict, as an outcome of diverging material interests. Wintrobe (1995) has suggested that envy on the part of members of one ethnic group, on account of greater success of a rival ethnic group, might precipitate conflict. In a recent article, Esteban and Ray(2006) also argue that ethnic conflict may be salient in the presence of economic inequality. Once initiated, an inter-ethnic group conflict might get a life of its own because the conflict would lead to a breakdown in trust which is a necessary pre-condition for a social contract about distribution of resources in an environment of peace.

Despite the importance of inter-ethnic group and inter-religion differences in economic conditions, however, there are relatively few studies that focus on this issue. Indeed, while there are a large number of research papers exploring inter-gender differences in earnings and employment opportunities (see Stanley and Jarrell, 1988), for example, a much smaller section of the literature explores differences in economic well-being along other potential lines of social division (Chiswick, 1988; O'Neill, 1990, Pendakur and Pendakur, 1998; Blackaby et al., 2002; Borooah, 2005; Borooah and Iyer, 2005; Borooah, Dubey and Iyer, 2006; Kijima, 2006b; Bhaumik, Gang and Yun, 2006). In particular, the literature on inter-religious group differences in economic conditions is very thin.

In an early attempt to examine the relationship between religious denomination and earnings, Gockel (1969) demonstrated that Catholics in the United States have an advantage vis-à-vis Protestants. Tomes (1984) did not find any impact of affiliation with the Catholic church on earnings *per se*, even

though Catholics did have a higher marginal return on college education relative to Protestants. However, these results are not necessarily universally applicable. In Canada, for example, Protestants experienced higher returns on education (especially, college education) than the Catholics (Tomes, 1983; Meng and Sentance, 1984). Jews in Canada were seen to have significantly higher returns on earning than Christians of all denominations.¹ The Jewish advantage over people of other religious denominations has also been recorded in the case of the United States (Chiswick, 1983).² In a more recent study, Steen (1996) found that the relative impact of affiliation to Judaism, Catholicism and the Protestant church(es) on earnings of labourers in the United States, as reported in the studies of Gockel (1969), Chiswick (1983) and Tomes (1984), continues to hold. Lindley (2002) argues that in the United Kingdom ethnicity plays a significant role in explaining interpersonal differences in employment opportunities and earnings even after one has controlled for religion.

It is evident that not only is the relationship between religion and earnings relatively unexplored, but also that the relationship has been examined largely in the context of the United States and Canada which are overwhelmingly Christian countries, especially so in the 1980s and the 1990s.³ Given the small size of the minorities relative to the overall population, the likelihood of actual inter-religion conflict was unlikely. Esteban and Ray (2006) have argued, for example, that the likelihood of conflict increases with the size of the rival groups. While sub-denominations within Christianity, namely, the Protestants and the Catholics, each comprised a large proportion of the overall population, and while Protestant-Catholic conflict in North America is not unheard of (see Kane, 1951), a Northern Ireland type violent conflict along those lines is difficult to envisage.

¹ Tomes (1985) showed that, *ceteris paribus*, Jews in Canada earned 12.7 percent more than the Protestants who, in turn, earned 5.1 percent more than people of all other religious denominations.

² Chiswick (1983) found that, *ceteris paribus*, Jewish men have 16 percent higher earnings than non-Jewish men. This can be significantly explained by a 20 percent higher rate of return from schooling for the former, and a steeper experience-earnings profile.

³ In 1990, for example, 88.3 percent of the US population was Christian, while 1.8 was Jewish. Less than a third of the Christians were Catholics. Atheists/agnostics, who accounted for 8.4 percent of the population, comprised the second largest “religious” group. In 1991, in Canada, 80 percent of the population was Christian, about 56 percent of whom were Catholics. Jews made up 1.2 percent of the population. Once again, atheists were the second largest “religious” group, accounting for 12.3 percent of the population.

In several other contexts, however, relative deprivation of one religious group vis-à-vis another might precipitate serious, even violent, conflict. India is one such context. At independence, the country was divided on religious grounds, and witnessed major riots along religious lines that left over half a million people dead. Since then, riots on a smaller scale have continued to persist. Muslims comprise of 13.4 percent of the Indian population, and comprise as much as a quarter of the population in some states like West Bengal. Yet they account for 6.3 percent of the college graduates and well over 90 percent of them are employed in the low-paying informal sector. For the sake of comparison, less than 85 percent of the economically challenged low-caste Hindus, those belonging to the scheduled castes and tribes, work in that sector. Further, while low caste and economically backward Hindus find succour in the affirmative action schemes that reserve nearly 50 percent of public sector jobs for them, there is no systematic affirmative action scheme for the Muslim population. As a consequence, in most states, Muslims account for less than 5 percent of the public sector workforce. Following the publication of the Sachar Committee Report (Government of India, 2006), the popular perception is that, on average, Muslims in India are worse off than even the lower caste Hindu population, largely on account of lower educational attainments. In other words, in India, both Hindus and Muslims have large populations, a significant proportion of whom share mistrust about the rival religious community, and actual as well as perceived differences in economic status that can precipitate or intensify any conflict between the two religious groups.

Ironically, these factors that make an intensification of religious conflict in India likely, *ceteris paribus*, are also those that make the context an interesting one for an examination of inter-religious group differences in measures of economic well-being such as employment and earnings. However, while living standards disparities across castes have been explored in detail in the literature (Borooah, 2005; Kijima, 2006b), the impact of religion remains neglected. Noland (2005) uses state-level data from India to argue that state-level income during the 1981-96 period was significantly affected by the proportion of people belonging to Buddhists, Jains and “other” religions. However, his paper does not address the micro- issues related to disparities in earnings, consumption etc across the different religious groups. The only two papers till date that uses micro data on India to examine inter-religion

differences are by Borooah and Iyer (2005) on school enrolment rates across religious groups and by Borooah, Dubey and Iyer (2006) on categories of employment status across different caste/religion groups. Borooah and Iyer (2005) find evidence of a narrowing gap between the enrolment rates of Hindus and Muslims at schools, especially for children with illiterate parents. The marginal impact of religion on enrolment rates is influenced by the size of the community in which the children reside. Borooah, Dubey and Iyer (2006), using a single round of employment survey data (1999) of India, find that the probability of being a regular salaried employee is significantly lower for Muslim labourers than for upper caste Hindus.

In this paper, we use data from India to make a significant contribution to the literature on the impact of religion on earnings. We use National Sample Survey household-level data from 1987, 1993, 1999 and 2004 to explore the relative impact of characteristics and returns on those characteristics on the earnings differential between Hindus and Muslims. Our results indicate that education differences between Hindu and Muslim wage earners, especially differences in the proportion of wage earners with tertiary education, are largely responsible for the differences in the average (log) earnings of the two religious groups across the years. By contrast, differences in the returns to education do not explain the aforementioned difference in average (log) earnings.

The rest of the paper is organised as follows: In Section 2, we describe the data set, and report some patterns in the data. The empirical strategy is outlined in Section 3. The results are reported and discussed in Section 4. Finally, in Section 5, we discuss the implications of our results for policy formulation.

2. Data

We use Indian National Sample Survey (NSS) (un)employment data for the urban sector for the years 1987, 1993, 1999 and 2004, i.e., from the 43rd, 50th, 55th and 60th rounds of the survey. The 43rd, 50th and 55th rounds involved collection of data for large quinquennial surveys that included a separate

Employment and Unemployment schedule. The 60th round of the survey was smaller and, until 2003, data on employment and unemployment was collected during smaller survey rounds by way of the schedule on Consumer Expenditure. However, this was changed from 2004, such that the 60th round of the survey also had a separate schedule for collection of (un)employment data. We, therefore, have comparable data for large random samples for a period of 17 years.

During these years, India experienced emergence of Hindu nationalism as a political force and intense riots in several parts of the country, a widening of the affirmative action net to include a significant proportion of the lower caste Hindus,⁴ as well as rapid economic growth following industrial liberalization in the post-1991 period. Importantly, the economic growth has been driven more by skill-intensive and capital-intensive manufacturing and services industries like auto ancillaries, pharmaceuticals, software and banking-finance, aggravating the extent of inequality in India (Ravallion, 2000; Kijima, 2006a), almost certainly between skilled and unskilled laborers. This mix of political and economic events and trends make the period of our analysis interesting, especially in view of the significant difference in the average education levels of Muslims and the Hindus (Borooah and Iyer, 2005).

For each individual included in the sample, the surveys provide information about weekly earnings, demographic characteristics of individuals such as age and gender, educational attainment, industry of occupation, and state of residence. The 1987 and 1993 surveys cover about 74,000 labour force participants each, and the coverage for 1999 and 2004 were about 87,000 and about 36,000, respectively. Across the years, Hindus account for about 80 percent of the labour force while Muslims account for another 14 percent. The balance is made up of a variety of religions including Sikhs, Christians and Jains. Since each of these other religious groups individually account for a small share

⁴ Since independence, 22.5 percent of all public sector jobs were reserved for the scheduled castes and tribes. In 1990, responding to the report of the Mandal Commission, the Government of India decreed that an additional 27 percent of all jobs would be reserved for Other Backward Classes (OBCs). While OBCs are not necessarily Hindus – the Indian constitution bars reservation along religious lines – evidence presented by the aforementioned Sachar Committee suggests that Hindu OBCs have benefited disproportionately from these reservations.

of the labour force – no more than 2 percent – we drop them from the sample, and focus on the earnings differences between Hindus and Muslims.

The earnings data, which are central to our analysis, are reported only for wage earners and casual workers. Hence, we leave out the self-employed individuals from our sample. Further, the earnings reported by the casual workers for the reference week are not necessarily a good proxy for the annual earnings, given the irregular employment patterns of these workers. Therefore, these workers have to be dropped from the sample as well. In other words, our samples include only wage earners in regular employment. This is consistent with the samples on Indian labour force used elsewhere in the literature (e.g., Kijima, 2006a). Our measure of their earnings includes salaries and wages, bonuses and perquisites, but not the income from working overtime. We have used consumer price indices for industrial workers to deflate the earnings figures and thereby make them comparable across time.

Finally, we restrict our sample to 21-60 year old people to avoid possible endogeneity with respect to education; people in India typically get their first university degree at the age of 21. Further, we leave out of the sample people belonging to Jammu and Kashmir and the politically troubled states in the north east of the country, where economic activity, employment etc are affected by insurgency and terrorism. Our final usable sample, therefore, includes 21-60 year old wage earners from 16 major states that account for approximately 40 percent of the total labour force. Our 1987, 1993, 1999 and 2004 data include, respectively, 18,187 Hindus and 1,929 Muslims, 17,389 Hindus and 1,773 Muslims, 17,422 Hindus and 2,107 Muslims, and 8,266 Hindus and 995 Muslims.

Table 1
Descriptive statistics

	1987		1993		1999		2004	
	Hindu	Muslim	Hindu	Muslim	Hindu	Muslim	Hindu	Muslim
Real earnings	254.23 (165.50)	206.90 (138.68)	326.41 (218.44)	247.85 (176.51)	412.82 (301.13)	319.30 (256.81)	401.42 (318.02)	298.16 (245.17)
Age	37.15 (9.93)	36.64 (10.09)	37.61 (9.83)	36.59 (9.93)	38.11 (10.03)	36.60 (10.23)	37.50 (10.51)	35.53 (10.71)
Female	14.08	8.50	15.48	10.55	15.38	9.77	17.01	11.06
Married	81.02	81.54	81.93	81.33	81.36	80.83	77.37	72.46
Illiterate	11.04	18.51	9.64	18.56	7.92	14.32	6.64	9.95
Below primary	8.06	14.72	7.02	11.68	5.87	10.10	3.61	7.34
Primary	12.79	21.20	9.06	12.41	7.71	13.66	8.57	13.57
Middle school	13.81	13.17	14.15	16.58	15.01	15.99	16.38	19.70
High school	29.16	20.94	30.41	25.38	32.92	27.13	34.02	30.25
Tertiary	15.16	11.45	29.71	15.40	30.47	18.74	30.76	19.20
Nobs	18187	1929	17389	1773	17422	2107	8266	995

Note: The values within parentheses are standard deviations.

The descriptive statistics are reported in Table 1. The descriptive statistics indicate the following:

- It can be seen that over time there was an increase in the Hindu-Muslim wage gap. The gap in the average earnings of the Hindus and the Muslims was 23 percent of the latter's average income in 1987, 32 percent in 1993, 29 percent in 1999, and 35 percent in 2004. Overall, between 1987 and 2004, there was a 58 percent increase in the real average weekly earnings of the Hindus and a 44 percent increase in the real average weekly earnings of the Muslims.
- The average age of the Hindu and Muslim wage earners was similar during all four years, between 35 and 39. There is also no noticeable difference between the proportion of Hindu and Muslim wage earners who were married. However, while the proportion of females among both Hindu and Muslim wage earners was low, with a high of 17 percent for Hindus and 11 percent for Muslims, in 2004, consistently through the years the proportion of wage earners who were female was higher among Hindus than among Muslims.

- The greatest difference between the Hindu and the Muslim wage earners was, however, with respect to their educational attainment.⁵ In 1987, 15 percent of the Hindu wage earners had tertiary education, while another 29 percent had high school education. By 2004, these proportions had risen to 31 and 34, respectively. On the other hand, in 1987, only 11.5 percent of the Muslim wage earners had tertiary education and another 21 percent had high school education. By 2004, while both these proportions had gone up, to 19 and 30, respectively, the proportion of Muslim wage earners with tertiary education was still significantly lower than the proportion of Hindu wage earners with a similar level of education. At the other end of the education spectrum, a greater proportion of Muslim wage earners was with primary education or less, compared with Hindu wage earners.

The descriptive statistics suggest that over time there was an increase in both the difference between average earnings of Hindu and Muslim wage earners, and the proportion of Hindus and Muslims with higher (especially tertiary) education. Even though this is merely a correlation, it highlights the possibility of a causal link between the difference in average wage earnings of the Hindus and Muslims, and the differences in the average educational attainment of the two groups. However, it is impossible to guess *a priori* whether the difference in wage earnings is also caused by a difference in the returns to education between these two religious groups. We explore these empirical issues further later in the paper.

⁵ There was a slight difference in the educational categories included in the 1987, 1993 and 1999 questionnaires, and those included in the 2004 questionnaire. After reconciling the differences to create comparable educational categories across all the years, we are left with the following categories: illiterate, below-primary, primary, middle school, secondary and higher secondary combined (which we call high school education), and tertiary. The first three surveys included information about people with medical and technical education. But wage earners with these qualifications account for less than 2 percent of the final samples for those years. Further, returns to medical and technical education were not significantly different from those with general tertiary education. Hence, in our analysis, we use the tertiary education category to account for all kinds of university education.

3. Empirical strategy

Conventionally, researchers aiming to explain earnings differences between any two socio-economic groups use a Mincer equation that relates (log) earnings of individuals within each of the groups to characteristics like age, gender and education.⁶ They then use the estimated coefficients of the Mincer equations and an algorithm proposed by Oaxaca and Blinder (Oaxaca, 1973; Blinder, 1973) to decompose the difference in (log) earnings into characteristics and coefficients effects (Ghiara, 1999; de Coulon, 2001; Garcia-Aracil and Winter, 2006). Characteristics effects indicate the extent to which differences in average characteristics of labourers in the different socio-economic groups explain the differences in (log) earnings, other things remaining the same. Similarly, coefficients effects indicate the extent to which differences in the impacts of these characteristics on the (log) earnings of these socio-economic groups (i.e., differences in the aforementioned estimated coefficients) explain the differences in (log) earnings, other things remaining the same.

We choose the following variant of the stylised Mincerian equation:

$$\ln E_i = \alpha_0 + \alpha_1 age_i + \alpha_2 age_i^2 + \sum_k \beta_k S_{ik} + \sum_j \lambda_j X_{ij} + A_i' \delta + \varepsilon_i \quad [1]$$

where $\ln E_i$, the natural logarithm of the earning of individual i , and this (log) earning is a function of age, level of education attainment by k types of degree/certification, denoted by S_{ik} , and personal characteristics such as gender and marital status,⁷ indexed by X_{ij} . Our specification allows the rate of return to vary across types of education level, which is consistent with the relevant literature (Heckman, Layne-Farrar and Todd, 1996; Sakellariou and Chris, 2004; Munich, Svejnar and Terrell, 2005). In addition, we control for the location of the individual, using dummy variables for each of

⁶ In a traditional Mincer equation, (log) earning is assumed to be a function of experience. This is typically measured as age of an individual less the sum of the number of years of schooling and five. However, our data do not provide information about the number of years of schooling, and any attempt to generate years of experience from the age of an individual would lead to measurement error. Since experience is a linear monotonic transformation of age, we retain the latter in the specification, instead of approximating the former.

⁷ The rationale for inclusion of marital status in the specification is that marriage increases the size of an individual's social network, thereby enhancing his or her ability to obtain better paid employment. In the Indian context, it can be said with a reasonable degree of certainty that for all but a handful of highly educated and upwardly mobile labourers marriage is exogenously determined.

the Indian states that are included in our sample, and the broad industry group in which the individual works.⁸

The aforementioned Oaxaca-Blinder decomposition algorithm suggests the following:

$$\ln \bar{E}_h - \ln \bar{E}_l = \bar{X}_l'(\hat{\beta}_h - \hat{\beta}_l) + (\bar{X}_h - \bar{X}_l)'\hat{\beta}_l + (\bar{X}_h - \bar{X}_l)'(\hat{\beta}_h - \hat{\beta}_l) \quad [2]$$

where $\ln \bar{E}$ is the predicted mean (log) earning; h and l refer to the groups with higher and lower earnings, respectively, \bar{X} is the mean vector of earning determining variables (human capital variables or endowments variable), $\hat{\beta}$ is vector of the estimated returns to the earnings determinants; and the last term indicates the interaction effect.⁹ As evident from the descriptive statistics reported earlier, in all four years of analysis, Hindu wage earners are type h while Muslim wage earners are type l .

The standard Mincer-Oaxaca-Blinder analysis has been extended to take into consideration the possibility that labourers do not become wage earners at random, but rather are selected into that category on the basis of their characteristics. If this is indeed the case, an ordinary least squares (OLS) estimation of the Mincer equation would yield biased coefficient estimates. Any selection bias, if present, can be corrected using the Heckman procedure that separately models the selection and the earnings equations. However, in the absence of good exclusion conditions, OLS yields better results than the Heckman model (see Puhani, 2000; Munich, Svejnar and Terrell, 2005). Nevertheless, we test for the presence of selection bias using the Heckman two-step process. Our exclusion conditions in the earning equation are the ratios of individuals in the 0-5, 6-15 and greater than 60 year olds age groups within households to the number of 21-60 year olds, i.e., the so-called dependency ratios. The rationale for the choice of these variables in the selection equation is that presence of children and

⁸ The industries are clubbed together as 3 sectors such as primary, secondary and tertiary. Primary includes agriculture, fishing etc; secondary includes mining and quarrying, manufacturing, electricity and construction and tertiary sector includes wholesale and retail trade, restaurant and hotels, transport, storage and communication services, financial, insurance, real estate and business services, community, social and personal services.

⁹ Our decomposition assumes that the *high* earnings group is the reference or “no discrimination” group, such that the explained component of the decomposition comprises of the endowment effect and the interaction effect (2nd and 3rd term in equation (3)), while the unexplained component includes only the coefficients effect (1st term in the expression). See Oaxaca (1973) for details.

elderly people within homes make it difficult for people to choose the wage earning professions that typically does not permit flexible working hours.¹⁰

Our results, not reported in the paper, indicate that for each Mincer equation at least one of these dependency ratios is significant, and that the inverse Mill's ratio is not significant for any of the earnings equations. Hence, we conclude that there is no selection bias for our samples. This is not surprising in view of the fact that, in India, there is a large degree of heterogeneity among wage earners, most of whom have characteristics that are not significantly different from those that are unemployed, self-employed etc. We, therefore, use OLS to estimate the Mincer equation, and use the Oaxaca-Blinder decomposition methodology to decompose the difference between the average (log) earnings of Hindu and Muslim wage earners during the four survey years. The regression and decomposition results are reported and discussed in the next section.

4. Results

The estimates of the Mincer equation are reported in Table 2. To begin with, it is evident that the variables included in our specification have the expected signs, e.g., (log) females earn less, on average, than males, and education is positively correlated with earnings. Further, the goodness of fit of the regression models – around 0.40, on average – is comparable with similar models estimated with cross-section data. Indeed, almost all estimated coefficients are significant at the 1 percent level.

¹⁰ In the literature, other identifying variables include land holdings and non-labour income (Buchinsky, 2001). However, our data do not provide the information on these variables for urban workers.

Table 2
Mincer equation

	1987		1993		1999		2004	
	Hindu	Muslim	Hindu	Muslim	Hindu	Muslim	Hindu	Muslim
Constant	3.07 *** (0.08)	3.24 *** (0.24)	2.88 ** (0.10)	3.41 *** (0.29)	3.18 *** (0.09)	3.67 *** (0.28)	3.12 *** (0.14)	3.17 *** (0.31)
Age	0.07 *** (0.003)	0.05 *** (0.01)	0.08 *** (0.004)	0.07 *** (0.01)	0.08 *** (0.004)	0.06 *** (0.01)	0.07 *** (0.01)	0.08 *** (0.02)
Age square	- 0.001 *** (0.00004)	- 0.0004 *** (0.0001)	- 0.001 *** (0.0001)	- 0.001 *** (0.0001)	- 0.001 *** (0.0001)	- 0.0004 *** (0.0001)	- 0.001 *** (0.0001)	- 0.001 *** (0.0002)
Female	- 0.31 *** (0.01)	- 0.54 *** (0.06)	- 0.32 *** (0.02)	- 0.50 *** (0.07)	- 0.27 *** (0.02)	- 0.45 *** (0.06)	- 0.32 *** (0.02)	- 0.35 *** (0.08)
Married	0.13 *** (0.01)	0.09 ** (0.04)	0.15 *** (0.00)	0.12 ** (0.05)	0.14 *** (0.02)	0.05 (0.04)	0.10 *** (0.02)	0.12 *** (0.05)
Below primary	0.14 *** (0.02)	0.16 *** (0.04)	0.23 *** (0.02)	0.26 *** (0.06)	0.15 *** (0.03)	0.24 *** (0.05)	0.22 *** (0.04)	0.17 *** (0.09)
Primary	0.21 *** (0.02)	0.30 *** (0.04)	0.25 *** (0.02)	0.25 *** (0.05)	0.23 *** (0.02)	0.18 *** (0.04)	0.24 *** (0.04)	0.16 *** (0.08)
Middle school	0.34 *** (0.02)	0.44 *** (0.05)	0.41 *** (0.02)	0.36 *** (0.05)	0.34 *** (0.02)	0.36 *** (0.05)	0.38 *** (0.03)	0.39 *** (0.07)
High school	0.65 *** (0.02)	0.75 *** (0.04)	0.74 *** (0.02)	0.70 *** (0.05)	0.68 *** (0.02)	0.64 *** (0.04)	0.71 *** (0.03)	0.62 *** (0.07)
Tertiary	1.03 *** (0.02)	1.09 *** (0.05)	1.11 *** (0.02)	0.98 *** (0.06)	1.11 *** (0.02)	1.12 *** (0.05)	1.21 *** (0.03)	1.09 *** (0.08)
Industry	Yes ***	Yes ***	Yes ***	Yes	Yes ***	Yes	Yes ***	Yes
State/Location	Yes ***	Yes ***	Yes ***	Yes ***	Yes ***	Yes ***	Yes ***	Yes ***
F-statistics (p-value)	521.63 (0.00)	58.88 (0.00)	351.66 (0.00)	39.89 (0.00)	546.96 (0.00)	74.13 (0.00)	309.15 (0.00)	
Adjusted R-sq	0.42	0.41	0.36	0.35	0.40	0.41	0.43	0.43
Nobs	18187	1929	17389	1773	17439	2108	8266	995

Note: The values within parentheses are robust standard errors
 ***, ** and * indicate significance at the 1%, 5% and 10% levels.

The regression results indicate the following:

Age: (Log) earnings are a quadratic function of age, which is our proxy for experience. It is easy to demonstrate that the coefficients imply that, *ceteris paribus*, the earnings of both Hindu and Muslim wage earners increase at least until the age of 70, longer in some cases. Further, it can also be shown that the marginal impact of age on earnings is roughly the same for Hindus and Muslims. For example, in 1987, the marginal impact of age on the (log) earnings of a 25-year old Hindu wage earner was 0.045, and the corresponding marginal impact was 0.040 for a Muslim wage earner. In the subsequent years, the marginal impacts of age on the log earnings of a similarly aged person were as follows: 0.055 (Hindu) and 0.045 (Muslim) in 1993, 0.055 (Hindu) and 0.050 (Muslim) in 1999, and 0.045 (Hindu) and 0.055 (Muslim) in 2004. In other words, coefficients effects of age are unlikely to significantly explain differences in the average (log) earnings of the Hindu and Muslim samples.

Gender: Women clearly earned less than men with both the Hindu and Muslim communities and across all the four years of analysis. Further, the absolute value of the (negative) coefficient of the female dummy variable was lower for the Hindu sample than for the Muslim sample. However, while the coefficients for this dummy variable for the Hindu and Muslim communities were significantly different for 1987 (0.23), 1993 (0.18) and 1999 (0.18), this difference was not significant in 2004 (0.03). In other words, among wage earners, both Hindu and Muslim women face discrimination relative to men, and, at least until 1999, Muslim women faced greater discrimination than Hindu women. However, in 2004, the extent of discrimination experienced by women of both communities was roughly the same. We might, therefore, expect the coefficients effect of the female dummy to explain inter-religion differences in average (log) earnings until 1999, but this coefficients effect is unlikely to be significant in 2004.

Education: In keeping with the literature, for both Hindu and Muslim wage earners, and for all the years in our analysis, the impact of education on earnings is positive, and the earnings-education profile is convex. For example, in 1987, *ceteris paribus*, the (log) earnings of a Hindu wage earner

with a below-primary education exceeds that of an illiterate person by 0.14, while that of a Hindu wage earner with tertiary education exceeds that of the illiterate person by 1.03. In other words, tertiary education adds about 7.5 times more to the (log) earnings of a wage earner than below-primary education. It is easily seen, however, that the impact of the different levels of education on (log) earnings of both Hindus and Muslims were roughly the same over time, the only noticeable increase in the impact being restricted to the below-primary category. For example, relative to the illiterate wage earners, below-primary education added 0.14 to the (log) earnings of Hindus in 1987, and this impact rose to 0.22 for the same religious community in 2004, i.e., by 57 percent. The corresponding figures for tertiary education were 1.03 and 1.21, respectively, i.e., a rise of 17 percent. Overall, with a few exceptions, the returns to education for Hindu wage earners were significantly different across the years, while those of their Muslim counterparts were not.¹¹ Interestingly, returns to education were higher for the Muslim wage earners in 1987, e.g., high school education added 0.65 to the (log) earnings of a Hindu wage earner but 0.75 to that of a Muslim wage earner. However, the trends had been reversed by 2004, e.g., the corresponding impacts for high school education for that year were 0.71 (Hindu) and 0.62 (Muslim) respectively. It is not obvious from this as to whether the coefficients effects of the education variables are likely to explain the inter-religion differences in average (log) earnings to a significant extent, and we shall revisit this empirical question later in this paper.

It is also evident that the sector of occupation and the location of the wage earner had a significant impact on their earnings, the former largely for the Hindu wage earners. This is consistent with the differences in the rates of growth of the primary, secondary and tertiary sectors in India, as also with differences in the different rates of growth/development with the different states and regions within the country. However, we are using these as control variables for the regression analysis, and hence would not examine these impacts in any detail.

¹¹ For the Hindus, across the years, the coefficients for below primary and middle school education were significantly different at the 5 percent and 10 percent levels, respectively, while those for high school and tertiary education across the years were significantly different at the 1 percent level.

Table 3
Decomposition of earnings difference

	1987		1993		1999		2004	
	High: Hindu Low: Muslim Difference: 0.212 *** (0.017)		High: Hindu Low: Muslim Difference: 0.273 *** (0.019)		High: Hindu Low: Muslim Difference: 0.273 *** (0.018)		High: Hindu Low: Muslim Difference: 0.269 *** (0.026)	
	Characteristics Effects	Coefficients Effects	Characteristics Effects	Coefficients Effects	Characteristics Effects	Coefficients Effects	Characteristics Effects	Coefficients Effects
Constant		- 0.172 (0.248)		- 0.527 * (0.309)		- 0.484 * (0.290)		- 0.051 (0.341)
Age	0.027 * (0.014)	0.558 (0.412)	0.076 *** (0.024)	0.040 (0.541)	0.090 *** (0.022)	0.722 (0.446)	0.160 *** (0.044)	- 0.265 (0.613)
Age square	- 0.017 (0.010)	- 0.225 (0.204)	- 0.053 *** (0.020)	0.023 (0.274)	- 0.047 *** (0.018)	- 0.356 (0.223)	- 0.104 *** (0.036)	0.233 (0.305)
Female	- 0.030 *** (0.005)	0.020 *** (0.005)	- 0.025 *** (0.005)	0.019 ** (0.008)	- 0.026 *** (0.005)	0.019 *** (0.006)	- 0.021 *** (0.006)	0.004 (0.007)
Married	- 0.0005 (0.001)	0.028 (0.034)	0.001 (0.001)	0.019 (0.024)	0.0002 (0.001)	0.077 ** (0.037)	0.006 * (0.003)	0.010 (0.012)
Below primary	- 0.011 *** (0.003)	- 0.004 (0.007)	- 0.012 *** (0.003)	- 0.003 (0.007)	- 0.010 *** (0.003)	- 0.009 (0.006)	- 0.006 * (0.004)	- 0.004 (0.007)
Primary	- 0.026 *** (0.006)	- 0.019 * (0.010)	- 0.009 *** (0.003)	- 0.0002 (0.007)	- 0.011 *** (0.003)	0.006 (0.007)	- 0.008 * (0.004)	0.010 (0.012)
Middle school	0.003 (0.004)	- 0.013 * (0.007)	- 0.009 ** (0.004)	0.008 (0.009)	- 0.004 (0.003)	- 0.002 (0.008)	- 0.013 ** (0.006)	- 0.002 (0.016)
High school	0.062 *** (0.006)	0.020 ** (0.010)	0.036 *** (0.008)	0.009 (0.012)	0.038 *** (0.007)	0.012 (0.013)	0.023 ** (0.010)	0.027 (0.024)
Tertiary	0.150 *** (0.011)	- 0.007 (0.006)	0.140 *** (0.013)	0.020 * (0.010)	0.133 *** (0.018)	- 0.001 (0.010)	0.126 *** (0.017)	0.023 (0.016)
Total	0.152 *** (0.015)	0.049 *** (0.014)	0.155 *** (0.018)	0.092 *** (0.016)	0.177 *** (0.016)	0.049 *** (0.014)	0.184 *** (0.020)	0.084 *** (0.021)

Note: The values within parentheses are standard errors.

***, ** and * indicate significance at 1%, 5% and 10% level, respectively. The interaction effect from equation (2), not presented here, is insignificant for all the years.

The decomposition results are reported in Table 3. Interestingly, while characteristics effects, i.e., the differences in education etc between the Hindu and Muslim wage earners, significantly explained the differences in average (log) earnings, with a few exceptions, individual coefficients effects were not statistically significant. Indeed, characteristics effects explained 72 percent, 57 percent, 65 percent and 68 percent of the difference in average (log) wages in 1987, 1993, 1999 and 2004, respectively. Further, most of the (few) significant coefficient effects are associated with demographic characteristics like gender. This has an important political economic significance.

The 1987-2004 period in India was marked by two major phenomena. The first of these was the rise of the Hindu-nationalist Bharatiya Janata Party (BJP) since 1987, resulting in a succession of BJP-dominated central governments between 1998 and 2004.¹² The other was the liberalisation of the Indian economy, arguably initiated in 1991, and the gradual dominance of the private sector and market processes over the public sector and central planning.¹³ Political discrimination against Muslims by the BJP and its allies, to the extent possible, would imply differences in earnings largely on account of differences in the impact of individual characteristics on (log) earnings. In other words, such discrimination would be captured by the coefficients effect. If, however, the difference in average (log) earnings is largely on account of differences in characteristics like education, with the increasingly private sector dominated labour market more willing to accommodate people with higher education (i.e., skills) than those without such education, then the characteristics effect should dominate. In other words, our analysis suggests that the political polarisation in large parts of India, along religious lines, did not play a significant role in lowering the average (log) earnings of the Muslim wage earners relative to their Hindu counterparts. Given that the process of liberalisation

¹² In the 1985 election, the BJP won only two seats in the 529-seat lower house of the Parliament. In 1989, the number of seats won by BJP increased to 85, and this number increased further to 120 in the 1991 election. In the 1996 election, the BJP emerged as the single largest party in the lower house, with 161 seats, and staked claim to the government. The party finally formed government after the 1998 elections, in which it had won 182 seats, more than any other political party, and once again after the 1999 elections. In the 2004 elections, however, its strength in the lower house declined to 138, and it had to relinquish the reins of the government to the Indian National Congress, which emerged as the single largest party in the lower house.

¹³ The Indian government's revenue expenditure, a measure of the relative size of the public sector, as a percentage of GDP decline from over 21 percent in 1990 to about 15 percent in 2000, and has since stabilised at that level.

robbed the central and state governments of their power of patronage, as the role of the public sector in creating jobs shrunk considerably over time, this result is hardly surprising.

Given the statistical insignificance of the coefficients effects, by and large, and the small absolute value of these effects, when significant, we restrict our discussion about the individual effects to characteristics effects. Further, given that the characteristics effects are similar across the years, we focus mostly on the results for 1987 and 2004. The only interesting coefficients effect we highlight is the positive coefficients effect for the female dummy variable. It once again brings to the fore the result that while both Hindu and Muslim wage earners earn less than their male counterparts, the gender difference is lower for the Hindus than for the Muslims. In other words, if the gender gap in earnings for Muslim wage earners were the same as that of the Hindu wage earners, the difference in the average (log) earnings of Hindu and Muslim wage earners would be reduced by 7-10 percent.

The characteristics effects can be interpreted as follows:

Age: With the exception of 1987, the characteristics effects of age are significant for both the linear and quadratic terms. Since Hindu wage earners were older, on average, than the Muslim wage earners, the difference between the average age of the Hindus and the Muslims, as well as the difference between the squares of the average ages, is positive. The positive characteristics effect of the linear term, therefore, is driven by the positive coefficient of the linear component of age, while the negative characteristics effect of the quadratic term is driven by the negative coefficient of the quadratic component. On balance, however, the characteristics effect associated with the linear component dominates; e.g., in 2004, the characteristics effect associated with the linear term is 0.16 while that associated with the quadratic term is (-) 0.10. In other words, overall, the higher average age of Hindu wage earners explains 0.06 (or 22.3 percent) of the difference in (log) earnings of the two religious communities. In 1987, 1993 and 1999, the characteristics effects of age accounted for 13 percent, 8 percent and 16 percent of the Hindu-Muslim difference in average (log) earnings, respectively. In

other words, over time, the earnings gap between Hindu and Muslim wage earners has widened on account of the characteristics effect of age, which is our proxy for experience.

Gender: As indicated by the regression results discussed above, *ceteris paribus*, women earned less than men during all the years. The descriptive statistics reported earlier in the paper indicated that women constituted a greater proportion of the Hindu wage earners than the Muslim wage earners. In other words, the average (log) earnings of the Hindu wage earners are reduced relative to that of the Muslim wage earners on account of the higher proportion of women among the former. This is reflected by the negative (and significant) characteristics effect of the female dummy variable. However, given the average value of about (-) 0.01 for this dummy variable, it is evident that the difference in the average (log) earnings of the Hindu and Muslim wage earners would have widened only marginally if, for example, the Hindu sample had the same proportion of women as the Muslim sample.

Education: All levels of education had a positive impact on (log) earnings of both the Hindu and Muslim wage earners. The negative characteristics effects for below-primary, primary and middle school education, therefore, reflect the greater concentration of Muslim wage earners in those education categories, relative to the Hindu wage earners. However, the absolute values of these characteristics effects vary between 0.01 and 0.02 and hence do not have a significant impact on the relative (average) earnings of the two religious groups. On the other hand, the positive characteristic effects for high school education and tertiary education, which reflect the greater concentration of Hindu wage earners within the higher education categories, explain a significant proportion of the differences in (log) earnings between the two communities. For example, in 1987, the characteristics effects of high school education and tertiary education, which favour the Hindu wage earners, add up to 0.21, i.e., about 100 percent of the difference in average (log) earnings between the Hindu and Muslim samples. Similarly, in 2004, the characteristics effects for high school education and tertiary education account for nearly 0.15, i.e., about 56 percent, of the difference in average (log) earnings of the Hindu and Muslim wage earners. In other words, if Muslim wage earners had the same

distribution across the education categories as the Hindu wage earners, they might have been able to reduce the gap in average (log) earnings between the two communities by about 82 percent [= (- 0.011 - 0.026 + 0.062 + 0.150)/0.212] in 1987 and about 45 percent [= (- 0.006 - 0.008 - 0.013 + 0.023 + 0.126)/0.269] in 2004. Clearly, the most important factor driving the relative deprivation of the Muslim wage earners is the lower average education level relative to a Hindu wage earner. This is consistent with the views of the aforementioned Sachar Committee Report.¹⁴ At the same time, however, our study shows that the relative importance of the characteristics effect of education in explaining the (log) earnings gap has declined over time. This is consistent with Borooah and Iyer's (2005) observation that Muslims in India were catching up with the Hindu population in terms of school enrolment.

The policy implications of these empirical results are discussed in the concluding section.

5. Concluding comments

In this paper, we first estimate stylised Mincer equations for Hindu and Muslim wage earners in India for 1987, 1993, 1999 and 2004. The estimated coefficients suggest that (log) earnings for both Hindus and Muslims are quadratic functions of age, and also both the Hindu and Muslim women wage earners earn less than their male counterparts. The estimates also suggest that earnings increase with the level of education, and that the earnings-education profile is convex, i.e., people with tertiary education earn a lot more than people with (say) primary or even middle school education. Thereafter, using these estimated coefficients and the Oaxaca-Blinder algorithm, we decompose the differences in the average (log) earnings of the Hindu and Muslim wage earners into characteristics and coefficients effects. Our results indicate that the aforementioned difference in average (log) earnings is largely explained by the characteristics effect, especially by those for education and age. Over time, there has

¹⁴ Borooah, Dubey and Iyer (2006) also find a significant contribution of low level of education attributes in explaining the lower proportion of regular salaried Muslims as compared to upper caste Hindu. Their counterfactual analysis also shows that the tackling of remaining coefficient bias through job-reservation can only benefit Muslims around 3-4 percent in securing regular salaried employment.

been an increase in the relative importance of the characteristic effect of age and a decline in the relative importance of the characteristic effect of education. However, even in 2004, equalisation of the educational levels of the Hindu and Muslim wage earners would have reduced the difference in their average (log) earnings by about 45 percent. This suggests that, *prima facie*, education can be a panacea for relative economic deprivation of Muslims in India.

Not surprisingly, policymakers in India are divided over whether to enact legislations that would usher in quotas for poorer Muslim households at public sector educational institutions. The danger of ushering in such a quota is that there is likely to be political resistance from the Hindu majority as well as from other religious minorities like Sikhs and Christians who would fall outside the purview of the quota. In other words, in the short run, a quota is likely to result in an intensification of the conflict among the different religious groups (see Horowitz, 1998). At the same time, provision of quotas at educational institutions may not necessarily translate into an immediate increase in the proportion of the Muslim labour force with tertiary education whose characteristics effect explains 45-50 percent of the difference in the average (log) earnings of Hindu and Muslim wage earners across the years. There is evidence in the literature to suggest that income as well as measures of capability such as education and health are highly correlated across generations, and in large part this is on account of the (in)ability of the parents to invest in education and health of the children early in the lives of the latter (e.g., Restuccia and Urrutia, 2004; Blanden, Gregg and Machin, 2005). Given that the average Muslim household is poorer and less educated than the average Hindu household, therefore, and given the imperfections in Indian capital markets, it is unlikely, therefore, that the reservation in itself will bridge the educational divide that explains a large proportion of the gap in the average (log) earnings of Hindu and Muslim wage earners.

Even though education could, in principle, be a panacea for the Muslim labour force participants, therefore, there is no easy way to deliver the education to them without shifting a sizeable proportion of the public assets to serve this cause, a move that would almost certainly precipitate political opposition from other religious groups, and intensify religious conflict in India. The rationale for an

emphasis on education is further weakened if we take into account the observation that the role of education in explaining the aforementioned gap in average (log) earnings has weakened over time, while that of age (or experience) has increased. In other words, while an enhancement of educational capabilities remains a laudable goal by its own right, an improvement of the economic status of the Muslim population in India, to put them at par with the Hindus and perhaps other religious groups might require a multi-pronged process that includes usual development policy prescriptions such as greater access to credit. This is likely to hold true in any country that is grappling with inequality in the economic status of the one religious group vis-à-vis others.

A logical extension to our analysis would be to examine the Hindu-Muslim differences among self-employed individuals; about 40 percent of the Hindu labour force participants and about 55 percent of their Muslim counterparts in the NSS samples are self-employed. This remains the data collection and research challenge for the future.

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