



INDIAN INSTITUTE OF DALIT STUDIES

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# Caste, Employment, and Wages in India: How do Employees from Different Social Groups Fare in India's Labour Market?

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## **Foreword**

The Indian Institute of Dalit Studies (IIDS) is among the pioneer Indian research organizations that focus exclusively on development concerns of marginalized groups and socially excluded communities. Over the last 12 years, IIDS has carried out several studies on different aspects of social exclusion and discrimination of the historically marginalized social groups, such as Scheduled Castes, Scheduled Tribes and Religious Minorities in India and other parts of the sub-continent. The Working Paper Series disseminates empirical findings of on-going research and conceptual development on issues pertaining to the forms and nature of social exclusion and discrimination. Some of our papers also critically examine inclusive policies for the marginalized social groups.

The working paper on 'Caste, Employment, and Wages in India: How do Employees from Different Social Groups Fare in India's Labour Market?' attempts to quantify the effects of reserving jobs in India for people from the Scheduled Castes (SC) and Scheduled Tribes (ST). The findings of the study explain that the two effects of positive discrimination in the public sector and negative discrimination in the private sector are 'self-cancelling'. However, there was considerable discrimination between men from these groups in respect of remuneration from regular salaried and wage employment. The paper suggests that the solution of identity based discrimination is to view education not just as imparting skills but also teaching norms of behaviour.

We hope the working paper will be of great help to academics, students, activists, civil society organisations and policymakers.

**Nidhi S. Sabharwal**

Director



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# **Caste, Employment, and Wages in India: How do Employees from Different Social Groups Fare in India's Labour Market?**

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## **Abstract**

This paper attempts to quantify the effects of reserving jobs in India for persons from the Scheduled Castes (SC) and Scheduled Tribes (ST). A major conclusion of the analysis was that there was no discrimination against SC, vis-à-vis High Caste Hindu (HCH) men in terms of their presence among those in regular salaried and wage employment (RSWE). As our results show, the two effects of positive discrimination in the public sector and negative discrimination in the private sector are self-cancelling. However, there was considerable discrimination between men from these groups in respect of remuneration from RSWE: 38% of the wage difference in RSWE was could not be explained by differences in labour market attributes.

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## 1. Introduction

An important concern of public policy in India is to ensure that all persons, regardless of caste or religion, are treated fairly in the jobs market. There are two aspects to this concern. The first is whether differences in remuneration between persons fully reflect their difference in productivities or whether these differences might, wholly or in part, be due to ‘earning discrimination’. Oaxaca (1983) developed a methodology for answering this question and this has subsequently been applied to a variety of labour market situations by *inter alia* Reimers (1983), Neumark (1988), Oaxaca and Ransom (1994), Borooah *et. al.* (1995), and Harkness (1996). The second issue is concerns the different likelihoods that persons, from different social groups, will *ceteris paribus* attain different degrees of occupational success. The issue here is whether these differences in likelihoods are justified by differences in worker distribution or whether they are, wholly or in part, due to ‘occupational discrimination’. Smith and Strauss (1975), MacPherson and Hirsch (1995), Borooah (2001) are examples of such studies. This paper is concerned with the both issues – ‘earnings discrimination’ and ‘occupational discrimination’ – in the context of the Indian labour market.

In response to the burden of social stigma and economic backwardness borne by persons belonging to some of India’s castes, the Constitution of India allows for special provisions for members of these castes. Articles 341 and 342 include a list of castes and tribes entitled to such provisions and all those groups included in this list – and subsequent modifications to this list – are referred to as, respectively, “Scheduled Castes” (SC) and “Scheduled Tribes” (ST)<sup>1</sup>.

These special provisions have taken two main forms. The first is action against adverse discrimination towards persons from the SC and the ST. The second is compensatory discrimination in favour of persons from the SC and the ST. Compensatory discrimination has taken the form of guaranteeing seats in national and state legislatures and in village *panchayats*, places in educational institutions, and the reservation of a certain proportion of government jobs for the SC and the ST.

In the mind of the Indian public, however, it is jobs reservation that is seen

as the most important of the public concessions towards the SC and the ST and it is the one which arouses the strongest of passions.<sup>2</sup> On the one hand, there is the demand to extend reservation to persons who are not from the SC or the ST but who, nevertheless, belong to economic and socially backward groups - the 'other backward classes' (OBC)<sup>3</sup>. On the other hand, there is the demand from the SC and the ST to extend reservation to private sector jobs<sup>4</sup>.

Given the fact that issues relating to occupational discrimination and unfair treatment of people belonging to certain castes and religions dominate public debate and discourse in India, it is surprising how little academic research there is on this subject (see, however, Dhesi and Singh, 1984; Esteve-Bolart, 2004; Borooah *et. al.*, 2007; Thorat and Attewell, 2007; Ito, 2009). Are certain groups treated 'unfairly' treated in the jobs market in India? Unfairly treated with respect to access and/or with respect to wage rates? And, if they are indeed treated unfairly, is it possible to quantify the extent of unfair treatment?

This paper attempts to answer these questions using unit record data from the latest available round (68<sup>th</sup>: June 2011-June 2012) of the National Sample Survey (NSS) Employment Unemployment Survey. The NSS employment and unemployment data give the distribution of its respondents - who are distinguished by various characteristics, including their caste, religion, and educational levels - between different categories of economic status. Of these categories, the three which are the most important are: *self-employed*; *regular salaried or wage employees*; and *casual wage employees*.

Using these data, we focused on prime-age (22-45 years of age) males and estimated, using the methods of multinomial logit, the probabilities of men being in these categories of employment, after controlling for their caste/religion<sup>5</sup> and their employment-related attributes.<sup>6</sup> These estimates were then used, using the methodology detailed below, to decompose the observed difference between the castes in their proportions in the different categories of economic status into an 'attributes' and a 'discrimination' effect.

The NSS data also provided information on the wages/day earned by the employed respondents in their jobs. Using these data, we estimated wage data equations with a view to seeing whether *ceteris paribus* the caste (and religion) of the respondents played a role in determining these differences

or whether these differences were entirely the product of inter-respondent differences in employment-related attributes.

## **2. Economic Status, Education and Community**

Table 1 shows, on the basis of data for the 68<sup>th</sup> round of the NSS (June 2011-June 2012), the distribution of 53,076 men, between the ages of 22 and 45 years (“prime-age” males), and living in the 16 major states of India and the Union Territories of Delhi and Chandigarh, by their educational standard, between the following categories of economic status<sup>7</sup>:

1. Regular Salaried and Wage Employment (RSWE)
1. Casual Wage Employment (CWE)
3. Own account employment (OAE)
4. Seeking and/or available for work (S&A)

Of these four categories, the first three were the main categories of economic status for prime-age men: 15,760 of the 53,076 men (30%) were in RSWE; 13,599 men (26% of the total) were in CWE; and 22,270 men (42% of the total) were in OAE. Only 1,447 men (3% of the total) were seeking and available for work.

Being in CWE or in OAE was largely the preserve of poorly educated men while those in RSWE were largely drawn from the ranks of the better educated: of the 13,599 men who were in CWE, 81% had an education standard less than secondary school and 27% were illiterate; of the 22,270 men in OAE, 56% had an education standard less than secondary school and 13% were illiterate; on the other hand, of the 15,760 men who were in RSWE, 68% were educated to secondary (or above) and 33% were graduates (or above).

This study implicitly assumes that becoming a regular salaried or wage worker was the most desirable outcome for prime-aged men and, compared to that, self-employment or casual wage worker were inferior outcomes. One can cite many justifications for this assumption. First, as referred to already, the Prime Minister of India has set up a high-powered committee to look at minority employment and, in particular, to examine why Muslims comprise only a fraction of India’s workforce. Second, this assumption is also consistent

with evidence from the field: for example, Jeffery and Jeffery (1997) in their study of Muslims in Bijnor argued that many Muslims regarded their relative economic weakness as stemming from their being excluded from jobs due to discriminatory practices in hiring. The belief that their sons would not get jobs then led Muslim parents to devalue the importance of education as an instrument of upward economic mobility.<sup>8</sup>

A striking feature of Table 1 is how few men were seeking, and/or available for, work: only 1,447 men (2.7% of the total) were unemployed in the conventional meaning of the term. Moreover, job search appeared to be the prerogative of better educated men: of the 1,447 “unemployed” men, 82% were educated to secondary level or above and 46% were graduates or postgraduates.

Table 2 shows the distribution of prime-age men across the categories of economic status by religion and caste. Since nearly one in ten persons from the OBC were Muslim, they are identified, in this study, separately from the non-Muslims (mostly Hindu, but some Sikhs) of the OBC. These are referred to, respectively, as OBCM and OBCX respectively. Table 2 clearly shows that OBC prime-age males were different from those belonging to the SC in two important respects. First, both Muslim and non-Muslim OBC men were *more* likely to be in self-employment (44 and 53% respectively) than men from the SC (30%). Second, both Muslim and non-Muslim OBC men were *less* likely to work as casual labourers (26% and 23% respectively) than men from the SC (42%).

Prime-age males from the OBC also differed from their high caste Hindu<sup>9</sup> (referred to as HCH) counterparts in two important respects. First, forward caste Hindu men were more likely to be in regular salaried or wage employment (40%) than OBC men (28% of non-Muslim, and 22% of Muslim, OBC men). Second, forward caste Hindu men were even less likely to work as casual labourers (12%) than men from the OBC (23% for non-Muslim and 29% for Muslim OBC males).

Consequently, if one was to establish a hierarchy of communities, in terms of the “desirability” of the economic status of their prime-age men, then the SC, 42% of whose economically active prime age men were in CWE and only 26% were in RSWE, would lie at the bottom; the HCH, with 40% of their

economically active men in RSWE, and only 12% of their men working as casual labourers, would be at the top; and sandwiched between them would be the OBCX and OBCM (non-Muslim and Muslim Other Backward Classes).

Lastly, Table 3 shows the education standards of prime-age men from the different communities. Economically active SC men, and their counterparts from OBC Muslims from the OBC, had the lowest level of educational achievement with more than one in five of them being illiterate. The best educated prime aged economically active men were from the HCH, only 5% of whom were illiterate and 30% of whom were graduates.

### 3. A Multinomial Logit Model of Economic Status Outcomes

The multinomial logit model has been used to analyse occupational outcomes by *inter alia*: Schmidt and Strauss (1975); Borooah (2001). The basic question that such a model seeks to answer is: what is the probability that a person with a particular set of characteristics, will be found in a specific category of economic status (hereafter, simply ‘status’)? These answers obtained by estimating the multinomial logit equation where the dependent variable  $Y_i$  took the values, 1, 2, or 3 depending upon whether person  $i$  is a regular salaried or wage worker; a casual wage worker; or was self-employed (own-account worker).<sup>10</sup> In essence, with self-employment ( $Y_i=3$ ) as the base category, the model consisted of two equations ( $Y_i=1$  and  $Y_i=2$ ) each of which took the following form:

$$\log \left[ \frac{\Pr(Y_i = j)}{\Pr(Y_i = 3)} \right] = f(\text{landholding, social group, education, state}) + \text{error}$$

Tables 4 and 5 show estimates from the multinomial logit model estimated for, respectively, 28,532 prime-age men in the rural sector, and 16,719 prime-age men in the urban sector, who were in *non-family employment*, that is in one of the following (mutually exclusive) categories of economic status: regular salaried or wage employment (RSWE); casual wage employment (CWE); and own account employment (OAE). Hereafter, these employed (as employees or as self-employed) prime aged men are referred to as simply “men”. Excluded from the analysis were: 1,157 men who were employers, 8,262 men who were unpaid family workers, and the 1,447 men who were available for and seeking work. The coefficient estimates are to be interpreted as the *change* in the log

risk-ratios,  $\log \left[ \frac{\Pr(Y_i = j)}{\Pr(Y_i = 3)} \right]$ , consequent upon a unit change in the value of the associated variable.

Positive coefficients in Tables 4 and 5 imply that the ratio increases and negative coefficients imply that it decreases<sup>11</sup>. Because the community, the education standard, the age and the state categories in addition to being mutually exhaustive, were also collectively exhaustive, one of each category had to be omitted from the equation in order to avoid multicollinearity in the presence of the intercept term. These omitted categories were the *reference categories*: OBC Muslims, “illiteracy”, men under the age of 30 years, and Tamil Nadu were the reference categories for, respectively, social group, education, age, and state. The variables shown in Tables 4 and 5 are binary variables, taking the value 1 if a man belonged to that category and zero if he did not.

### ***A New Methodology for Measuring Discrimination***

The basic question that the multinomial logit model of income distribution sought to answer was: *ceteris paribus* what is the probability that a male, with a particular set of characteristics, will be found in a specific status: RSWE, CWE, or OAE? However, as observed earlier, the signs of the coefficient estimates associated with a variable - which, consequent upon a unit change in the value of the variable, reflect the directions of change in the risk-ratios - do not predict the directions of change in the probabilities of the outcomes.

Consequently, in order to answer these questions, we used the method of “predictive margins” to evaluate the following *counterfactual* scenarios:

1. We first treat *all* the men in the sample as high caste Hindus (HCH), with all other non-caste characteristics unchanged. In operational terms, *ceteris paribus*  $FCH_i=1, OBCX_i=0, MSX_i=0, SC_i=0$ , and  $OBCM_i=0, i=1...N$ . where: OBCX refers to non-Muslim OBCs. Suppose that, under this scenario,  $p_j^{HCH}$  is the average probability of a man belonging to status category  $j, j=0, 1, 2$ .
2. Next, we treat *all* the men in the sample as non-Muslims from the OBC,

with all other non-caste characteristics unchanged. In operational terms, *ceteris paribus*  $HCH_i=0$ ,  $OBCX_i=1$ ,  $MSX_i=0$ ,  $OBCM_i=1$ ,  $SC_i=0$ ,  $i=1..N$ . Suppose that, under this scenario,  $p_j^{OBCX}$  is the average probability of a man belonging to status category  $j$ ,  $j=1..4$ .

3. Next, we treat all the men in the sample as non-SC/OBC Muslims, with all other non-caste characteristics unchanged. In operational terms, *ceteris paribus*  $HCH_i=0$ ,  $OBCX_i=0$ ,  $MSX_i=1$ ,  $OBCM_i=1$ ,  $SC_i=0$ ,  $i=1..N$ . Suppose that, under this scenario,  $p_j^{MSX}$  is the average probability of a man belonging to status category  $j$ ,  $j=1..4$ .
4. Next, we treat all the men in the sample as OBC Muslims, with all other non-caste characteristics unchanged. In operational terms, *ceteris paribus*  $HCH_i=0$ ,  $OBCX_i=0$ ,  $MSX_i=0$ ,  $OBCM_i=1$ ,  $SC_i=0$ ,  $i=1..N$ . Suppose that, under this scenario,  $p_j^{OBCM}$  is the average probability of a man belonging to status category  $j$ ,  $j=1..4$ .
5. Lastly, we treat all the men in the sample as from the SC, with all other non-caste characteristics unchanged. In operational terms, *ceteris paribus*  $HCH_i=0$ ,  $OBCX_i=0$ ,  $MSX_i=1$ ,  $OBCM_i=0$ ,  $SC_i=1$ ,  $i=1..N$ . Suppose that, under this scenario,  $p_j^{SC}$  is the average probability of a man belonging to status category  $j$ ,  $j=1..4$ .

The differences between the *adjusted proportions*,  $p_j^{HCH}$ ,  $p_j^{OBCX}$ ,  $p_j^{MSX}$ ,  $p_j^{OBCM}$ , and  $p_j^{SC}$  are entirely the result of *different* sets of coefficients ( $HCH$ ,  $OBCX$ ,  $MSX$ ,  $OBCM$ , and  $SC$ ) being applied to a *given* set of attributes. These differences may, therefore, be attributed to the unequal treatment of men who, except for their caste/religion, are identical in every respect. However, the *sample proportions* of men from the different caste groups – denoted,  $q_j^{HCH}$ ,  $q_j^{OBCX}$ ,  $q_j^{MSX}$ ,  $q_j^{OBCM}$ , and  $q_j^{SC}$  – will, in general, be different from the adjusted proportions. This reflects the fact that men from the different social groups differ not just with respect to their caste/religious backgrounds but also with respect to their attributes. Then the overall disparity faced by (say) SC, relative to HCH, men, with respect to a “desirable” status category  $j$  (for example, RSWE), is measured by the *disparity coefficient*,  $1-\mu_j^{SC}$  where:

$$\mu_j^{SC} = \frac{q_j^{SC}}{q_j^{HCH}}, \text{ where: } 0 \leq \mu_j^{SC} \leq 1 \quad (1)$$

There is no disparity between males from the SC, relative to their HCH

counterparts, with respect to status  $j$ , if  $1 - \mu_j^{SC} = 0$ , that is,  $q_j^{SC} = q_j^{HCH}$ ; at the other extreme, disparity between SC and HCH males, with respect to status  $j$ , is greatest when  $1 - \mu_j^{SC} = 1$  that is,  $q_j^{SC} = 0$ . In turn,  $\mu_j^{SC}$  can be decomposed as:

$$\mu_j^{SC} = \frac{q_j^{SC}}{q_j^{HCH}} = \left[ \frac{p_j^{SC}}{p_j^{HCH}} \right] \times \left[ \frac{q_j^{SC}}{p_j^{SC}} \right] \times \left[ \frac{p_j^{HCH}}{q_j^{HCH}} \right] = \lambda_j^{SC} \times \frac{\pi_j^{SC}}{\pi_j^{HCH}} = \lambda_j^{SC} \times \delta_j^{SC} \quad (2)$$

Then the discrimination faced by SC, relative to HCH men, is measured by the *discrimination coefficient*,  $1 - \lambda_j^{SC}$  where,  $\lambda_j^{SC} = \frac{p_j^{SC}}{p_j^{HCH}}$  in equation (2) above. This represents the ratio of the proportionate representations in status  $j$  of SC and HCH males, where these representations are entirely due to caste/religious factors. When  $1 - \lambda_j^{SC} = 0$ , there is no discrimination since  $p_j^{SC} = p_j^{HCH}$  and when  $1 - \lambda_j^{SC} = 1$  discrimination is at its maximum since  $p_j^{SC} = 0$ , implying that *ceteris paribus* SC men would be completely excluded from status  $j$ . The terms  $\pi_j^{SC} = \frac{q_j^{SC}}{p_j^{SC}}$  and  $\pi_j^{HCH} = \frac{q_j^{HCH}}{p_j^{HCH}}$  are the ratios of the sample to the adjusted proportions for SC and HCH households respectively.

From equation (2), the overall disparity coefficient can be written as the sum of the disparity coefficient ( $1 - \lambda_j^{SC}$ ) and a composite term ( $\lambda_j^{SC} [1 - \delta_j^{SC}]$ ):

$$1 - \mu_j^{SC} = 1 - \lambda_j^{SC} \delta_j^{SC} = 1 - \lambda_j^{SC} \delta_j^{SC} + \lambda_j^{SC} - \lambda_j^{SC} = (1 - \lambda_j^{SC}) + \lambda_j^{SC} (1 - \delta_j^{SC}) \quad (3)$$

The term  $\delta_j^{SC} = \frac{\pi_j^{SC}}{\pi_j^{HCH}} = \left( \frac{q_j^{SC}}{q_j^{HCH}} \right) / \left( \frac{p_j^{SC}}{p_j^{HCH}} \right)$  in equation (3) is a measure of the attributes deficit of men from the SC. The attributes deficit compares the sample ratio of SC and HCH proportions in status  $j$  to the corresponding adjusted ratio.

1. If  $\delta_j^{SC} = 1$ , there is no attributes deficit since the sample and adjusted

ratios are equal:  $\frac{q_j^{SC}}{q_j^{HCH}} = \frac{p_j^{SC}}{p_j^{HCH}}$  implying that  $\pi_j^{SC} = \pi_j^{HCH}$ . In this case, from

equation (3),  $1 - \mu_j^{SC} = 1 - \lambda_j^{SC}$  so that the value of the disparity coefficient equals the value of the discrimination coefficient: *all* of the observed



disparity between SC and HCH males in their representation in status  $j$  is due to discrimination.

2. If  $\delta_j^{SC} < 1$ ,  $(1 - \mu_j^{SC}) > (1 - \lambda_j^{SC})$  since, in equation (3),  $\lambda_j^{SC} (1 - \delta_j^{SC}) > 0$ . The value of the disparity coefficient exceeds the value of the discrimination coefficient: *some* of the observed disparity between SC and HCH males in their representation in status  $j$  is due to discrimination and some is due to the fact that, compared to their HCH counterparts, SC men have *inferior* attributes.
3. If  $\delta_j^{SC} > 1$ ,  $(1 - \mu_j^{SC}) < (1 - \lambda_j^{SC})$  since, in equation (3),  $\lambda_j^{SC} (1 - \delta_j^{SC}) < 0$ . The value of the disparity coefficient is less than the value of the discrimination coefficient: *more than all* the observed disparity between SC and HCH males in their representation in status  $j$  is due to discrimination and SC men neutralise some of this discrimination with *superior* attributes compared to their HCH counterparts.

It is worth emphasising the differences between the decomposition method set out above and the standard Oaxaca (1973) type decomposition in a wage regression. The latter decomposes the observed difference in average wage between two groups into an “explained” and an “unexplained” part. The “explained” part has to do with differences in attributes between the two groups and the “unexplained” part is often identified as being due to discrimination. The Oaxaca (1973) decomposition can be extended to binary choice models in which the difference in *average probabilities* of being in a particular category can be similarly decomposed (Nielsen, 1998). However, when applied to models with multiple discrete outcomes, as in the multinomial logit model, the variable to be decomposed becomes the difference in average log odds-ratios,  $\log \left[ \frac{\Pr(Y_i = j)}{\Pr(Y_i = 3)} \right]$ , which is not so easy to interpret and, in particular, cannot be translated into differences in the underlying probabilities.

The method proposed in this paper overcomes this. Equation (3) shows how the disparity coefficient (which is 1 minus the observed difference in proportions) is decomposed into the discrimination (which is 1 minus the difference in proportions due to discrimination) and a composite term  $\lambda_j^{SC} (1 - \delta_j^{SC})$  where:  $\lambda_j^{SC} (1 - \delta_j^{SC}) = 0$ , if  $\lambda_j^{SC} = 0$  (discrimination is perfect, so attributes don't matter) and  $\lambda_j^{SC} (1 - \delta_j^{SC}) = 1 - \delta_j^{SC}$ , if  $\lambda_j^{SC} = 1$  (discrimination

is absent, so observed differences depend only on attribute differences). In between these extremes,  $\partial\lambda_j^{SC}(1-\delta_j^{SC})/\partial\lambda_j^{SC} = 1-\delta_j^{SC} > 0$  so attribute differences become more (less) important in explaining observed differences as discrimination becomes weaker (stronger).

### ***Measuring Discrimination***

Tables 6 and 7 show values of the disparity and discrimination coefficients, with respect to regular and salaried and wage employment, for men in the rural and urban sectors, respectively, using high caste Hindus as the comparator. Tables 6 and 7 show that the *observed* proportion of high caste Hindu (HCH) men in RSWE was 25.5% in the rural sector and 46.3% in the urban sector; the *observed* proportion of non-Muslim OBC (OBCX) men in RSWE was 18.1% in the rural sector and 35.9% in the urban sector; the *observed* proportion of non-OBC Muslim (MSX) men in RSWE was 13.1% in the rural sector and 26.0% in the urban sector; the *observed* proportion of Muslim OBC (OBCM) men in RSWE was 15.1% in the rural sector and 24.8% in the urban sector; and the *observed* proportion of Scheduled Caste (SC) men in RSWE was 17.2% in the rural sector and 37.8% in the urban sector.

1. If *everyone* in the sample (the OBCX, MSX, OBCM, and SC men) was treated as HCH (in effect, had their attributes evaluated at HCH coefficients), the proportion of men in RSWE would fall from 26.2% to 21.1% in the rural sector and from 48.7% to 43.3% in the urban sector. These falls reflect that the fact that when the *entire* sample of men was being treated as HCH, it had a *lower* quality of attributes than the HCH sub-sample. Consequently the adjusted proportions (21.1% and 41.5%) were *lower* than the observed proportions of HCH men (25.5% and 43.3%) in RSWE.
2. If *everyone* in the sample (the HCH, the MSX, OBCM, and SC men) was treated as OBCX (in effect, had their attributes evaluated at OBCX coefficients), the proportion of men in RSWE would remain unchanged at 18.5% in the rural sector and rise from 36.9% to 38.3% in the urban sector. These small changes reflect the fact that the attributes of the men in the sample, considered in its entirety, was broadly similar to the attributes of the OBCX sub-sample of men.
3. If *everyone* in the sample (the HCH, OBCX, the OBCM, and the SC men)

was treated as MSX (in effect, had their attributes evaluated at MSX coefficients), the proportion of men in RSWE would rise from 13.4% to 16% in the rural sector and rise from 26.8% to 31.6% in the urban sector. These increases reflect the fact that when the *entire* sample of men was being treated as MSX, it had a *higher* quality of attributes than the MSX sub-sample. Consequently the adjusted proportions (16% and 31.6%) were *higher* than the observed proportions of MSX men (13.4% and 26.8%) in RSWE.

4. If *everyone* in the sample (the HCH, OBCX, MSX, and SC men) was treated as OBCM (in effect, had their attributes evaluated at OBCM coefficients), the proportion of men in RSWE would rise from 15.4% to 19.3% in the rural sector and from 25.2% to 31.6% in the urban sector. These increases reflect the fact that when the *entire* sample of men was being treated as OBCM, it had a *higher* quality of attributes than the OBCM sub-sample. Consequently the adjusted proportions (19.3% and 31.6%) were *higher* than the observed proportions of OBCM men (15.4% and 25.2%) in RSWE.
5. Lastly, if *everyone* in the sample (the HCH, OBCX, MSX, and OBCM men) was treated as SC (in effect, had their attributes evaluated at SC coefficients), the proportion of men in RSWE would rise from 17.6% to 21.3% in the rural sector and from 39.1% to 44.1% in the urban sector. These increases reflect the fact that when the *entire* sample of men was being treated as SC, it had a *higher* quality of attributes than the SC sub-sample. Consequently the adjusted proportions (21.3% and 44.1%) were *higher* than the observed proportions of SC men (17.6% and 39.1%) in RSWE.

A feature of the results shown in Tables 5 and 6 is that when the chances of the men in the sample being in RSWE were evaluated using, in turn, the coefficients of each group, the adjusted proportions in RSWE were highest when the HCH coefficients were used. The implication of this is that Hindu coefficients were most favourable for being in RSWE or, in other words, the *same* group of people (that is, *all* the men in the sample) would have had a *higher* chance of being in RSWE had they *all* been HCH compared to *all* being OBCX, or MSX, or OBCM. As argued above, 1 minus the ratio of the HCH and the OBCX (or MSX or OBCM) adjusted proportions ( $1 - p_j^{OBCX} / p_j^{HCH}$ ) is

the value of the discrimination coefficient against OBCX (or MSX or OBCM), vis-à-vis HCH, men and this, as Tables 6 and 7 show, was always positive. In terms of RSWE, men from the OBCX, the MSX, and the OBCM were discriminated against vis-à-vis HCH men.

The exception to this general observation arose when all the men in the sample were treated as though they were from the SC. In this case, the adjusted proportions were the same – both for the rural and urban sectors – as those which resulted from treating *all* the men as though they were HCH. In other words, it made no difference to the chances of the men in the sample being in RSWE whether their attributes were evaluated using HCH or SC coefficients; to put it differently, the results shown in Tables 6 and 7 imply that there was no discrimination against SC, vis-à-vis HCH, men!

The answer to this counter-intuitive result lies in the reservation of jobs for the SC instituted, as noted above, under the aegis of the Indian constitution. A major reason for jobs reservation was to combat discrimination against persons from the SC who, along with persons from the Scheduled Tribes, are arguably the most down trodden of India's population. Jobs reservation cannot alter the employment-related attributes of the SC but, *given those attributes*, it can raise the proportion of persons from the SC who secure RSWE by shifting the coefficients of the employment equations in favour of persons from this group. In respect, jobs reservation for the SC has succeeded in neutralising the discrimination that they undeniably face from other sections of Indian society. For SC men who, for reasons of discrimination, are turned down for RSWE in favour of a HCH man in the private sector, where jobs reservation does not apply, positive discrimination ensures that there are HCH men who are turned down in favour of SC men in the public sector where jobs reservation does apply. As our results show, the two effects are self-cancelling: positive discrimination in favour of SC men neutralises its negative counterpart against SC men.

So, given their attributes *and the advantage of jobs reservation* (as reflected in the SC coefficients), SC men achieve a RSWE representation of 17.6% in rural areas and 39.1% in urban areas. If everyone was treated as a SC male, RSWE representation would rise to 21.3% in rural areas and 44.1% in urban areas – the superior attributes of the men in the sample in its entirety,

relative to men in the SC sub-sample, *would combine with jobs reservation* (as reflected in the SC coefficients) to yield the higher proportions in RSWE.

These observations then raise the counterfactual question of what the representation of SC men in RSWE *would have been* had they *not* been protected by jobs reservation? In order to see how effective jobs reservation was in raising the proportions of SC men in RSWE we consider what these proportions *would have been* if the attributes of these men had been evaluated using the coefficients of employment-deficit groups *who did not benefit from jobs reservation*: OBC and non-OBC Muslims. This was implemented by estimating the multinomial logit equations, shown in Tables 4 and 5, *on the Muslim subsample (MSX+OBCM) only* and then using these estimates to *predict the proportion SC men in RSWE*. Our results show that if SC men had been treated as Muslims, their proportion in RSWE in the *rural* sector would have fallen from the observed 17.6% to 16% and proportion in RSWE in the *urban* sector would have fallen from the observed 39.1% to 28.3%. So, on our estimates, jobs reservation added 1.6 percentage points to SC male representation in RSWE in the rural sector and added 10.8 percentage points to SC male representation in RSWE in the urban sector.

Jobs reservation is, of course, one way of raising SC representation in RSWE. Another way is to raise the educational levels of persons from the SC. For example, as Table 3 shows, 21% of SC, compared to 13% of non-Muslim OBC and 10% of non-OBC Muslim, men were illiterate. At the other end of the educational spectrum, only 9% of SC, compared to 13% of non-Muslim OBC and 11% of non-OBC Muslim, men were graduates. So, a natural question that rises is by how much would the RSWE representation of SC males improve if their educational levels rose to, say, that of non-OBC men?

Our calculations suggest that if men from the SC in the rural sector had had the education standards of rural sector non-Muslim men from the OBC, their proportion in *rural* RSWE would have been 22% instead of the observed 17.6% and their proportion in *urban* RSWE would have been 42.1% instead of the observed 39.1%: rises of 4.4 and 3 points which could be ascribed to the rise in the education standard of men from the SC to the standard of non-Muslims from the OBC.

Access to RSWE is one aspect of labour market welfare and, as we have argued, jobs reservation has succeeded in delivering to SC men a share in urban RSWE that is nearly 11 points more than what they might have expected in its absence. However, another aspect of labour market welfare is the *quality* of RSWE. Although this quality has many dimensions, the wage rate obtained in RSWE is, arguably, a good encapsulation of these. The next section turns to a discussion of issues relating to wages.

#### 4. A Model of Wage Rate Determination

The NSS gives details of a person's current weekly status in terms of whether in the course of a reference week a person was: in RSWE; in casual wage employment; self-employment; unemployed. The NSS also reports the intensity of work in terms of whether a person, if he was not unemployed, worked a full day (value 1) or a half day (value 0.5). The maximum and minimum number of (full) days an employed person could work was, therefore, 7 and 0.5, respectively.<sup>12</sup> The NSS also reports on the total wages received every person who was employed during that week; dividing wages by the number of days worked then yields the daily wage rate. Hereafter, this is referred to as the wage rate.

Table 8 shows that the wage rate for HCH men in rural and urban RSWE was, respectively, 32% and 64% above the corresponding SC wage rate: HCH men earned Rs. 391 and Rs. 556 per day, while SC men earned Rs. 296 and Rs. 339 per day, in, respectively, rural and urban RSWE. The mark up of the RSWE wage rate over the wage rate for CWE was considerably higher for HCH, compared to SC, men: 2.4 and 2.8 for HCH men in the rural and urban sectors and 1.8 for SC men in both sectors. HCH males also earned 42% more in urban, compared to rural, RSWE while OBCM males earned only 2% more (Rs. 288 compared to Rs. 282) and OBCX males actually earned less in the urban, compared to the rural, sector (Rs. 361 versus Rs. 334).

Tables 9 and 10 show the results of estimating a wage equation, in which the dependent variable was the wage rate (as defined above) for, respectively, the sample of 15,902 men in rural India and the sample of 10,096 employee men in urban India. The rural and urban equations explained, respectively, 33.5% ( $\bar{R}^2 = 0.335$ ) and 26.9% ( $\bar{R}^2 = 0.269$ ) of the variation in wage rates among

men. The interpretation of the estimates in these tables is as follows. A male with all the “reference” characteristics (an OBC Muslim male in casual wage employment, below the age of 30, owning minimal or no land, illiterate, not holding a National Rural Employment Guarantee (NREG) card, and living in Tamil Nadu would earn Rs. 178 and Rs. 90 as daily wages in, respectively, the rural and urban sectors. For such a man, working in the *rural* sector in any other state of India (except Kerala, where he would earn Rs. 83 more) would reduce his wages for example, by Rs. 58 in Maharashtra and by Rs. 31 in Punjab. However, working in the *urban* sector, would raise his wage rate in several states: in Delhi by Rs. 189, in Haryana by Rs. 180, and in Kerala by Rs. 78.

By far, *ceteris paribus* the largest contributor to a higher wage rate was being a graduate or higher. Having this educational level would add Rs. 235 to the wage rate in rural areas and Rs. 400 to the wage rate in urban areas; in contrast, having a level of education between higher secondary and a diploma would add only Rs. 60 to the rural wage rate and Rs. 88 to the urban wage rate. The next biggest contributor was in being in regular, as opposed to casual, employment – this fact would add Rs. 72 to the rural wage rate and Rs. 59 to the urban wage rate. In rural areas, those who had a NREG card would earn Rs. 36 less in daily wages than those who did not have this card.

Not surprisingly, the wage rate increased with the wage of the employee: workers who were aged 40-45 earned more than workers aged 35-40, who earned more than workers aged 30-35 workers and who, in turn, earned more than the youngest (below 30 years) workers. In a similar fashion, the wage rate was higher for those who owned more assets by way of land: workers who were in the top quintile of land owners earned more than workers in the next quintile and so on.

Compared to rural areas, caste effects on the wage rate were significant in both rural and urban India but these were stronger in urban areas. With OBC Muslims as the reference group, *ceteris paribus* HCH males earned Rs. 72 more in daily wages than OBC Muslims in urban areas but only Rs. 6 more in rural areas; SC males earned Rs. 25 less in daily wages than OBC Muslims in urban areas but only Rs. 5 less in rural areas. A slightly surprising feature of the results is that *ceteris paribus* except for HCH males, men in all the groups

had a *lower* wage rate in the urban sector than for OBC men and, except for HCH and non-OBC Muslims, also had a *lower* wage rate in the rural sector than for OBC men. This can largely be explained by the high wage rate for OBC men in casual wage employment – as Table 8 shows, OBC Muslim men had the highest CWE wage rate in the rural sector (Rs. 196) and the CWE wage rate of OBC Muslim men in the urban sector (Rs. 198) was only slightly lower than that for non-OBC men (Rs. 201) and considerably higher than that for non-OBC Muslim (Rs. 164) and SC (Rs. 184) males. Excluding HCH males, of the total number of employees in the sample, 59% of were in CWE, with 41% in RSWE. In terms of the *overall* wage rate, therefore, this put OBC Muslim men at an advantage over men from all groups except HCH males.

### ***The Decomposition of Wage Rates***

In the previous analysis, a *single* regression was estimated over all the regardless of the group to which they belonged. The implicit assumption was that all the men from the different groups (HCH, OBCX, MSX, OBCM, SC) faced the *same* regression coefficients in the evaluation of their attributes and that the *only* coefficient that distinguished between them the caste/religion variable. Under this assumption, as discussed above, caste played a significant role in determining wage rates.

This assumption is relaxed by estimating separate equations between the two groups and allowing the coefficients to be different between them. This raises the following question: when we observe a difference in mean achievement between the groups how much is it due to a difference in attributes and how much is due to a difference in coefficients? So the first step is to ask what the HCH/SC difference (and the HCH/OBCX, the HCH/MSX, and the HCH/OBCM difference) *would have been* if both sets of attributes were evaluated at a *common* coefficient vector. This difference could then be entirely ascribed to a *difference in attributes* since coefficient differences would have been neutralised. Then the *observed* difference less the *difference due to attributes* is the *residual* or *unexplained* difference. It is this residual difference that can, subject to several *caveats*, be interpreted as due to discrimination.<sup>13</sup>

A recent formal exposition of the Blinder-Oaxaca (B-O) decomposition method (named after Blinder, 1973 and Oaxaca, 1973) for *linear* regression



models is to be found in Jann (2008). Suppose there are two groups, H and S with Y as an outcome variable such that  $E(Y_H)$  and  $E(Y_S)$  are the *expected* values of the outcome variable for, respectively, groups H and S. Then:

$$Y_k = X_k' \beta_k + \varepsilon_k, \quad k = H, S \quad (4)$$

Where  $\mathbf{Y}_k$  is the vector of outcomes,  $\mathbf{X}_k$  is the matrix of observations, and  $\varepsilon_k$  is the vector of error terms for persons in group k. Since, by assumption  $E(\varepsilon_k) = 0$ , we have:

$$\begin{aligned} R &= E(Y_H) - E(Y_S) = E(X_H')\beta_H - E(X_S')\beta_S \\ &= E(X_H')\beta_H - E(X_S')\beta_S + E(X_H')\beta^* - E(X_H')\beta^* + E(X_S')\beta^* - E(X_S')\beta^* \\ &= E(X_H - X_S)'\beta^* + \left[ E(X_H')(\beta_H - \beta^*) + E(X_S')(\beta^* - \beta_S) \right] \\ &= U + V \end{aligned} \quad (5)$$

Equation (5) yields a two-fold decomposition in which the term  $U = E(X_H - X_S)'\beta^*$  is the part of the outcome difference that can be explained by the difference in attributes, and the term  $V = E(X_H')(\beta_H - \beta^*) + E(X_S')(\beta^* - \beta_S)$  is the unexplained part. The latter is usually ascribed to discrimination. In general, the problem of defining  $\beta^*$ , the non-discriminatory coefficient vector, is a big issue in the decomposition literature on discrimination. One possibility is to identify  $\beta^*$  with the coefficients of one of the groups. Another is to regard it as the average of the two group coefficients (Reimers, 1983):  $\beta^* = 0.5 \times \beta_H + 0.5 \times \beta_S$ . Yet another (Cotton, 1988) is to weight the coefficients by the size of the groups:  $\beta^* = n_H \times \beta_H + n_S \times \beta_S$  where  $n_H$  and  $n_S$  are the proportions in groups H and S. The pair-wise decompositions in this paper were carried out by the pooling the observations for: HCH and SC men; HCH and OBCX men; HCH and MSX men; HCH and OBCM men. Separate pairwise decompositions were conducted by RSWE and CWE wage rates for the rural and urban sectors: (i) rural, RWSE; (ii) rural CWE; (iii) urban RWSE; (iv) urban CWE.

Tables 11-14 show the results from the decomposition analysis for RSWE in the urban sector.<sup>14</sup> For example, Table 14 shows that there was a difference of Rs. 231 between the HCH and SC male wage rates: Rs. 573 and Rs. 341, respectively. Of this difference, Rs. 144 (62%) was due to a difference in attributes between males from the two groups and Rs. 87 (38%) was the “unexplained” difference. Tables 12 and 13 show that for Muslim males (both

non-OBC and OBC), the contribution of the attributes difference was much higher – 71% for non-OBC Muslim and 77% for OBC Muslim males; lastly, Table 11 shows that the contribution of the attributes difference was smallest for 55%.

The above observations beg the question of what are the attributes that matter in explaining differences between the social groups in their male wage rates for RSWE in the urban sector. Table 15 shows the contributions that differences in the various attributes made to the *overall* attributes difference between of HCH males and males from the other groups in their urban RSWE wage rate. The largest contribution to the attribute difference between HCH males and males from the other groups was graduate level education. The difference in this attribute alone accounted for: 74% of the total attributes difference between HCH and non-Muslim OBC males (Rs. 75 of Rs. 106); 75% of the total attributes difference between HCH and non-OBC Muslim males (Rs. 117 of Rs. 157); 70% of the total attributes difference between HCH and OBC Muslim males (Rs. 162 of Rs. 232); and 88% of the total attribute difference between HCH and SC males (Rs. 127 of Rs. 144).

## 5. Conclusions

This paper attempted to quantify the effects of reserving jobs in India for persons from the SC and ST. A major conclusion of the analysis was that it made no difference to the chances of the men in the sample being in regular salaried or wage employment (RSWE) whether their attributes were evaluated using HCH or SC coefficients; to put it differently, the results showed that there was no discrimination against SC, vis-à-vis HCH, men in terms of their presence among those in RSWE!

The answer to this counter-intuitive result lies in the reservation of jobs for the SC instituted, as noted above, under the aegis of the Indian constitution. The goal of jobs reservation in India has been to bring about an improvement in the welfare of those who are, and have been for a long time, economically and socially depressed. A major reason for jobs reservation was to combat discrimination against persons from the SC who, along with persons from the Scheduled Tribes, are arguably the most down trodden of India's population.

Jobs reservation cannot alter the employment-related attributes of the SC but, *given those attributes*, it can raise the proportion of persons from the SC who secure RSWE by shifting the coefficients of the employment equations in favour of persons from this group. In this respect, jobs reservation for the SC has succeeded in neutralising the discrimination that they undeniably face from other sections of Indian society. For SC men who, for reasons of discrimination, are turned down for RSWE in favour of a HCH man in the private sector - where jobs reservation does not apply - positive discrimination ensures that there are HCH men who are turned down in favour of SC men in the public sector where jobs reservation does apply. As our results show, the two effects are self-cancelling: positive discrimination in favour of SC men neutralises its negative counterpart against SC men. However in comparison to the other groups, Hindu coefficients were most favourable for being in RSWE or, in other words, *ceteris paribus* our sample of men would have had a *higher* chance of being in RSWE had they *all* been HCH compared to *all* being OBCX, or MSX, or OBCM. To put it differently, compared to HCH men, men from the OBCX, the MSX, and the OBCM were discriminated against in respect of RSWE.

Compared to an absence of discrimination, between men from the HCH and the SC, in respect of *access* to RSWE, there was considerable discrimination between men from these groups in respect of *remuneration* from RSWE. Of the difference of Rs. 231 between the HCH and SC male wage rates in RSWE (Rs. 573 and Rs. 341, respectively), 62% was due to a difference in *attributes* between males from the two groups and 38% was the result of *unexplained* difference. For Muslim males (both non-OBC and OBC), the contribution of the attributes difference was much higher – 71% for non-OBC Muslim and 77% for OBC Muslim males whereas, at 55%, the contribution of the attributes difference was smallest for OBC Hindu males.

In terms of the important attributes that influenced wage rates, the most important was graduate level education. The contribution of this attribute alone accounted for 70%-88% of the total attributes contribution to the RSWE wage rate difference between HCH and non-HCH males. If employees from the non-HCH groups could raise their performance in respect of degree level education to HCH levels then much of the difference in RSWE wage rates between them and HCH males due to attribute differences would disappear.

However, needless to say, differences in RSWE wages due to discrimination would continue.

The importance of education forces one to reflect on the schooling experience of *Dalit* and Muslim children. Thrown in as a minority group with children from the higher social groups they face discrimination, exclusion, and humiliation. Nambissan (2010) in her study of the experiences of *Dalit* children in schools in Jaipur district in the state of Rajasthan concluded that “social relations and the pedagogic processes fail to ensure full participation of *Dalit* children and they are subject to discriminatory and unequal treatment in relation to their peers” (p. 282). Ramachandran and Naorem (2013) call on policymakers in India to officially acknowledge the prevalence of exclusionary practices in schools and the urgent need to address them.

The role of social identity in shaping outcomes in work and education has been extensively discussed by Akerlof and Kranton (2010). They argued that the traditional economic model in which students, as rational decision makers, weighed the economic costs and benefits of schooling was flawed because it took no account of the constraints imposed by the social identities of the children. Using examples from the USA, they showed that the social burden of being Black or Hispanic led many children from such groups to underperform relative to their white peers even within the same school: consequently, relative to social pressures, the economic return to education in terms of more pleasant and better paid jobs could be a weak determinant of children’s efforts at school. The solution for such “identity-based” problems is to view schools not just as imparting skills but also teaching norms of behaviour and, by so doing, becoming a sanctuary from the dysfunctional world outside its walls.

**Table 1: Economic Status and Educational Standards of Economically Active Men between 22 and 45 years of age (June 2011-June 2012)**

Economic Status	Illiterate	Literate, but below primary	Primary or Middle	Secondary	Graduate	Total
Regular Salaried and Wage Employment	838 5.3	603 3.8	3,585 22.8	5,488 34.8	5,246 33.3	15,760 100
Casual Wage Employment	11.3	13.9	21.2	35.2	59.4	29.7
Own Account Workers	3,608 26.5	1,795 13.2	5,590 41.1	2,383 17.5	223 1.6	13,599 100
Available and Searching for Work	48.6	41.4	33.1	15.3	2.5	25.6
Total	2,936 13.2	1,906 8.6	7,541 33.9	7,192 32.3	2,695 12.1	22,270 100
Available and Searching for Work	39.6	44.0	44.6	46.2	30.5	42.0
Total	36 2.5	30 2.1	194 13.4	517 35.7	670 46.3	1,447 100
Available and Searching for Work	0.5	0.7	1.2	3.3	7.6	2.7
Total	7,418 14.0	4,334 8.2	16,910 31.9	15,580 29.4	8,834 16.6	53,076 100
	100	100	100	100	100	100

Notes to Table 1:

First figure in column is total in caste/religion category; second figure is row percentage; third figure is column percentage.

Source: NSS 68<sup>th</sup> Round

**Table 2: Economic Status and Caste/Religion of Men between 22 and 45 years of age (June 2011-June 2012)**

Caste/Religion	RSWE	CWE	OAW	A&S	Total
High Caste Hindu	5,353 40.0	1,536 11.5	6,005 44.9	495 3.7	13,389 100
Non-Muslim OBC	34.0	11.3	27.0	34.2	25.2
Non-OBC Muslim	5,882 27.8	5,477 25.9	9,296 44.0	494 2.3	21,149 100
OBC Muslim	37.3	40.3	41.7	34.1	39.9
Scheduled Castes	775 21.5	819 22.72	1,903 52.8	107 3.0	3,604 100
Total	4.9 851	6.0 1,135	8.6 1,805	7.4 76	6.8 3,867
	22.0	29.4	46.7	2.0	100
	5.4	8.4	8.1	5.3	7.3
	2,899 26.2	4,632 41.9	3,261 29.5	275 2.5	11,067 100
Total	18.4 15,760	34.1 13,599	14.6 22,270	19.0 1,447	20.9 53,076
	29.7	25.6	42.0	2.7	100
	100	100	100	100	100

Notes to Table 2:

RSWE=regular salaried or wage employment; CWE=Casual Wage Employment; OAW=Own Account Worker; A&S= Available and Seeking Work

First figure in column is total in caste/religion category; second figure is row percentage; third figure is column percentage.

Source: NSS 68<sup>th</sup> Round

**Table 3: Education Standard and Caste/Religion of Men between 22 and 45 years of age (June 2011-June 2012)**

Caste/ Religion	Illiterate	Literate, but below primary	Primary or Middle	Secondary	Graduate	Total
High Caste Hindu	684 5.1 9.2	587 4.4 13.5	3,216 24.0 19.0	4,852 36.2 31.1	4,050 30 45.9	13,389 100 25.2
Non-Muslim OBC	2,824 13.4 38.1	1,769 8.4 40.8	6,972 33.0 41.2	6,501 30.7 41.7	3,083 14.6 34.9	21,149 100 39.9
Non-OBC Muslim	717 19.9 9.7	402 11.2 9.3	1,317 36.5 7.8	791 22.0 5.1	377 10.5 4.3	3,604 100 6.8
OBC Muslim	860 22.2 11.6	407 10.5 9.4	1,457 37.7 8.6	863 22.3 5.5	280 7.2 3.2	3,867 100 7.29
Scheduled Castes	2,333 21.1 31.5	1,169 10.6 27.0	3,948 35.7 23.4	2,573 23.3 16.5	1,044 9.4 11.8	11,067 100.0 20.9
Total	7,418 14.0 100	4,334 8.2 100	16,910 31.9 100	15,580 29.4 100	8,834 16.6 100	53,076 100 100

## Notes to Table 3

First figure in column is total in caste/religion category; second figure is row percentage; third figure is column percentage.

Source: NSS 68<sup>th</sup> Round

**Table 4: Multinomial Logit Estimates for Men in the Rural Sector**

	Regular Salaried and Wage Workers			Casual Labourers		
	Rel- ative Risk Ratio	z-Value	P>  z	Rel- ative Risk Ratio	z-Value	P>  z
High Caste Hindus	1.027	0.30	0.76	0.914	-1.18	0.24
Non-Muslim OBC	0.948	-0.63	0.53	1.271	3.65	0.00
Non-SC/OBC Muslim	0.634	-3.84	0.00	0.921	-0.91	0.37
Scheduled Caste	1.437	4.05	0.00	2.191	11.33	0.00
Land Ownership: 2 <sup>nd</sup> quintile	1.059	0.83	0.41	0.893	-2.13	0.03
Land Ownership: 3 <sup>rd</sup> quintile	0.847	-2.41	0.02	0.727	-6.01	0.00
Land Ownership: 4 <sup>th</sup> quintile	0.583	-8.48	0.00	0.322	-22.26	0.00
Land Ownership: 5 <sup>th</sup> quintile	0.353	-15.92	0.00	0.084	-37.06	0.00
Age: 30-35	0.669	-8.32	0.00	0.591	-12.38	0.00
Age: 35-40	0.636	-9.53	0.00	0.462	-18.27	0.00
Age: 40-45	0.661	-8.31	0.00	0.398	-20.36	0.00
Literate but Below Primary Education	0.994	-0.06	0.95	0.718	-5.86	0.00
Primary and Middle Educa- tion	1.439	4.99	0.00	0.535	-14.37	0.00
Secondary and Higher Sec- ondary	2.849	14.51	0.00	0.324	-22.38	0.00
Graduate and above	10.842	30.23	0.00	0.158	-18.05	0.00
NREG card	0.756	-6.38	0.00	2.185	22.36	0.00
Himachal Pradesh	1.075	0.63	0.53	0.999	-0.01	1.00
Punjab	0.732	-2.50	0.01	0.859	-1.32	0.19
Uttaranchal	0.429	-6.00	0.00	0.664	-3.13	0.00
Haryana	0.433	-7.46	0.00	0.733	-2.88	0.00
Rajasthan	0.644	-4.27	0.00	0.758	-2.87	0.00
Uttar Pradesh	0.283	-14.79	0.00	0.607	-6.58	0.00
Bihar	0.190	-16.18	0.00	0.751	-3.45	0.00
Assam	0.351	-9.73	0.00	0.457	-7.72	0.00
West Bengal	0.359	-10.50	0.00	0.473	-8.70	0.00
Jharkand	0.266	-9.93	0.00	0.756	-2.70	0.01
Orissa	0.450	-7.99	0.00	0.551	-6.39	0.00
Chhattisgarh	0.522	-5.03	0.00	0.714	-2.74	0.01
Madhya Pradesh	0.330	-10.01	0.00	0.438	-8.49	0.00
Gujarat	0.633	-4.15	0.00	0.540	-5.49	0.00
Maharashtra	0.545	-7.04	0.00	0.853	-1.84	0.07
Andhra Pradesh	0.501	-7.77	0.00	0.469	-9.01	0.00
Karnataka	0.532	-6.14	0.00	0.881	-1.28	0.20
Kerala	0.748	-2.55	0.01	2.053	7.20	0.00
	0.768	-2.04	0.04	3.539	12.40	0.00

27,857 observations on economically active men, 22-45 years of age

Pseudo R<sup>2</sup>=0.1984

Reference categories are: OBC Muslims; lowest quintile of land ownership; younger than 30 years; illiterate; Tamil Nadu.

**Table 5: Multinomial Logit Estimates for Men in the Urban Sector**

	Regular Salaried and Wage Workers			Casual Labourers		
	Relative Risk Ratio	z-Value	P>  z	Relative Risk Ratio	z-Value	P>  z
High Caste Hindus	1.648	6.55	0.00	1.060	0.59	0.56
Non-Muslim OBC	1.525	5.75	0.00	1.849	7.54	0.00
Non-SC/OBC Muslim	0.980	-0.21	0.83	1.106	0.91	0.37
Scheduled Caste	2.450	10.87	0.00	3.633	14.42	0.00
Land Ownership: 2 <sup>nd</sup> quintile	0.860	-3.14	0.00	1.044	0.72	0.47
Land Ownership: 3 <sup>rd</sup> quintile	0.793	-4.10	0.00	0.782	-3.29	0.00
Land Ownership: 4 <sup>th</sup> quintile	0.841	-2.30	0.02	0.625	-4.36	0.00
Land Ownership: 5 <sup>th</sup> quintile	0.475	-8.89	0.00	0.350	-6.91	0.00
Age: 30-35	0.585	-10.39	0.00	0.491	-10.91	0.00
Age: 35-40	0.587	-10.76	0.00	0.389	-14.47	0.00
Age: 40-45	0.540	-11.88	0.00	0.326	-15.98	0.00
Literate but Below Primary Education	1.075	0.65	0.52	0.746	-3.06	0.00
Primary and Middle Education	1.303	3.23	0.00	0.459	-10.63	0.00
Secondary and Higher Secondary	1.640	6.13	0.00	0.188	-20.76	0.00
Graduate and above	3.645	15.43	0.00	0.049	-21.35	0.00
NREG card	0.738	-1.46	0.15	0.544	-2.12	0.03
Himachal Pradesh	1.012	0.10	0.92	0.256	-8.92	0.00
Punjab	1.063	0.17	0.86	0.077	-2.36	0.02
Chandigarh	0.462	-5.11	0.00	0.233	-6.56	0.00
Uttaranchal	0.826	-1.60	0.11	0.425	-5.44	0.00
Haryana	1.253	1.51	0.13	0.145	-7.55	0.00
Delhi	0.765	-2.41	0.02	0.326	-8.13	0.00
Rajasthan	0.491	-7.39	0.00	0.268	-11.90	0.00
Uttar Pradesh	0.375	-8.26	0.00	0.328	-8.39	0.00
Bihar	0.428	-6.15	0.00	0.199	-8.21	0.00
Assam	0.600	-4.89	0.00	0.408	-7.20	0.00
West Bengal	0.550	-4.51	0.00	0.502	-4.41	0.00
Jharkand	0.643	-3.34	0.00	0.321	-6.59	0.00
Orissa	0.936	-0.41	0.68	0.577	-2.77	0.01
Chhattisgarh	0.469	-7.17	0.00	0.288	-10.03	0.00
Madhya Pradesh	0.987	-0.12	0.90	0.239	-9.56	0.00
Gujarat	0.943	-0.62	0.53	0.377	-8.42	0.00
Maharashtra	0.919	-0.80	0.42	0.419	-6.78	0.00
Andhra Pradesh	0.705	-3.11	0.00	0.602	-3.98	0.00
Karnataka	0.949	-0.41	0.68	1.928	5.03	0.00
Kerala	0.774	-2.06	0.04	3.689	10.17	0.00

16,125 observations on employed men, 22-45 years of age

Pseudo R<sup>2</sup>=0.1416

Reference categories are: OBC Muslims; lowest quintile of land ownership; younger than 30 years; illiterate; Tamil Nadu.



**Table 6: Disparity and Discrimination Coefficient Values for Regular Salaried and Wage Employment in the Rural Sector, by Caste and Religion**

	Observed Proportion	Adjusted Proportion	Disparity Coefficient: $1 - \mu_j^c$	Discrimination Coefficient: $1 - \lambda_j^c$	Discrimination/Disparity Ratio
High Caste Hindus	0.262	0.211	$1 - (0.262/0.262) = 0.0$		
Non-Muslim OBC	0.185	0.185	$1 - (0.185/0.262) = 0.29$	$1 - (0.185/0.211) = 0.12$	44.8%
Non-SC/OBC Muslims	0.134	0.160	$1 - (0.134/0.262) = 0.49$	$1 - (0.160/0.211) = 0.24$	49.0%
OBC Muslims	0.154	0.193	$1 - (0.154/0.262) = 0.41$	$1 - (0.193/0.211) = 0.09$	65.9%
Scheduled Castes	0.176	0.213	$1 - (0.176/0.262) = 0.33$	$1 - (0.213/0.211) = 0.0$	0%

**Table 7: Disparity and Discrimination Coefficient Values for Regular Salaried and Wage Employment in the Urban Sector, by Caste and Religion**

	Observed Proportion	Adjusted Proportion	Disparity Coefficient with respect to HCH: $1 - \mu_j^c$	Discrimination Coefficient with respect to HCH: $1 - \lambda_j^c$	Discrimination/Disparity Ratio
High Caste Hindus	0.487	0.433	$1 - (0.487/0.487) = 0.0$		
Non-Muslim OBC	0.369	0.383	$1 - (0.369/0.487) = 0.24$	$1 - (0.383/0.433) = 0.12$	45.5%
Non-SC/OBC Muslims	0.268	0.316	$1 - (0.268/0.487) = 0.45$	$1 - (0.316/0.433) = 0.27$	63.6%
OBC Muslims	0.252	0.316	$1 - (0.252/0.487) = 0.48$	$1 - (0.316/0.433) = 0.23$	56.5%
Scheduled Castes	0.391	0.441	$1 - (0.391/0.487) = 0.11$	$1 - (0.441/0.433) = -0.02$	0%

**Table 8: Wage Rates by Employment Type, Rural/Urban, and Social Group**

	Rural				Urban		% in RSWE (Rural+Urban)
	RSWE	CWE	RSWE/CWE	RSWE	CWL	RSWE/CWL	
High Caste Hindus	391	165	2.4	556	208	2.7	74
Non-Muslim OBC	327	177	1.8	375	201	1.9	47
Non-OBC Muslims	361	151	2.4	334	164	2.0	43
OBC Muslims	288	196	1.5	282	198	1.4	38
Scheduled Castes	296	166	1.8	339	184	1.8	34
Sample Average	341	168	2.0	431	193	2.2	48

RSWE=Regular Salaried and Wage Employment; CWE=Casual Wage Employment  
Source: NSS 68<sup>th</sup> Round

**Table 9: Estimates for the Wage Equation for Employees in Rural Employment**

<b>Dependent Variable: Wage Rate per Day</b>	<b>Coefficient Estimate</b>	<b>Standard Error</b>	<b>T value</b>	<b>P&gt;t</b>
Regular Salaried and Wage Employment	72.06	3.68	19.59	19.59
High Caste Hindus	5.69	5.26	1.08	1.08
Non-Muslim OBC	-5.84	4.25	-1.37	-1.37
Non-SC/OBC Muslim	2.57	8.11	0.32	0.32
Scheduled Caste	-4.67	4.51	-1.03	-1.03
Land Ownership: 2 <sup>nd</sup> quintile	6.40	4.36	1.47	1.47
Land Ownership: 3 <sup>rd</sup> quintile	8.68	4.75	1.83	1.83
Land Ownership: 4 <sup>th</sup> quintile	13.08	4.63	2.82	2.82
Land Ownership: 5 <sup>th</sup> quintile	43.72	5.66	7.73	7.73
Age: 30-35	33.51	3.80	8.81	8.81
Age: 35-40	59.05	3.83	15.41	15.41
Age: 40-45	100.48	4.12	24.40	24.40
Literate but Below Primary Education	9.59	5.51	1.74	1.74
Primary and Middle Education	11.72	4.23	2.77	2.77
Secondary and Higher Secondary	60.26	4.88	12.35	12.35
Graduate and above	235.22	6.11	38.52	38.52
NREG card	-36.37	3.26	-11.16	-11.16
Himachal Pradesh	-34.41	9.68	-3.55	-3.55
Punjab	-30.90	8.77	-3.52	-3.52
Uttaranchal	-10.73	12.77	-0.84	-0.84
Haryana	-0.55	9.35	-0.06	-0.06
Rajasthan	-35.81	8.23	-4.35	-4.35
Uttar Pradesh	-89.63	6.73	-13.33	-13.33
Bihar	-65.39	7.61	-8.59	-8.59
Assam	-12.41	9.37	-1.32	-1.32
West Bengal	-59.84	7.54	-7.94	-7.94
Jharkhand	-57.14	9.24	-6.18	-6.18
Orissa	-103.08	7.95	-12.97	-12.97
Chhattisgarh	-138.21	9.85	-14.04	-14.04
Madhya Pradesh	-103.30	8.32	-12.42	-12.42
Gujarat	-84.11	8.83	-9.53	-9.53
Maharashtra	-58.07	7.12	-8.15	-8.15
Andhra Pradesh	-66.12	7.18	-9.21	-9.21
Karnataka	-75.70	8.40	-9.01	-9.01
Kerala	82.50	8.02	10.29	10.29
Intercept	178.36	7.87	22.68	22.68

**Table 10: Estimates for the Wage Equation for Employees in Urban Employment**

<b>Dependent Variable: Wage Rate per Day</b>	<b>Coefficient Estimate</b>	<b>Standard Error</b>	<b>t value</b>	<b>P&gt;t</b>
Regular Salaried and Wage Employment	59.28	9.47	6.26	0.00
High Caste Hindus	71.63	12.80	5.60	0.00
Non-Muslim OBC	-34.36	11.91	-2.89	0.00
Non-SC/OBC Muslim	-14.10	18.64	-0.76	0.45
Scheduled Caste	-24.80	13.03	-1.90	0.06
Land Ownership: 2 <sup>nd</sup> quintile	35.90	9.08	3.95	0.00
Land Ownership: 3 <sup>rd</sup> quintile	90.93	12.58	7.23	0.00
Land Ownership: 4 <sup>th</sup> quintile	40.50	16.20	2.50	0.01
Land Ownership: 5 <sup>th</sup> quintile	62.95	19.54	3.22	0.00
Age: 30-35	62.27	10.02	6.21	0.00
Age: 35-40	113.60	9.84	11.55	0.00
Age: 40-45	156.54	10.50	14.91	0.00
Literate but Below Primary Education	11.39	18.60	0.61	0.54
Primary and Middle Education	11.90	13.97	0.85	0.39
Secondary and Higher Secondary	88.45	14.52	6.09	0.00
Graduate and above	399.78	15.50	25.79	0.00
Himachal Pradesh	-42.87	42.72	-1.00	0.32
Punjab	-20.18	21.01	-0.96	0.34
Chandigarh	84.43	73.53	1.15	0.25
Uttaranchal	-15.32	33.35	-0.46	0.65
Haryana	180.26	22.60	7.98	0.00
Delhi	189.21	26.96	7.02	0.00
Rajasthan	-45.59	20.97	-2.17	0.03
Uttar Pradesh	-38.01	18.14	-2.10	0.04
Bihar	-43.41	23.54	-1.84	0.07
Assam	-18.58	29.95	-0.62	0.54
West Bengal	-64.29	19.55	-3.29	0.00
Jharkhand	11.32	25.47	0.44	0.66
Orissa	-28.52	25.42	-1.12	0.26
Chhattisgarh	-102.40	27.50	-3.72	0.00
Madhya Pradesh	-75.26	20.17	-3.73	0.00
Gujarat	-38.40	20.04	-1.92	0.06
Maharashtra	42.61	16.92	2.52	0.01
Andhra Pradesh	-7.14	19.36	-0.37	0.71
Karnataka	8.64	20.31	0.43	0.67
Kerala	77.60	20.87	3.72	0.00
Intercept	90.43	20.53	4.40	0.00

**Table 11: The Decomposition of the Difference in Daily Wage Rate between HCH and non-Muslim OBC males: Pooled Estimates for Urban RWSE wage rates**

	<b>Value</b>	<b>Standard Error</b>	<b>z value</b>	<b>P&gt;z</b>
HCH: Mean Daily Wage Rate	573	12	47	0
Non-Muslim OBC: Mean Daily Wage Rate	379	7	54	0
Difference between HCH and SC households	193	14	14	0
<b>Decomposition of the Difference between HCH and Non-Muslim OBC Males</b>				
Explained	106	9	12	0
Unexplained	88	11	8	0

Decomposition using equation (5) of paper: 4,461 observations

**Table 12: The Decomposition of the Difference in Daily Wage Rate between HCH and non-OBC Muslim males: Pooled Estimates for Urban RWSE wage rates**

	<b>Value</b>	<b>Standard Error</b>	<b>z value</b>	<b>P&gt;z</b>
HCH: Mean Daily Wage Rate	573	12	47	
Non-OBC Muslim: Mean Daily Wage Rate	353	33	11	
Difference between HCH and OBC households	220	35	6	
<b>Decomposition of the Difference between HCH and Non-OBC Muslim Males</b>				
Explained	157	14	11	0
Unexplained	63	33	2	0

Decomposition using equation (5) of paper: 2,746 observations

**Table 13: The Decomposition of the Difference in Daily Wage Rate between HCH and OBC Muslim males: Pooled Estimates for Urban RWSE wage rates**

	<b>Value</b>	<b>Standard Error</b>	<b>z value</b>	<b>P&gt;z</b>
HCH: Mean Daily Wage Rate	573	12	47	0
OBC Muslim: Mean Daily Wage Rate	270	15	19	0
Difference between HCH and OBC households	303	19	16	0
<b>Decomposition of the Difference between HCH and OBC Muslim Males</b>				
Explained	232	15	16	0
Unexplained	70	16	4	0

Decomposition using equation (5) of paper: 2,801 observations

**Table 14: The Decomposition of the Difference in Daily Wage Rate between HCH and OBC Muslim males: Pooled Estimates for RWSE wage rates**

	<b>Value</b>	<b>Standard Error</b>	<b>z value</b>	<b>P&gt;z</b>
HCH: Mean Daily Wage Rate	573	12	47	0
SC: Mean Daily Wage Rate	341	9	37	0
Difference between HCH and OBC households	231	15	15	0
<b>Decomposition of the Difference between HCH and SC Males</b>				
Explained	144	10	15	0
Unexplained	87	12	7	0

Decomposition using equation (5) of paper: 3,468 observations

**Table 15: Contributions by Individual Attributes to Overall Attribute-Induced Difference in Urban RSWE Daily Wage Rates for Males**

	HCH vs non-Mus- lim OBC			HCH vs non-OBC Muslim			HCH vs OBC Muslim			HCH vs SC		
	Con- trib	z value	p> z	Contri- b	z value	p> z	Con- trib	z value	p> z	Con- trib	z value	p> z
Land Ownership: 2 <sup>nd</sup> quintile	0	-0.74	0.462	2	1.46	0.15	0	-0.28	0.78	0	-0.45	0.66
Land Ownership: 3 <sup>rd</sup> quintile	2	1.69	0.09	7	2.62	0.01	2	0.72	0.47	4	2.12	0.03
Land Ownership: 4 <sup>th</sup> quintile	0	-0.75	0.451	2	2.32	0.02	3	2.83	0.01	2	2.55	0.01
Land Ownership: 5 <sup>th</sup> quintile	0	-0.7	0.486	3	2.74	0.01	3	2.66	0.01	3	2.78	0.01
Age: 30-35	0	0.2	0.845	-2	-0.71	0.48	1	0.26	0.79	1	1.10	0.27
Age: 35-40	2	1.11	0.266	1	0.32	0.75	5	1.44	0.15	4	1.40	0.16
Age: 40-45	5	1.78	0.075	17	3.66	0.00	20	4.68	0.00	7	2.07	0.04
Literate but Below Primary Educa- tion	-1	-1.62	0.106	-1	-1.43	0.15	-2	-1.60	0.11	-1	-1.64	0.10
Primary and Mid- dle Education	-2	-2.06	0.039	-4	-2.06	0.04	-5	-2.10	0.04	-4	-2.13	0.03
Secondary and Higher Secondary	-5	-2.44	0.015	2	0.45	0.65	6	1.69	0.09	-5	-1.79	0.07
Graduate and above	75	10.24	0	117	9.25	0.00	162	14.38	0.00	127	14.35	0.00
Himachal Pradesh	1	0.81	0.417	1	0.81	0.42	1	0.81	0.42	0	0.78	0.44
Punjab	1	1.89	0.058	3	2.13	0.03	2	2.09	0.04	-1	-1.66	0.10
Chandigarh	1	1.69	0.09	1	1.78	0.08	1	1.78	0.08	0	0.48	0.63
Uttaranchal	1	1.66	0.098	1	1.49	0.14	0	-0.51	0.61	0	1.12	0.26
Haryana	14	4.53	0	20	4.92	0.00	19	4.93	0.00	11	3.64	0.00
Delhi	9	4.59	0	9	3.25	0.00	11	4.76	0.00	-9	-2.86	0.00
Rajasthan	0	-0.13	0.9	0	0.13	0.89	0	-0.14	0.89	0	0.14	0.89
Uttar Pradesh	0	-0.71	0.48	-1	-0.83	0.41	-3	-0.84	0.40	0	0.25	0.80
Bihar	0	0.45	0.65	0	-0.45	0.65	0	0.23	0.82	0	0.37	0.71
Assam	0	0.15	0.882	0	-0.15	0.88	1	1.25	0.21	0	-0.40	0.69
West Bengal	4	1.78	0.075	2	1.59	0.11	5	1.78	0.08	1	1.45	0.15
Jharkhand	0	-0.16	0.871	2	2.24	0.03	0	-0.25	0.80	1	1.88	0.06
Orissa	0	-0.26	0.795	0	-0.49	0.62	0	-0.52	0.60	0	0.50	0.62
Chhattisgarh	1	2.22	0.027	0	0.45	0.66	-1	-2.18	0.03	0	-0.01	0.99
Madhya Pradesh	0	0.58	0.561	-1	-1.11	0.27	0	0.57	0.57	0	0.91	0.37
Gujarat	1	1.87	0.062	0	0.29	0.77	0	0.56	0.58	2	2.09	0.04
Maharashtra	3	1.95	0.051	-21	-4.35	0.00	10	3.86	0.00	0	0.16	0.88
Andhra Pradesh	-2	-1.62	0.106	-2	-1.54	0.12	0	-0.81	0.42	-1	-1.25	0.21
Karnataka	-2	-2.03	0.042	-2	-1.48	0.14	-1	-1.47	0.14	-1	-1.20	0.23
Kerala	-1	-1.37	0.171	2	1.56	0.12	-8	-1.54	0.12	1	1.04	0.30
Total	106	12.24	0	157	10.90	0.00	232	15.99	0.00	144	15.00	0.00

## Endnotes

1. Reservation for the SC were designed to assist groups who had known centuries of suppression; reservation for ST were designed to assist groups who were traditionally isolated from the modern world and from mainstream society. For the history and evolution of caste-based preferential policies in India see Osborne (2001).
2. In arriving at this judgement about who should be eligible for reservation, the criterion has been a person's caste rather than his/her income or wealth. Consequently, groups belonging to what Article 115 of the Indian Constitution calls "socially and educationally backward classes" have benefited from reservation even though, in practice, many persons belonging to these classes could not be regarded as "socially and educationally backward"; at the same time, many persons belonging to non-backward classes could legitimately be regarded as "socially and educationally backward". Compounding this anomaly is that many of the benefits of reservation have been captured by well-off groups from the depressed classes (for example, *chamars*) while poorer groups (for example, *bhangis*) have failed to benefit. Unfortunately, we are unable to address this issue in this study since the data do not allow a breakdown of the SC by sub-caste.
3. Article 340 of the Indian Constitution empowers the government to create such classes and in 1955, following the report of the "Kalelkar" Commission, 2,339 groups were designated as belonging to the OBC. The 1980 report of the "Mandal" Commission recommended that, in addition to the 23 percent of government jobs reserved for the SC and ST, a *further 27* percent be reserved for the OBC. In 1990, the V.P. Singh announced plans to implement this recommendation triggering a wave of "anti-Mandal" rioting in India. In 1992, India's Supreme Court, in *Sawhney v The Union of India*, upheld jobs reservation for the OBC but ruled that: (i) reservation was not to extend to more than 50 percent of the population and (ii) that groups within the OBC category who were manifestly not disadvantaged (the "creamy layer") were to be excluded from reservation.
4. See Bhambri (2005); Thorat (2005).
5. The caste/religion groups considered are: Scheduled Castes (S)C; Other Backward Classes, Muslim (OBCM); Other Backward Classes, non-Muslim (OBCX); high caste Hindus, non-OBC/SC Hindus (HCH); Muslims, non-OBC/SC/ST (MSX).
6. The choice of prime-age males was influenced by the fact that a very large proportion of these men were likely to be active in the labour market, in the sense of being either employed or seeking employment.
7. Excluded from this analysis were prime-age males who were: attending educational institutions; attending domestic duties, and/or producing goods and services for household use (for example, serving, tailoring, weaving), and/or engaged in free

collection of goods - for example, vegetables, roots, firewood, cattle feed; rentiers, pensioners, and remittance recipients unable to work owing to a disability; beggars and prostitutes; and "others".

8. However, there may be cases where self-employment is the preferred outcome over the available choices. We are unable to take account of such preferences because all we observe is the outcome and not the reasons for the outcome.
9. That is, Hindus who did not belong to the SC/ST or to the OBC.
10. With  $J$  mutually exclusive and collectively exhaustive outcomes, indexed  $1...J$ , the multinomial logit model is defined by a pair of equations. The first, defines *the log odds ratio* of a person  $i$  being in status  $j > 1$ , relative to being in the 'base' status  $j = J$ ,

as a linear function of  $\mathbf{X}_i = \{X_{ik}, k = 1...K\}$ , the vector of values of  $K$  explanatory

variables ( $X_{i1} = 1$ ) for the person:  $\log\left(\frac{\mathbf{P}(Y_i = j)}{\mathbf{P}(Y_i = J)}\right) = \sum_{k=1}^K \beta_k X_{ik} = X_i \beta_j$  where:

$Y_i$  is an integer variable which takes the value  $j$  if, and only if, outcome  $j$  occurs for person  $i$ , and  $\beta_j$  is the vector of coefficients associated with outcome  $j$ ,  $\beta_{j1}$  being the coefficient associated with the intercept term. The second equation defines the probability of outcome  $j$  ( $j=1...J$ ) occurring for individual  $i$  as:

$$\mathbf{P}(Y_i = j) = \exp(Z_j) / \left[ 1 + \sum_{r=1}^J Z_r \right] = F(X_i \beta_j)$$

11. However, the direction of change in the probability of an outcome, consequent upon a unit change in  $X_{ik}$ , cannot be inferred from the sign of  $\beta_{jk}$ . The reason is that, in a multinomial model, a change in the value of a variable for a person changes the probability of *every* outcome for him/her. Since these changes are constrained to sum to zero, whether the probability of a particular outcome goes up or down depends on what happens to the probabilities of the other outcomes.
12. By definition, an unemployed person did not work on any day of the week.
13. See Oaxaca (1973), Blinder (1973).
14. Other tables are not shown but available on request from the author.



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