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Is caste destiny? Occupational diversification among Dalits in rural India

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Abstract

The caste system – a system of elaborately stratified social hierarchy – distinguishes India from most other societies. Among the most distinctive factors of the caste system is the close link between castes and occupations, especially in rural India, with Dalits or Scheduled Castes (SC) clustered in occupations that were the least well paid and most degrading in terms of manual labour. Along with the Scheduled Tribes (STs), the SCs have the highest incidence of poverty in India, with poverty rates that are much higher than the rest of the population. Since independence, the Indian government has enacted affirmative action policies in educational institutions and public sector employment for SCs and STs. In addition, there has been an emergence of political parties that are strongly pro-SC in their orientation in the more populous states of India. We use five rounds of all-India employment data from the National Sample Survey quinquennial surveys from 1983 to 2004 to assess whether these political and social changes have led to a weakening of the relationship between low caste status and occupational segregation that has existed historically in India. We find evidence that the occupational structure of the SC households is converging to that of the non-scheduled households. However, we do not find evidence of a similar occupational convergence for ST households.

Keywords: caste, occupational diversification, poverty, India

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Introduction

The caste system – a system of elaborately stratified social hierarchy – distinguishes India from most other societies (Bayly 1999). Among the most distinctive factors of the caste system is the close link between castes and occupations, especially in rural India. The traditional village economy revolved around a hereditary caste hierarchy that prescribed individuals' occupations (Anderson 2011). Upper castes were land owners, middle ranked castes were farmers and artisans and the lowest ranked castes, the Dalits (or Scheduled Castes) were the labourers and performers of menial tasks (Béteille 1996). The position of castes in the social hierarchy had a clear relationship with their economic status and wellbeing, with Scheduled Castes (SC) clustered in occupations that were the least well paid and most degrading in terms of manual labour (Mendelsohn and Vicziany 1998, Shah et al. 2006). Along with the Scheduled Tribes (STs), the SCs have the highest incidence of poverty in India, with poverty rates that are much higher than the rest of the population.[1] Previous studies have found that differences in occupational structure account for a large proportion of the difference in poverty rates between SCs and the 'mainstream' population, with SCs more likely to be in 'bad occupations' than the other social groups (Deshpande 2001, Borooah 2005, Kijima 2006, Gang, Sen and Yun 2008).

Since independence in 1947, the Indian government has enacted radical affirmative action policies, providing quotas in state and central legislatures, village governments, the civil service and government-sponsored educational institutions to SCs and STs (Revankar 1971, Galanter 1984). Beginning in the 1960s, there has been increasing assertiveness of SCs in the local, state and national political arenas, culminating in the victory of the Bahugan Samaj Party, a party led by Dalits, in the Uttar Pradesh state elections in the 1990s (Jaffrelot 2003). In Indian villages, sociologist M. N. Srinivas has observed the process of Sanskritisation – a process by which a low caste takes over the customs, rituals, beliefs, ideology and style of life of a high caste (Srinivas 1966, 1989) – that may have led to increasing access to better occupations by the SCs. At the same time, modernisation of agriculture brought about by the Green Revolution in the 1960s, along with rapid economic growth fuelled by manufacturing and service sector growth in the 1980s and 1990s, may have led to a decline in taste-based labour market discrimination against SCs (Kapur et al. 2010). Have these significant economic, political and social changes after independence and especially in recent decades led to a weakening of the relationship between low caste status and occupational segregation that has existed historically in India? We use five waves of large representative all-India household surveys undertaken by Indian National Sample Survey Organisation (NSSO) over 1983-2004 to address this question.

We examine the determinants of occupational diversification with multinomial logit models and a pooled data-set combining the five waves of the Consumer Expenditure Surveys (CES) of

[1] According to the 2011 Census, SCs and STs comprised 16.2 and 8.2 percent of the population respectively, yet accounted for 40.6 percent of the poor in the 2004-2005 household expenditure survey.

the NSSO, with households as our unit of analysis. Our empirical strategy identifies the direct effect of caste/tribe identity on occupational segregation over time, separate from other indirect routes by which caste status may determine occupational structure, and from other determinants of occupational choice, such as education, land ownership and demographic characteristics of the household. Our strategy is similar to difference-in-differences and for ease later we refer to it as a difference-in-differences *type* analysis.[2] We compare the SCs and STs with the 'mainstream' population, which includes forward Hindu castes as well as members of other religions and the intermediate castes. We call this group 'Other Castes and Classes' (OCC).[3] We undertake the difference-in-difference type analysis for both the SCs and STs, both social groups being characterised by occupational structures that are correlated with high poverty.

The rest of the paper is in five sections. In the next section, we provide a description of the nature of the link between the Indian caste system and occupational structure, along with a summary of previous studies that have looked at occupational mobility over time, mostly within the anthropological/sociological tradition. In Section III, we set out patterns in changes in rural poverty and occupational structure by social group over time, along with a description of the data. In Section IV, we discuss the econometric methodology. Section V presents the results and Section VI concludes.

II. The caste system and occupational segregation

The Indian caste system is a social order which originates from the *varna* system, which consists of four broad, hereditary and hierarchically ordered occupational categories, with priests or *Brahmins* at the top, warriors (*Kshatriyas*) next, merchants and traders (*Vaishyas*) third and menial workers (*Shudras*) making up the bottom layer. SCs (along with STs) occupy an ambivalent place in the *varna* system, and are either treated as a subset of the *Shudras* or

[2] We rely on the interactions of group dummy variables and time dummy variables similar to the popular difference-in-difference method in the experimental economics literature. We say 'difference-in-difference *type*' to denote that we are not interpreting the estimates of interaction terms as showing a causational relationship, unlike the experimental economics literature. Due to coverage of our study over 20 years, it is virtually impossible to isolate any treatment to scheduled groups to investigate a causational relationship between interventions such as affirmative action programmes or the political mobilisation of 'backward' castes. So, our strategy is not difference-in-difference, but it has the same appearance, since we rely on the interactions of group dummy variables and time dummy variables.

[3] To make our social groups comparable, we do not confine our analysis of the OCC households to the 'forward caste' Hindu population, as several ST and SC households were also classified as belonging to religions other than Hinduism (though we control for religion as a possible correlate of occupational diversification in our empirics). The individuals in these households may have been originally Hindu, but have converted to a different religion. Further, the NSSO rounds prior to 1999-2000 did not make a distinction between Other Backward Classes (OBC) – the intermediate castes and SCs. However, while the OCC category is a heterogeneous group, the barriers to occupational diversification that may operate for sub-members of this group (such as OBCs and Muslims) would be of a different order of magnitude than that operated for SCs under the Indian caste system.

a separate category whose main distinguishing characteristic is a particularly degrading ('polluting') traditional occupation, and are below the four *varnas* in the social order (Bayly 1999, Iversen 2011). Each *varna* comprises a large number of sub-castes or *jatis* who with few exceptions are endogamous (intra-marry).

The tight relationship between different castes and the specific occupations they are expected to occupy that were observed in Indian villages in the past was provided by the *jajmani* system, which is a system of hereditary patron–client relationships between the *jajman* (the patron) – usually, landed proprietors from the upper and middle castes – and the *kamins* or *balutedars* (the clients) – usually, unfree agricultural labourers from the low castes, who were expected to provide labour and other specialised services to the landed upper and middle castes (Dumont 1970, Bayly 1999). While legislation brought in by the Indian government may have lessened the incidence of the worst forms of bonded labour and other coercive practices, the hereditary nature of the link between castes and occupations, especially in the lower rungs of the caste system, persists.

Ethnographic studies have documented the changes in occupational structure in Indian villages across castes over time. Several studies find clear evidence of occupational mobility among low castes over time. For example, based on fieldwork for around 20 years in Behror, a village in the Western state of Rajasthan, Mendelsohn (1993) finds that with increasing political consciousness among the SCs, the Chamars, one of the largest SC castes in Northern India (working in leather trading and leather work in addition to in agriculture), along with another two SC castes, the Bhangis (working in toilet cleaning) and the Dhanaks (working in weaving), are no longer willing to perform agricultural labour, and are increasingly moving out of the village in search of employment. Thus, Mendelsohn notes that 'while the old *jajmani* system seems to persist, it has now diminished in intensity and is increasingly strained' (1993, p. 824). Similarly, Jodhka (2004) finds that

> Dalit communities of rural Punjab … used the new spaces opened up by the process of economic development to re-negotiate their relationships with locally dominant castes and rural social structure, eventually leading to a near complete breakdown of *jajmani* relationships (2004, p. 182),

consciously dissociating themselves from their 'traditional' polluting occupations. Mayer (1997) revisits a village in central India in 1992, which he first studied in 1954, and observes a considerable weakening of the correspondence between caste and occupation in the intervening 38 years, with an increasing number of jobs available in the village which are not caste-restricted. A similar re-visit by Epstein et al. (1998) in the 1990s in two villages in Southern India finds an increasing (albeit small) presence of SC households in the village elite, with educated SCs entering into public sector jobs, as compared to the 1970s. Finally, based on surveys undertaken in 2007 in the rural areas of two districts in Uttar Pradesh, Kapur et al. (2010) find that, as compared to 1990, SCs are less likely to work the fields of

traditional landlords, have moved into non-traditional occupations, such as own account enterprises, and are increasingly resorting to circular migration to cities.

However, not all previous studies find a clear breakdown of *jajmani* system in Indian villages. For example, Iversen and Raghavendra (2006) find in the context of fieldwork in the Southern Indian state of Karnataka that the caste system retains a firm grip on occupational structure, with village hotels unlikely to hire non-Brahmins for kitchen jobs or as suppliers, and remaining largely Brahmin-owned family enterprises. Based on fieldwork in two villages in Western Uttar Pradesh, Jeffrey (2001) observes a persistence of feudal relationships in the context of a capitalist agricultural economy, with SCs depending on land-owning Jats[4] for labouring work, and where the latter caste use their economic and political clout to create barriers for the low castes to obtain more remunerative employment than agricultural labour. What the mixed evidence from these village studies using ethnographic methods suggests is the need for quantitative analysis based on large all-India household surveys over a sufficiently long period of time, so as to establish more clearly whether there is a weakening of the relationship between caste status and occupational segregation in India in the recent decades.[5]

III. Patterns of poverty and occupational segregation in India, 1983-2004

We first describe the sources of the data, and then examine patterns of poverty and occupational segregation among the SC, ST and OCC households.

Data

Our data comes from five rounds of the Consumer Expenditure Surveys (CES) of the Indian National Sample Survey Organisation (NSSO), beginning with 1983-84 (38th round) and ending with 2004-05 (61st round). The other rounds are from 1987-88 (43rd round), 1993-94 (50th round) and 1999-2000 (55th round). The households in these surveys are selected using a two-stage stratified random sampling design technique. Therefore, weights or multipliers are an integral part of the data, and we use the multipliers in our empirical analysis to weight the household-level observations.[6] The surveys cover almost the entire geographical area in India, barring less than 0.001 percent which is not accessible, either for natural reasons or security constraints. India is divided into 28 states and seven union territories for administrative purposes, with states having populations ranging from over 160 million to less

[4] Jats are an intermediate and a relatively prosperous caste, mostly located in the states of Haryana, Punjab and Uttar Pradesh.

[5] There is very little study of this issue using quantitative methods. Two recent studies that have used the large representative surveys of the NSSO and quantitative methods to examine the relationship between caste and occupational structure are Hnatkovska, Lahiri and Paul (2010) and Lanjouw and Murgai (2009). These papers provide a less direct answer to what we try to study, the change in occupational structure over time in order to see whether Dalits are assimilating into the mainstream.

[6] Weights or multipliers provide the number of households each one of the surveyed households represents in the population. For details on NSSO sampling design and other related issues, see Government of India (1999).

than a million. We use samples drawn from 15 major states of India that account for over 96 percent of the total Indian population and over 90 percent of sampled households.[7] Our key explanatory variables are the five occupational categories (called 'type of household') provided in the CES for rural households. These are: i) agricultural wage labour (agricultural labour); ii) non-farm wage labour (non-agricultural labour); iii) self-employment in the rural non-farm sector (self-employed, non-agriculture); iv) cultivators/farmers (self-employed, agriculture); and v) a residual category, termed 'miscellaneous'.[8] 'Self-employed, non-agriculture' refers to rural household enterprises working in the non-farm sector, such as own enterprise activities in retail trade, artisanal activities, personal services, construction and manufacturing. 'Agricultural labour' would be both casual wage labour and workers in regular/long-term contracts involved in agricultural activities. 'Non-agricultural labour' would be wage labourers in the rural non-farm sector, both casual and regular, along with salaried workers employed in public administration and education, such as government servants and teachers. 'Self-employed, agriculture' would be mostly cultivators. Households placed in the 'miscellaneous' category are households with diversified income sources, where no source of income exceeds 50 percent of total income (e.g., school teachers, government servants).[9]

How occupational types are differentiated is critical to our study – balancing the practical need to use only a few groupings without clubbing together fundamentally different positions. For example, at the heart of the economic basis of how the caste system operated in rural India was a clear divide in land ownership, with the dominant castes in villages being land-owning upper and middle castes, and the SCs mostly landless and confined to providing labour to other castes, so it is important to distinguish landless labourers from the self-employed (Anderson 2011). Doing so allows us to capture a crucial dimension of occupational diversification in rural India, which is the move from being a wage labourer to being self-employed, either to being a farmer or to being self-employed in the non-farm sector.

The CES provides detailed information on occupational type and other socioeconomic characteristics, as well as demographic characteristics of the heads of surveyed households. Another large-scale survey, the Employment and Unemployment surveys (EUS), conducted usually at the same time as the CES for the same surveyed households as the CES, provides additional information on other members of surveyed households. However, the EUS do not

[7] We exclude the smaller states and union territories as we use state fixed effects in our empirical analysis, and in several of the smaller states such as those in North-East India, all three social groups that we are interested in – ST, SC and OCC – are not present in each of the occupational categories that will comprise our dependent variables in the econometric analysis.

[8] The NSSO assigns households to a specific occupational type, when the income from that occupational type is 50 percent or more of total income.

[9] An alternate set of dependent variables would have been the NCO occupational codes also provided in the CES. However, the link between occupational codes provided in the NCO classification and economic status is much weaker than between household occupational types used in this paper and economic status (especially at the level amenable for econometric analysis using discrete choice models of occupational choice). Furthermore, NCO occupation codes are missing for a large proportion of the sample we used in the empirical analysis for the years 1983-84 and 1987-88.

provide information on the occupational type of individual members of households in addition to the information on occupational type available on the heads of households in the CES. As occupational type is the main variable of interest in this paper, we use data from the CES and not the EUS in our empirical analysis.

The rounds of the CES that we use include data on 80,000 to 120,000 households. As stated in the introduction, we confine our analysis to rural households. We also restrict our empirical analysis to male-headed households between the ages of 15 and 75 years.[10]

We distinguish between SCs and STs, and undertake the empirical analysis separately for these two social groups. This we do for two reasons. Firstly, while the STs are also severely economically disadvantaged, both in terms of their geographical location and their large presence in 'bad occupations', they do not face the same social barriers to occupational mobility operating through the caste system as the SCs. Second, as we will see later in this section, there are significant differences in the occupational structure between SCs and STs, no less than the difference between SCs and the OCCs.

We undertake the analysis only for rural households, Not differentiating between rural and urban populations is misleading as taste-based discrimination, an important reason for the presence of labour market discrimination against SCs found in numerous studies (Madheswaran and Attewell 2007, Thorat and Attewell 2007, Banerjee et al. 2008, Siddique 2011), is less likely to hold in cities where caste identities may not be known as compared to villages (Iversen 2011).[11] By restricting our analysis to rural households, we are more able to attribute the changes in occupational structure to caste identity than to other factors that may be correlated with both occupation and caste.

Patterns of poverty among social groups in India

Before we discuss the patterns of occupational distribution of the STs, SCs and OCCs, We examine the close association between poverty incidence and occupational type for rural India. We calculate poverty rates (defined as the number of households for a particular occupational category who are below the poverty line as a proportion of all households in that occupational category) using state-specific rural official poverty lines (OPL) of the Indian Planning Commission for the five main occupational categories – (i) self-employed, non-agriculture; (ii) agricultural labour; (iii) non-agricultural abour; (iv) self-employed, agriculture;

[10] Female-headed households are few in number and are usually special in that these households have faced circumstances such as widowhood (Hnatkovska et al. 2010). Moreover, unobserved societal and cultural factors may explain female occupational structure and without a panel, it would be difficult to control for these factors. For these reasons, we exclude female-headed households from our econometric analysis.

[11] As Iversen and Raghabendra (2006) find, SCs may invent new names when they compete for jobs in cities, which makes it less likely that their caste identities would be known to prospective employers or fellow workers.

and (v) miscellaneous.[12] We do this for all five rounds. The poverty rates are presented in Table 1. It is clear from the Table that the highest poverty incidence is among agricultural labourers, followed by non-agricultural labourers, followed by self-employed, non-agriculture, followed by self-employed, agriculture, followed by households classified as in the occupational category 'miscellaneous'. The ranking of occupational categories by poverty incidence is remarkably constant over the 21 years for which we have household survey data. Thus, there is a strong correlation between poverty incidence and occupational type in rural India, with agricultural labourers the most likely to be in poverty and those in the 'miscellaneous' occupational category the least likely to be in poverty. In 2004-2005, the last year in our period of analysis, the poverty rates for male-headed households who were agricultural labours was 37.8 percent, for other labourers, it was 27.4 percent, for self-employed, non-agriculture, it was 20.1 percent; for self-employed, agriculture, it was 18.3 percent, and for miscellaneous households, it was 8.8 percent. Thus, the gap in the poverty rate between those households in the agricultural labourer category and those households in the 'miscellaneous' category was a staggering 29 percentage points, as of 2004-2005. The rate of decline in the poverty rate for agricultural labourers in 1983/84-2004/05 was 36.6 percent, as compared to the corresponding rate of decline of 61.6 percent for households in the 'miscellaneous' category. Therefore, not only were agricultural labourers the poorest occupational group in 1983 by a significant margin over other occupational groups, the rate of poverty decline was significantly lower than the occupational group, with the lowest poverty rate in 1983, which was the 'miscellaneous' occupational group.

Table 1: Poverty rates, by occupational type and year, rural households

Year	Male headed households				
Year	1	2	3	4	5
1983	40.21	59.64	41.07	35.25	22.91
1987	29.20	51.20	37.11	29.11	15.95
1993	28.65	48.39	35.80	26.25	13.93
1999	20.15	34.20	22.94	17.06	10.12
2004	20.13	37.83	27.41	18.34	8.79

Notes: a) Male headed households only; b) Occupations**:** 1: Self-employed, non-agriculture; 2: Agricultural labour; 3: Non-agricultural labour; 4: Self-employed, agriculture; 5: Miscellaneous; c) All observations weighted by household multipliers, which are the number of households each one of the surveyed households represents in the population.

[12] Deaton and Tarozzi (2005) point out that a limitation of the OPL is that the price indices used to update them are based on fixed commodity weights that have become outdated over time. They have proposed an alternate set of poverty lines based on unit values and quantities obtained from the CES directly. However, these poverty lines are not available for 1983-84 and 1987-88, and so we use the OPL to make our calculations of poverty rates comparable over time. Whether OPL or the poverty lines proposed by Deaton and Tarozzi (2005) are used, poverty rate gaps between social groups are not significantly different (Gang, Sen, and Yun 2008).

Table 2: Poverty rates, by social group and year, rural households

Year	ST	SC	OCC
1983	61.39	54.71	36.70
1987	53.21	45.48	30.29
1993	47.25	43.45	27.84
1999	41.14	30.80	18.04
2004	41.44	32.03	19.07

Notes: a) Male headed households only; b) ST: Scheduled Tribes, SC: Scheduled Castes, OCC: Other Castes and Classes – Non ST/SC; c) All observations weighted by household multipliers, which are the number of households each one of the surveyed households represents in the population.

We now examine the relationship between poverty incidence and social groups in India. In Table 2, we present the poverty rates for the ST. SC and OCC groups, from 1983/84 to 2004/05. We note that the social group with the higher poverty incidence in 1983/84 was the ST, with 61.4 percent of households in this group being in poverty, followed by the SC, with 54.7 percent of households in this group being in poverty, and finally, the OCC, with 36.7 percent of households in this group being in poverty. This ranking of poverty incidence across social groups is constant over the period 1983/84 to 2004/05. While the gap between the poverty rates between ST and OCC social groups was 24.5 percentage points in 1983/84, the gap in poverty rates between the two groups was 22.4 percent in 2004/05. Therefore, there was very little reduction in the gap in poverty incidence between ST and OCC households over the 21-year period of our study. In contrast, for the SC households, there was a more significant reduction in the gap in poverty incidence between these households and OCC households, from 18.0 percentage points in 1983/84 to 13 percentage points in 2004/05.

Patterns of occupational segregation

We first look at the evolution of occupational structure for ST, SC and OCC households from 1983/84 to 2004/05 (Table 3). We note the high proportion of ST and SC households that are agricultural labourers as compared to OCC households – in 1983/84, 38.4 percent and 56.1 percent of ST and SC households were agricultural labourers, as compared to 23.4 percent of OCC households. Recall from Table 1 that the occupational type with the highest poverty incidence was agricultural labour. The proportion of SC households that were agricultural labourers has fallen over time, and by 2004/2005, 43.9 percent of SC households were agricultural labourers, a decline of 16.2 percentage points. However, there has been little change in the proportion of ST and OCC households who are agricultural labourers – in 2004/05, it was 38.0 percent for ST households and 21.0 percent for OCC households.

The occupational type that had the lowest poverty incidence was ‘Miscellaneous’ (as evident in Table 1), and we see that the proportion of ST and SC households in this category is very low – in 1983/84, it was 4.5 and 5.2 percent, respectively (as compared to a proportion of 9.4

Table 3: Occupational type by social group

Year	Occupations	ST	SC	OCC
1983	Self-employed, non-agriculture	5.40	10.52	13.84
	Agricultural labour	38.40	56.05	23.39
	Non-agricultural labour	7.01	8.14	5.98
	Self-employed, agriculture	44.68	20.11	47.43
	Miscellaneous	4.51	5.19	9.36
1987	Self-employed, non-agriculture	5.87	11.37	14.54
	Agricultural labour	40.15	52.93	24.10
	Non-agricultural labour	12.44	11.51	7.88
	Self-employed, agriculture	37.85	19.26	44.59
	Miscellaneous	3.70	4.93	8.89
1993	Self-employed, non-agriculture	6.07	10.74	15.26
	Agricultural labour	40.93	53.35	23.57
	Non-agricultural labour	10.11	10.58	6.92
	Self-employed, agriculture	38.22	19.92	45.30
	Miscellaneous	4.67	5.42	8.95
1999	Self-employed, non-agriculture	5.42	12.41	15.66
	Agricultural labour	45.33	54.68	26.90
	Non-agricultural labour	8.56	9.67	7.11
	Self-employed, agriculture	35.90	16.95	39.89
	Miscellaneous	4.78	6.29	10.46
2004	Self-employed, non-agriculture	6.82	14.95	18.51
	Agricultural labour	37.99	43.87	20.95
	Non-agricultural labour	11.83	15.21	9.22
	Self-employed, agriculture	38.18	19.59	42.15
	Miscellaneous	4.17	6.39	9.17

percent for OCC households in the same year). By 2004/05, there was a slight increase in the proportion of SC households in this category to 6.4 percent, but there was a slight fall for ST and OCC households to 4.2 percent and 9.2 percent, respectively. The two occupational categories where there was a perceptible increase in the proportion of SC households were self-employed non-agriculture (from 10.5 percent in 1983/84 to 15.0 percent in 2004/2005) and non-agricultural labour (from 8.1 percent in 1983/84 to 15.2 percent in 2004/05). For ST households, there was an increase in the proportion of households in the non-agricultural labour category from 7.0 percent in 1983/84 to 11.8 percent in 2004/05.

We also observe that there are clear differences in the occupational distribution of ST vs. SC households. A large proportion of ST households are self-employed, agriculture (cultivators) – the proportion was 44.7 percent in 1983/84 and 38.2 percent in 2004/2005. In fact, in 2004/05, the number of ST households who are cultivators exceeded the number of ST households

who are agricultural labourers. It should be noted that the 'self-employed, agriculture' category was the occupational type with the second lowest poverty incidence. In contrast to what we observe for ST households, the proportion of SC households who are cultivators, even in 2004/05, is only 19.6 percent. On the other hand, a larger proportion of SC households are in self-employed, non-agriculture as compared to ST households (in 2004/05, 15.0 percent of SC households were self-employed, non-agriculture as compared to 6.8 percent of ST households). We also note that the changes in the proportion of households in each occupational type is not monotonically increasing or decreasing over the 21 years of our study (the proportions of households in a particular occupational type may increase in one year and then decline in the next year), suggesting that occupational structure is sensitive to year-specific shocks that may affect the movement of households from one occupational category to another (e.g. in a drought year, households may move from agriculture-based occupations to non-agriculture based occupations).

A convenient measure highlighting occupational segregation is the Duncan dis-similarity index, defined as:

$$D = 0.5 \sum_{c=1}^{C} | A_c - B_c |,$$

where A_c is the proportion of households in occupational category c among social group A, and B_c is the proportion of households in occupational category c among social group B ($\neq A$).

The Duncan Index captures in a simple way the degree of similarity in occupational structure between SC and ST households, on one hand, and OCC households, on the other. The Index (D) ranges from zero to one, and is read as the proportion of either social group that would have to shift occupations to generate identical occupational distributions. If D is zero, we have complete integration, which indicates that the distribution of one social group across occupations is identical to that of the comparator social group, and if D is one, we have complete occupational segregation, which is when one social group is in occupations that are not populated at all by the comparator social group (Blau and Hendricks 1979, Spriggs and Williams 1996).

We can calculate this index for each pairing of our social groups ST, SC and OCC. For example, in comparing SC and OCC groups the Duncan Index is simply $0.5\sum|A_c - B_c|$, where A_c is the proportion of occupation c among SC and B_c is the proportion of occupation c among the OCC. We do this for each pairing using the five rounds of the CES, presenting the calculations in Table 4.

We note that there was lower occupational segregation between ST and OCC households at the beginning of our study as compared to the occupational segregation of SC and OCC households – in 1983, the Duncan Index for occupational dissimilarity of ST-OCC households

Table 4: Duncan Index of occupational segregation between ST, SC and OCC households

	ST-SC	ST-OCC	SC-OCC	
1983	0.246	0.160	0.348	*59029*
1987	0.195	0.206	0.325	*60734*
1993	0.183	0.206	0.334	*50928*
1999	0.189	0.199	0.303	*53947*
2004	0.196	0.197	0.289	*56793*

Note: An increase in the Duncan Index suggest greater occupational dis-similarity, while a decrease in the index suggests greater occupational similarity.

was 0.1602460 as compared to a value of 0.348 for SC-OCC households. However, there has been greater occupational segregation between ST and OCC households over time – in 2004, the Duncan Index of occupational dissimilarity between these two groups had increased to 0.197. In contrast, the Duncan Index of occupational dissimilarity between SC and OCC social groups had declined to 0.289 in 2004/05, suggesting an increase in occupational similarity between these two groups over the period of our study. Interestingly, the occupational similarity between ST and SC social groups is not high – the Duncan Index of occupational similarity for these two groups was a low 0.246 in 1983/84 and it had declined to 0.196 in 2004/05, suggesting an increase in occupational similarity between these two groups over time.

However, the Duncan Index is a bivariate summary statistic, which does not allow us to disentangle the pure effect of caste identity from other factors that may determine occupational convergence, such as education and other household characteristics. For this, we need to model occupational diversification choice in a multivariate framework, and explicitly control for other determinants of occupational structure, along with the direct effects of caste identity on occupational diversification. In the next section, we set out our econometric methodology and empirical specification.

IV. Econometric methodology, empirical specification and descriptive statistics

We begin by specifying a multinomial logit model of occupational choice, then discuss the variables used in the empirical analysis, followed by a discussion of the descriptive statistics.

Econometric approach

Our basic approach is to use a multinomial logit to capture households' constrained choice of one occupation over other occupations, which is the standard approach to modelling occupational choice in the labour economics literature (Abowd and Killingsworth 1984,

Constant and Zimmerman 2003).[13] That is, supposing that *s* is the occupational choice (occupational type of household in our case) variable which takes values of 0, 1, ... , *J* for *J*+1 outcomes. Using pooled samples of the five waves of the CES, the model for determination of *s* is specified as

$$P_{ij} = \Pr[s_i = j] = \exp(X_i\beta_j)/[1 + \sum_{j=1}^{J} \exp(X_i\beta_j)], \qquad (1)$$

where *i* indexes the individual and *j* indexes the choice or outcome.

To identify the role caste and ethnicity has played, we include dummy variables of castes and tribes (ST and SC), time fixed effects, and their interaction terms in *X*. That is,

$$X_i\beta_j = \alpha_j + \sum_{l=1}^{L} Z_{il}\gamma_{jl} + \sum_{m=1}^{M} D_{im}\delta_j^m + \sum_{t=1}^{T} T_{it}\theta_j^t + \sum_{m=1}^{M}\sum_{t=1}^{T} D_{im}T_{it}\tau_j^{m,t}, \qquad (2)$$

where Z_{il} is the *l*th socio-economic or demographic variable; D_{im} is a dummy variable whose value is one if individual *i*'s caste/tribe status is m, where *m* = SC, and ST; T_{it} is a time dummy variable whose value is one if the time period is *t*, where *t* = 1987/1988, 1993/1994, 1999/2000 and 2004/2005. The residual social group is OCC; and 1983 is the reference year.

We employ a difference-in-difference *type* strategy to examine whether the relationship between caste and ethnicity and occupational structure has changed over time. We do this by evaluating whether the coefficients of the interaction terms are zero, both jointly and for specific time-periods; that is, $\tau_j^{m,t} = 0$, for all *m* and *t*. If there has been diversification of occupation among SC/ST out of agricultural labour, then the coefficients of interaction terms would be significantly non-zero. Furthermore, we can see whether SC/ST has migrated to a more affluent occupation (e.g., the category referred to as the miscellaneous occupational type) by examining the signs of the interaction terms. If the sign of the interaction term is negative and significant for the occupational types at the bottom of the caste hierarchy (such as agricultural labour) and with the highest poverty incidence, and positive and significant for occupational types with the lowest poverty incidence (such as the miscellaneous category), then we can infer that the occupational structure of the social group in question (SC or ST) is converging to that of the OCC households, as the movement away from the occupations with the highest poverty incidence is faster for the socially marginalised groups (ST/SC) than for the 'mainstream' population (that is, the OCC). By controlling for other variables that may explain occupational diversification (we describe in the next section our control variables), we are able to interpret the interaction terms as capturing the *direct* effect of caste identity on occupational diversification, and thus assess whether the effect of caste identity on occupational structure of the ST and SC households has weakened over time, over and above

[13] Ordering occupations according to the poverty rate in each occupation, we also estimated ordered probit and ordered logit models and found no significant difference in our results.

the indirect routes by which caste/ethnicity may influence occupational choice (such as by a lower educational attainment among SC and ST households).

Empirical specification

Our multinomial logit specification models the choice among the five occupational types that characterise the occupational outcomes of rural households in India – self-employed, non-agriculture; agricultural labour; non-agricultural labour; self-employed, agriculture; and a miscellaneous category.

Our main explanatory variables are the dummies for social group – whether the household is a SC, ST or of other castes and classes (OCC) and the interactions of these variables with the time dummies corresponding to the years of the CES surveys. We also introduce controls for household socio-economic and demographic characteristics which may also explain occupational choice, along with state fixed effects. Since we include dummy variables for SC and ST, and time dummies for the four rounds of the CES from 1987 onwards, along with other determinants of occupational diversification, such as education and land ownership, our identification strategy is able to pick out whether the relationship between caste affiliation and ethnicity, on one hand, and occupational choice, on the other, has changed over the period 1983-2004, independent of other factors that may explain occupational diversification. Given the close relationship between choice of occupations and poverty that we observed in Section III, we are able to assess whether the relationship between social identity (that is, whether the household belongs to a SC or an ST social group) and 'bad occupations' has weakened over time, independent of other household, state and national-level factors that may explain the move out of 'bad occupations'.

Among the household-level controls we introduce are demographic features of the household, such as age and household size. Households with older heads are more likely to move out of bad occupations, such as agricultural labour and other labour, as they gain the experience and the savings needed to move into self-employment. Larger households may have the necessary number of adults to diversify into different economic activities (Dimova and Sen 2010). We include age and household size as categorical variables, with the various categories provided in Table 5.

We also include land ownership and the highest level of education achieved by the head of the household. Households with higher land ownership are more likely to be cultivators. They are also more likely to have the necessary asset base to move into a more diversified occupational portfolio or into non-farm self-employment (Dercon and Krishnan 1996, Lanjouw and Murgai 2009). Educational levels are expected to be strongly correlated with occupational choice – households with more educated heads of households are more likely to be in the more remunerative occupational types, such as 'others', or in 'self-employed, non-agriculture' (Lanjouw and Murgai 2009). Finally, we include religion of the head of the household as a

Table 5: Definition of variables

Variable	Definition
Age, 16-25 years	=1 if age of head of household is between 16 and 25 years; =0 otherwise
Age, 26-35 years	=1 if age of head of household is between 26 and 35 years; =0 otherwise
Age, 36-45 years	=1 if age of head of household is between 36 and 45 years; =0 otherwise
Age, 46-55 years	=1 if age of head of household is between 46 and 55 years; =0 otherwise
Age, 56-65 years	=1 if age of head of household is between 56 and 65 years; =0 otherwise
Age, 66-75 years	=1 if age of head of household is between 66 and 75 years; =0 otherwise
Household size, 1 member	=1 if household size is one; =0 otherwise
Household size, 2 members	=1 if household size is two; =0 otherwise
Household size, 3 members	=1 if household size is three; =0 otherwise
Household size, 4 members	=1 if household size is four; =0 otherwise
Household size, 5 members	=1 if household size is five; =0 otherwise
Household size, 6 members	=1 if household size is six; =0 otherwise
Household size, 7 or more members	=1 if household size is seven or more; =0 otherwise
Land owned, 0 hectares	=1 if there is no land ownership; =0 otherwise
Land owned, above 0 and below 1 hectares	=1 if land ownership is between zero and 1 hectares; =0 otherwise
Land owned, above 1 and below 50 hectares	=1 if land ownership is between 1 and 50 hectares; =0 otherwise
Land owned, above 50 hectares	=1 if land ownership is above 50 hectares; =0 otherwise
Illiterate	=1 if head of household is not literate; =0 otherwise
Educated, below primary	=1 if head of household is educated to below primary level; =0 otherwise
Educated, primary	=1 if head of household is educated till at primary level; =0 otherwise
Educated, middle	=1 if head of household is educated till at least middle level; =0 otherwise
Educated, secondary and higher secondary	=1 if head of household is educated to higher secondary level; =0 otherwise
Education, graduate and above	=1 if head of household is a graduate and above; =0 otherwise
Religion, Hindu	=1 if head of household is Hindu; =0 otherwise
Religion, Muslim	=1 if head of household is Muslim; =0 otherwise
Religion, Christian	=1 if head of household is Christian; =0 otherwise
Religion, Sikh	=1 if head of household is Sikh; =0 otherwise
Religion, Others	=1 if head of household is Jain, Buddhist, other religions; =0 otherwise

control variable, as households of certain religions are more likely to choose one occupation over others (e.g. Sikhs as cultivators). We will introduce land ownership, education and religion as categorical variables, as described in Table 4.

We include state fixed effects in the multinomial logit regressions to control for state-specific factors that may make it more likely for households to choose one occupation over others.[14] For example, some states are located in areas with favourable agro-ecological factors and rural households in these states are more likely to be cultivators.[15] On the other hand, if a state has a high labour/land ratio or has high rates of urbanisation, rural households in these states are more likely to be agricultural and non-agricultural labourers or engaged in diversified occupations. We include time dummies to take into account time-specific effects that may affect occupational structure, such as a drought in a given year that may make rural households move into non-farm activities in that year.

Descriptive statistics

Table 6 provides the means of the explanatory variables, separately for each of the five occupational types for the pooled sample over the period 1983-2004. As noted previously, the proportions of agricultural and other non-agricultural labour who are SC and ST are much higher than for other occupational types – 49 percent of agricultural labour households and 41 percent of non-agricultural labour households are from the ST and SC social groups, as compared to 24 percent of self-employed, non-agricultural households, 22 percent of self-employed agricultural households and 21 percent of households in the 'miscellaneous' category. The majority of households across all five occupational types have heads of households whose age fall in the range 26-55 years. Self-employed agricultural households have household sizes far in excess of those of households in other occupational types, with 32 percent of self-employed agricultural households having a household size in excess of six members (as compared to 25 percent for households in the self-employed non-agriculture, 17 percent for agricultural labour, 18 percent for non-agricultural labour and 19 percent for the miscellaneous category). As expected, land ownership is far higher for self-employed agricultural households, with 55 percent of such households owning land in excess of 50 hectares, and only three percent of households in this category owning no land. In contrast, 23 percent of self-employed non-agriculturists, 26 percent of agricultural labour, 29 percent of non-agricultural labour and 30 percent of 'miscellaneous' households own no land. Illiteracy rates are particularly high among agricultural and non-agricultural labourers and among self-

[14] We merge the new states Chhattisgarh, Jharkhand and Uttaranchal formed in 2000 with their parent states (Madhya Pradesh, Bihar and Uttar Pradesh, respectively) to construct the state dummies over the period 1983-2004.

[15] The CES also provides information on which sub-state NSSO regions households belong to. Since regions are more closely aligned to agroclimactic potential of the state (see Palmer-Jones and Sen 2003), the use of NSS region fixed effects rather than state fixed effects would have been preferred. However, the NSSO have changed the geographical coverage and the number of NSS regions, thus not allowing us to construct consistent NSS region dummies over time.

Table 6: Means, rural male headed households, by occupational types

Occupations	Self-employed, non-agriculture	Agricultural labour	Non-agricultural labour	Self-employed, agriculture	Miscellan-eous
Social group					
ST	0.046	0.139	0.127	0.111	0.059
SC	0.187	0.351	0.281	0.108	0.152
OCC	0.766	0.510	0.592	0.781	0.789
AGE					
16-25 years	0.065	0.089	0.100	0.051	0.075
26-35 years	0.283	0.309	0.345	0.204	0.227
36-45 years	0.293	0.282	0.278	0.268	0.270
46-55 years	0.197	0.184	0.163	0.232	0.206
56-65 years	0.119	0.106	0.085	0.175	0.139
66-75 years	0.043	0.030	0.030	0.070	0.084
Household size					
1 member	0.017	0.017	0.033	0.012	0.110
2 members	0.078	0.105	0.081	0.074	0.113
3 members	0.116	0.148	0.139	0.097	0.110
4 members	0.188	0.217	0.210	0.157	0.175
5 members	0.201	0.205	0.205	0.182	0.176
6 members	0.152	0.138	0.149	0.157	0.128
7 or more members	0.250	0.169	0.184	0.321	0.189
Land owned					
No land owned	0.233	0.256	0.291	0.016	0.304
Above 0 and below 1 hectares	0.272	0.308	0.244	0.248	0.238
Above 1 and below 50 hectares	0.297	0.277	0.277	0.184	0.225
Above 50 hectares	0.197	0.160	0.187	0.551	0.233
Education					
Illiterate	0.380	0.665	0.487	0.469	0.202
Below primary	0.178	0.140	0.158	0.151	0.098
Primary	0.171	0.105	0.161	0.145	0.109
Middle school	0.144	0.063	0.126	0.128	0.1528
Secondary and higher secondary	0.101	0.025	0.062	0.089	0.292
Graduate and above	0.026	0.002	0.006	0.019	0.147
Religion					
Hindu	0.785	0.868	0.842	0.888	0.847

Muslim	0.171	0.084	0.103	0.071	0.090
Christian	0.016	0.019	0.030	0.014	0.028
Sikh	0.018	0.015	0.016	0.021	0.024
Others	0.011	0.014	0.008	0.005	0.009
Number of observations	*43906*	*74528*	*22489*	*114228*	*26280*

Notes: a) All observations weighted by household multipliers.

employed agriculturists, with 67 percent, 49 percent and 47 percent of households respectively in these three categories not being able to read or write. With respect to religion, the proportion of self-employed non-agricultural households who are Muslim is much higher (at 17 percent) than for other occupational types.

V. Results

In this section, we implement the methodology outlined in Section IV to test whether the relationship between SC/ST group affiliation and occupational segregation has changed over time, over and above other factors that may explain occupational diversification. We begin by presenting the marginal effects of our explanatory variables on the probability of being in each of the five occupational types obtained from the multinomial logit estimation of the set of equations described in (2). To estimate the multinomial logit models, we pool the five waves of the household-level data of the CES. Our base category is the occupational type 'miscellaneous', which is the occupational type that we observed to have the lowest incidence of poverty in Section III.

Table 7 presents the results of the multinomial logit estimation. We first examine the direct effects of social group affiliation on occupational choice, independent of indirect effects working through education, demographic factors and land ownership. We find that if the household is of the SC social group, the likelihood of the household being an agricultural labourer household increases by 27.1 percent. In contrast, if the household is of the SC social group, the likelihoods of the SC household being in the 'self-employed, non-agriculture', 'self-employed, agriculture' and 'miscellaneous' occupational types are -6.8 percent, -18.6 percent and -2.8 percent, respectively. Thus, there is a marked occupational segregation of SC households; SC households with the same educational level, demographic characteristics and land ownership as OCC households are more likely to be in the agricultural labour occupational type relative to similar OCC households. A similar pattern is observed for ST households, though not of the same degree of occupational segregation as the SC social group. We find that if the household is of the ST social group, the likelihood of the household being an agricultural labourer household increases by 13.6 percent. In contrast, if the household is of the ST social group, the likelihoods of the ST household being in the 'self-

Table 7: Marginal effects, multinomial logit

Occupational categories	Self-employed in non-agriculture	Agricultural labour	Non-agricultural labour	Self-employed in agriculture	Miscellaneous
Social group: ST	-0.090***	0.137***	0.031***	-0.057***	-0.020***
	(0.006)	(0.009)	(0.007)	(0.008)	(0.004)
Social group: SC	-0.068***	0.271***	0.011**	-0.186***	-0.028***
	(0.006)	(0.007)	(0.005)	(.006)	(.003)
Year 1987	0.001	0.012**	0.028***	-0.028***	-0.014***
	(0.004)	(0.005)	(0.004)	(0.005)	(0.002)
Year 1993	-0.141***	-0.258***	-0.072***	0.533***	-0.062***
	(0.003)	(0.004)	(0.002)	(0.006)	(0.001)
Year 1999	-0.181***	-0.308***	-0.097***	0.664***	-0.077***
	(0.002)	(0.004)	(0.002)	(0.005)	(0.001)
Year 2004	0.069***	0.069***	0.088***	-0.188***	-0.038***
	(0.004)	(0.006)	(0.004)	(0.004)	(.002)
ST*1987	0.013	0.015	0.043***	-0.067***	-0.004
	(0.014)	(0.012)	(0.010)	(0.011)	(0.007)
ST*1993	-0.010	-0.012	0.014	0.003	0.007
	(0.014)	(0.012)	(0.009)	(0.012)	(0.008)
ST*1999	-0.021*	-0.001	0.001	0.019	0.003
	(0.0123)	(0.012)	(0.008)	(0.012)	(0.008)
ST*2004	-0.019	-0.007	0.003	0.016	0.007
	(0.012)	(0.013)	(0.008)	(0.013)	(0.008)
SC*1987	0.009	-0.028***	0.004	0.014	0.001
	(0.010)	(0.009)	(0.006)	(0.012)	(0.006)
SC*1993	0.002	-0.016*	0.012***	-0.015	0.010
	(0.009)	(0.009)	(0.007)	(0.011)	(.006)
SC*1999	0.027***	-0.028***	0.008	-0.016	0.009
	(0.010)	(0.009)	(0.007)	(0.012)	(0.006)

SC*2004	0.019** (0.010)	-0.045*** (0.010)	0.025*** (0.007)	-0.022* (0.012)	0.024*** (0.007)
Age, 26-35 years	0.021*** (0.005)	-0.019*** (0.006)	-0.007** (0.003)	-0.004 (0.006)	0.009** (0.003)
Age, 36-45 years	0.026*** (0.005)	-0.059*** (0.006)	-0.031*** (0.003)	0.024*** (0.006)	0.039*** (0.004)
Age, 46-55 years	0.025*** (0.005)	-0.102*** (0.005)	-0.046*** (0.003)	0.054*** (0.006)	0.070*** (0.005)
Age, 56-65 years	0.017*** (0.006)	-0.152*** (0.005)	-0.060*** (0.002)	0.094*** (0.007)	0.100*** (0.006)
Age, 66-75 years	-0.007 (0.006)	-0.220*** (0.005)	-0.066*** (0.002)	0.082*** (0.009)	0.212*** (0.011)
Household size, 2 members	0.029*** (0.010)	0.063*** (0.012)	-0.036*** (0.005)	-0.001 (0.012)	-0.056*** (0.002)
Household size, 3 members	0.038*** (0.010)	0.077*** (0.011)	-0.024*** (0.005)	-0.020* (0.011)	-0.070*** (0.001)
Household size, 4 members	0.046*** (0.010)	0.077*** (0.011)	-0.026*** (0.005)	-0.019* (0.011)	-0.078*** (0.002)
Household size, 5 members	0.061*** (0.010)	0.054*** (0.011)	-0.024*** (0.006)	-0.012 (0.011)	-0.079*** (0.002)
Household size, 6 members	0.069*** (0.010)	0.031*** (0.011)	-0.018*** (0.006)	-0.008 (0.011)	-0.074*** (0.002)
Household size, 7 or more members	0.093*** (0.010)	0.004 (0.010)	-0.021*** (0.006)	0.012 (0.011)	-0.087*** (0.002)
Land owned, above 0 and below 1 hectares	-0.148*** (0.003)	-0.239*** (0.004)	-0.093*** (0.002)	0.547*** (0.006)	-0.068*** (0.001)
Land owned, above 1 and below 50 hectares	-0.208*** (0.002)	-0.371*** (0.003)	-0.126*** (0.002)	0.788*** (0.005)	-0.083*** (0.001)
Land owned, above 50	-0.253***	-0.438***	-0.152***	0.931***	-0.0883***

hectares	(0.002)	(0.003)	(0.002)	(0.002)	(0.001)
Educated, below primary	0.084*** (0.004)	-0.130*** (0.003)	-0.002 (0.002)	0.004 (0.004)	0.043*** (0.003)
Educated, primary	0.095*** (0.004)	-0.185*** (0.003)	-0.009*** (0.002)	0.022*** (0.004)	0.077*** (0.004)
Educated, middle	0.081*** (0.004)	-0.252*** (0.003)	-0.021*** (0.002)	0.011** (0.004)	0.181*** (.005)
Educated, secondary and higher secondary	0.029*** (0.004)	-0.326*** (0.003)	-0.057*** (0.001)	-0.068*** (0.004)	0.422*** (0.006)
Education, graduate and above	-0.045*** (0.005)	-0.345*** (0.002)	-0.091*** (0.001)	-0.191*** (0.004)	0.673*** (0.007)
Religion, Muslim	0.086*** (0.004)	0.004 (0.005)	.0064961** (.00288)	-0.105*** (0.004)	0.008*** (0.003)
Religion, Christian	-0.044*** (0.006)	0.020** (0.009)	-0.001 (0.005)	0.023** (0.010)	0.002 (0.004)
Religion, Sikh	-0.052*** (0.008)	0.002 (0.014)	-0.046*** (0.004)	0.112*** (0.016)	-0.015*** (0.005)
Religion, others	0.102*** (0.014)	0.016 (0.013)	-0.025*** (0.007)	-0.0850*** (0.013)	-0.008 (0.006)
Predicted probability	0.181	0.343	0.099	0.306	0.071
Wald Chi^2	69003.90***				
Pseudo R square	0.236				
Number of observations	281431				

Notes: a) *, ** and ***: significant at 10, 5 and 1 per cent level respectively; b) Standard errors in parentheses; c) State dummies included; d) All observations weighted by household specific multiplier; e) Reference categories: Occupational category: Agricultural labour; Social group: Others; Year: 1983l Age, 15-25 years; Household size: 1 member; Education: Not literate, Land owned: No land owned; Religion: Hindu.

employed, non-agriculture', 'self-employed, agriculture' and 'miscellaneous' occupational types are -9 percent, -5.7 percent and -2.1 percent, respectively.

There is no clear across-the-board movement out of agricultural labour for all households over the period 1983-2004, as seen by the sign (and significance) of the marginal effects associated with the year effects. While there was a discernible move away from agricultural labour and into the 'self-employed, agriculture' category in 1993 and 1999, this was not the case in 2004, when there seems to be a reverse movement back into agricultural labour (though not of the same magnitude as the movements out of agricultural labour observed in 1993 and 1999). Interestingly, there is no evidence that rural households in India are moving into more diversified income portfolios over time, as the signs of the year dummies for the 'miscellaneous' category are consistently negative for 1987, 1993, 1999 and 2004, compared to the benchmark year – 1983, suggesting instead a move to more concentrated income portfolio. There is also no clear evidence that rural households are moving into the non-farm sector, either as wage labour or in the self-employed category, over time – the marginal effect of a rural household being in the self-employed, non-agriculture category is negative for the years 1993 and 1999, and the marginal effect of being in the non-agricultural labour category is negative for the year 1993.

Our key explanatory variables are the interactions between the year dummies and the dummies for ST and SC social group affiliation. Strikingly, we find that the marginal effects on the interaction terms between SC households and the year effects –1987, 1999 and 2004 – are negative and significant consistently. This suggests that relative to the beginning year of our analysis – 1983 – and relative to OCC households, SC households have moved out of being agricultural labourers over time (when we have already seen that there has no across-the-board movement out of agricultural labour for all households). As we are controlling for other determinants of occupational diversification (including state-level time-invariant factors that may influence occupational diversification across social groups), the interaction terms between SC social group affiliation and year dummies are picking up a clear weakening of the caste system's relationship with occupational structure over time in rural India, and a sizeable movement of SC households out of agricultural labour. In terms of which occupational type SC households are moving into and whether they are moving to the occupations where the incidence of poverty is lower than for agricultural labour, the picture is clear. SC households are moving away from being agricultural labourers into other occupational types and the similarity of the occupational distribution between SC and OCC households has increased over the 21 years of our analysis.

The results on the marginal effects on the interaction terms that capture occupational diversification away from agricultural labour over time are surprisingly different for ST households. None of the interaction terms between ST social group affiliation and the

year dummies are significant for the agricultural labour category, nor is there any sign of movement away or into other occupational types over the period 1983-2004, except a movement away from 'self-employed, agriculture' in 1987 and a movement away from 'self-employed, non-agriculture' in 1999 (relative to 1983). The overall evidence suggests a stagnation in the occupational structure of ST households over the period 1983-2004, with little movement out of 'bad occupations', in contrast to what we have observed for SC households.

Turning to the other determinants of occupational diversifications, households with older heads of households are less likely to be agricultural and non-agricultural labourer households and more likely to be self-employed, either in agriculture or non-agriculture and in the miscellaneous category (though there is a non-linear relationship present for 'self-employed, non-agriculture' with households that have heads of households older than 66 years less likely to be in this category). Larger households are more likely to be in 'self-employed, non-agriculture' and in 'agricultural labour' and less likely to be in 'non-agricultural labour', 'self-employed, agriculture' and in the 'miscellaneous' category. As expected, land ownership is strongly and positively correlated with being in the 'self-employed, agriculture' category, and negatively correlated with being a labourer, either in agriculture or non-agriculture, with self-employment in non-agriculture and with the 'miscellaneous' category. With respect to education, the higher the education level of the head of the household, the more likely that the household will be in the miscellaneous category, and less likely to be in the other four occupational types. Finally, with respect to religion, in relation to Hindu households, Muslim households are more likely to be in self-employment, non-agriculture, non-agricultural labour and the miscellaneous category, and less likely to be farmers, while Sikh households are more likely to be farmers, and less likely to be in non-agriculture (in self-employment or as wage labour) or in the miscellaneous category.

While the marginal effects on the interaction terms between ST/SC social group affiliation and year dummies capture whether the likelihood of an ST or SC household being in a particular occupation has changed over time, and in what direction, presenting the coefficients of the multinomial logit estimates of equation (2) in odds ratios allows us to provide a more intuitive interpretation of the changes in occupational choice over time for ST and SC households that can be directly attributed to their social group affiliation. The odds ratios provide pairwise comparisons of the probability of ST and SC households being in one occupational type versus another and, therefore, allow us to assess whether ST and SC households are moving up the occupational ladder from occupations with higher incidence of poverty to occupations with lower incidence of poverty (as we have seen in Section III, there is a clear rank order in the incidence of poverty across occupational types in rural India that has remained invariant over time).

Table 8: Odds ratios

Odds ratio	ST*1987	ST*1993	ST*1999	ST*2004
1 vs 2	1.375***	0.977	0.887	0.914
1 vs 3	0.747**	0.829	0.879	0.874
1 vs 4	1.375***	0.935	0.831*	0.853*
1 vs 5	1.134	0.860	0.853	0.813
2 vs 3	0.725***	0.848*	0.991	0.956
2 vs 4	1.335***	0.957	0.936	0.933
2 vs 5	1.101	0.880	0.962	0.890
3 vs 4	1.840***	1.128	0.945	0.977
3 vs 5	1.517***	1.038	0.971	0.931
4 vs 5	0.825*	0.920	1.027	0.953
	SC*1987	**SC*1993**	**SC*1999**	**SC*2004**
1 vs 2	1.146**	1.059	1.256***	1.272***
1 vs 3	1.013	0.841*	1.070	0.882
1 vs 4	1.004	1.059	1.215**	1.191**
1 vs 5	1.043	0.887	1.020	0.824*
2 vs 3	0.884*	0.795***	0.851**	0.694***
2 vs 4	0.876**	1.001	0.967	0.936
2 vs 5	0.910	0.838**	0.812**	0.648***
3 vs 4	0.992	1.259***	1.136	1.350***
3 vs 5	1.030	1.055	0.954	0.935
4 vs 5	1.039	0.838*	0.840*	0.692***

Notes: a) Category 1: Self-employed, Non-agriculture,; Category 2: Agricultural labour; Category 3: Non-agricultural labour; Category 4: Self-employed, agriculture; Category 5: Miscellaneous. b) Each cell is a pair-wise comparison of relative probabilities of occupation X vs Y, where Y is the reference occupational type, for a particular year and social group relative to OCC social group and base year 1983. An odds ratio of less than one for a particular cell suggests a higher probability of the ST/SC household being in occupation Y relative to occupation X in that year, relative to OCC households and compared to 1983. An odds ratio of greater than one suggests the reverse.

We present the odds ratios computed from the coefficients of the estimated multinomial logit models in Table 8. The odds ratio presented in Table 8 for any pairwise comparison of occupations for the ST/SC social group – say, occupations 1 vs 2 for the SC social group in 1987 – provides the factor change in odds in being in occupation 1 over the odds in being in occupation 2 in the year 1987 if the household belongs to the SC social group, relative to the benchmark year 1983 and to OCC households. An odds ratio of less than one suggests a higher probability of being in occupation 2 over occupation 1 for the SC social group relative to the OCC social group, and an odds ratio of greater than one suggests a higher probability of being in occupation 1 than in occupation 2, as

compared to the relative probabilities of being in these two occupations for the same two social groups in 1983.

Examining the odds ratios of ST households first, we see that for 1987, the odds ratios for most pairwise comparisons of occupations are significant, and the probability of ST households being in agricultural labour was higher than the probability of being in self-employed, non-agriculture and agriculture, as compared to OCC households and as compared to the base year – 1983 (that is, the odds ratios are greater than one when the reference group is agricultural labour, and less than one when agricultural labour was being compared to other occupational types). However, the odds ratios for the other years are not significant, reinforcing our earlier finding of very little occupational change for the ST social group relative to the OCC social group, especially since 1987. In contrast, in the case of the SC social group, we find that when we compare the odds of being in agricultural labour to odds of being in other occupations, the odds ratios are almost always significant and less than one, and the probability of being in agricultural labour is less than the probability of being a non-agricultural labourer for all the years 1987, 1993, 1999 and 2004, relative to OCC households and the base year, 1983. For example, when comparing the odds-ratio of SC households being in agricultural labour with the reference occupational type – self-employed non-agriculture, the probability of being in 'self-employed non-agriculture' for such households is higher than the probability of being in agricultural labour for the years 1987, 1999 and 2004, relative to OCC households and the benchmark year 1983. When we compare the odds ratio of SC households being in agricultural labour with being in the 'miscellaneous' category, the probability of being in the miscellaneous category is higher than the probability of being in agricultural labour for the years 1993, 1999 and 2004, relative to OCC households and the benchmark year 1983. Therefore, there is unequivocal evidence that SC are diversifying away from agricultural labour faster than OCC households into more remunerative occupations.

We also see a movement away from SC households from agriculture to non-agriculture, whether in self-employment or as wage labour, and to the miscellaneous category, relative to OCC households for several of the years in the period of analysis, with the odds ratios for these years significant and in favour of the alternate occupations. The move from farming to non-agricultural labour for SC households suggests that not all the change in occupational structure for the SC social group could be seen to be welfare-enhancing, as the incidence of poverty is higher for non-agricultural labour as compared to that for farmers. It is also interesting to note that SC households who are agricultural labourers are more likely to be moving into non-farm employment (either as self-employed or as wage labourers) or into the miscellaneous category than into farming. This may be because SC households would face social barriers from the upper castes in attempting to acquire land, while starting a shop, working in the construction sector or being employed by the government as a teacher would face less social impediments.

Why have the SC social group diversified their occupations and not the ST social group?

Our main finding is that over the period 1983-2004, there has been a significant movement of SC households from agricultural labour to other occupations, and this movement can be linked to a significant weakening of the historically given relationship between caste and occupation in rural India, as we are able to capture in our empirical strategy the direct and 'pure' effect of caste over and above other determinants of occupational diversification, where SC social group affiliation may matter indirectly. However, we see no such movement for ST households, who also have a large presence in the agricultural labourer class, from the latter occupation to other occupations in the same period. Why do we not see a similar movement for ST households as we observe for SC households, in view of the fact that social barriers to occupational mobility via the caste system were far more significant for SC households as compared to ST households?

We provide two possible explanations for the asymmetrical outcomes with respect to occupational diversification for SC and ST households. The first explanation is to do with the differences in the geographical location of SC and ST households. Most SC households reside in villages where other castes and social groups are located, while ST households are mostly located in own-populated villages which are in geographically isolated regions of Indian states (often adjacent to or within forests) (Banerjee and Somanathan 2007).[16] The possibilities of occupational mobility that were opened up by increasing commercialisation and mechanisation of agriculture brought about the Green Revolution, along with the growth of non-farm rural employment evident in India in the post-1980 period, were more pronounced in the villages in which SC households resided, which were located close to large towns or in agriculturally dynamic regions (such as Punjab) (Jodhka 2004). In contrast, the geographical isolation of the villages in which ST households resided along with the poor agricultural potential of these villages that limited the possibilities of mechanisation and commercialisation did not allow them to take part in these processes of rural change (von Fürer-Haimendorf 1982). Consequently, ST households were constrained in their ability to move into non-farm employment and into more diversified income earning and out of agricultural labour, as compared to SC households.

A second possible explanation of why SC households have been more able to diversify out of 'bad' occupations than ST households lies in the political economy of public goods

[16] For example, Iversen et al. (2010) find that ST households were the largest land-holding group in 93 percent of villages where they were the largest population group. In contrast, the SC households were the largest land-owning group in 35 percent of villages where they were the largest population group. The geographical isolation of ST households has also been found to be an important factor behind their higher poverty (as compared to OCC households) by Gang, Sen and Yun (2008) and Kijima (2006).

provision in India. Using data on public goods and social structure from parliamentary constituencies in rural India, Banerjee and Somanathan (2007) find that there are asymmetries in public good provision by social group, with systematic under-provision of public goods in areas populated by ST households, while areas with higher SC presence were associated with increased public goods provision. In particular, there was significantly less provision of electricity, phone connections and paved roads in areas where there was a large ST presence. Since these are public goods that are important in the growth of the non-farm rural economy, the under-provision of such public goods in ST-dominated parliamentary constituencies could have led to weaker non-farm employment growth in these areas, limiting the possibility of occupational diversification for ST households. Banerjee and Somanathan argue that the asymmetry in under-provision of public goods is due to the ability of the SC to politically mobilise themselves and create an independent political presence in many states, in contrast to the inability of the ST to do so. Supporting evidence for this hypothesis is provided by Pande (2003), who finds that mandated reservation of seats in state legislatures for the SC and ST led to an increase in job quotas in the public sector for the SC but not for the ST, and by Jaffrelot (2003), who argues that the formation of governments by political parties led by politicians in the 1990s in Northern Indian states led to increasing provision of jobs for SCs and other backward castes in the public sectors of these states.

VI. Conclusions

Poverty rates among rural Dalits [Scheduled Caste (SC)] and Adivasis [Scheduled Tribe (ST)] households are significantly higher than among ‘forward caste’ households. A key contributory factor is occupational structure – most SCs are employed as agricultural labourers, an occupational grouping which has by far the highest incidence of poverty in rural India. The high prevalence of agricultural labour among SC households can be traced in part to the Indian caste system, which is a social order with hierarchically ordered occupational types, with the SC social group clustered in occupations that were the least well paid and most degrading in terms of manual labour. Since independence, the Indian government enacted large-scale affirmative action policies in educational institutions and public sector employment to help provide routes out of poverty for SC and ST households. In addition, there has been an emergence of political parties that are strongly pro-SC in their orientation in the more populous states of India. We examine the determinants of occupational diversification with multinomial logit models and a pooled data-set combining the five waves of the Consumer Expenditure Surveys of the NSSO, with households as our unit of analysis, to assess whether these political and social changes has led to a weakening of the relationship between low caste status and occupational segregation that has existed historically in India. We conduct our empirical analysis both for SC and ST households, comparing them with the non-scheduled population, which we call Other Castes and Classes (OC). Our empirical strategy

identifies the direct effect of caste/tribe identity on occupational segregation over time, separate from other indirect routes by which caste status may determine occupational structure, and from other determinants of occupational choice, such as education, land ownership and demographic characteristics of the household.

We find that there is a discernible direct effect of caste identity on occupational diversification, and this effect is observed all through the 1980s to the early 2000s. In particular, SCs are able to move out of the occupation which has the highest incidence of poverty, which is agricultural labour, at a greater pace than the OCCs. This leads to a convergence in occupational types between these two social groups over time. We also find that much of the movement away from agricultural labour has been to self-employment in non-agriculture and to the more diversified income portfolios, rather than into being farmers, where both economic and social barriers to land acquisition may still be strong. In contrast to the positive story emerging for SC households, we see no direct effect of ST identity on occupational diversification, with ST households remaining in high numbers in agricultural labour, and with very little convergence in occupational structure for these households with OCC households in the period 1983-2004. We surmise that the asymmetrical outcomes of SCs and STs on occupational convergence with the OCC households may be related to locational differences between SCs and STs, as well as political economy factors relating to greater political mobilisation of the SCs versus the STs.

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